ICE YACHTING.

[SEE FRONTISPIECE.]

There is no sport, the excitement of which is so thrilling and whose records of speed so wonderful as that of ice yachting. Ice boats are to be found on the lakes and rivers of our Northern States, but their favorite cruising ground is on those great expanses of ice on the upper and middle Hudson. Here the principal ice yacht clubs are located, and the traveler often may catch glimpses of them from his car window as far south as Nyack and Tarrytown.

The ice boat, like the catamaran, is a racing machine, pure and simple. Its hull (if the few timbers forming that spider-like structure can be so called) is put together in such a manner as to obtain the greatest possible strength consistent with lightness.

Every village along the great river appears to have a few of these boats, but whether made by the boys, who nail a few boards together, with a bean pole for a mast and a blanket for a sail, to the gentleman whose mighty flier rejoices in plated hand rails, inlaid cockpit, and buffalo robes, the same principle of construction prevails, namely, a triangular frame with two widely extended runners abreast of the mast, and one astern which does duty as rudder. Some use the plain cat rig, some the sloop, with short, low, slanting gaff and long boom, and the single yard lateen has also been tried.

The season for the sport rarely lasts over thirty days, and some winters afford but a week of good racing weather. Of course there are many fine days scattered through the season, which the individual ice boat enthusiast watches for and takes prompt advantage of. The main obstacles to the sport are light winds, rough ice, and snow, and it is a delightful sight after a spell of bad weather to see the eagerness with which the devotees to the sport launch their fairy craft and fly over the river with their snowy wings. On pleasant afternoons, when the wind is not too strong, one can often see many a family party out for an airing on the dainty craft, which glides smoothly along as if conscious of the necessity of extreme caution in all its movements; but when the whistling west wind whirls down the mountain side and sweeps across the bay, what a change is there in the actions of that same craft! How she darts about like a frightened bird, shivering and trembling up into the wind, now paying off and darting away again, seeming to leave the ice, then fading away and dropping out of sight like a feather on the gale! And when with wind abeam, and in a race, with her competitor close at hand, how madly she rears and holds tremblingly aloft the man perched upon her windward runner, as if intent upon shaking clear of her burden and flying into the air!

Nevertheless, accidents are rare, and it is seldom that any more serious harm comes to the sportsman than a thorough ducking or a frost bitten hand or nose. The most serious accidents occur from collisions where the boats meet on opposite tacks, or when one, stopped suddenly by some unforeseen obstruction, is run into by another too closely following its course. Ladies are often keen participants in the sport, and take their share of its dangers, as in a recent instance off Poughkeepsie, where two were riding, one on each runner, when the ice suddenly gave way and precipitated one of them into the river. The accident happily resulted in nothing serious.

The authentic runs of some of these boats are really marvelous. The swiftest express trains are frequently overtaken and passed as if they were at rest. A mile a minute is often made by the fliers. Longer distances at this rate are not often recorded, on account of the fitfulness of the wind and the impossibility of getting perfectly smooth ice for a long distance. Under perfectly favorable circumstances and for short stretches these boats have probably flown at a rate as high as ninety or a hundred miles an hour. The distance between Poughkeepsie and New Hamburg is nine miles. The Snow Flake, 44 ft. 10 in. length, owned by Mr. Rogers, has made the distance in seven minutes. In 1872 the yachts Haze, Snow Flake, and Snow Squall sailed to Albany on one day and returned the next. In 1882 the Haze made nine miles in seven minutes, at times making two miles a minute. In 1879 the Comet, Phantom, Zephyr, and Magic sailed together ten miles in ten minutes, and most of the time the gale hurled the boats till their windward runners were at an angle of 45°.

A gentleman of Poughkeepsie wishing to speak to his brother (who had started on a train for New York) concerning some business of importance, jumped on his ice boat, caught up with and passed the train, and reached the depot at Newburg in time to meet and accomplish his object. The winning boats since 1869 bear such speed suggesting and wintry names as Haze, Arctic, Hail, Restless, Snow Bird, Æolus, Phantom, Avalanche, Jack Frost, Zig-Zag, Whiz, and Icicle. The latter is the largest ice boat on the river. She is owned by Commodore John A. Roosevelt. Her dimensions are as follows: Extreme length from end of bowsprit to main boom, 68 ft. 11 in.; length of frame, 29 ft. 3 in.; width between runners, 25 ft. 7 in.; area of sail, 1,070 square feet; hoist of main sail, 22 ft.; length of boom, 42 ft.; gaff, 42 ft. 9 in.; hoist of jib, 28 ft.; on jib boom, 23 ft. 6 in.; on stay, 23 ft; total weight of yacht, 2,360 lb.

A ride on one of these boats at full speed is most exhilarating, producing a sensation as of flying through space, a feeling as of delightful buoyancy, once experienced always to be remembered.

ONE of the surest remedies for destroying buffalo carpet bugs is benzine, if thoroughly applied.

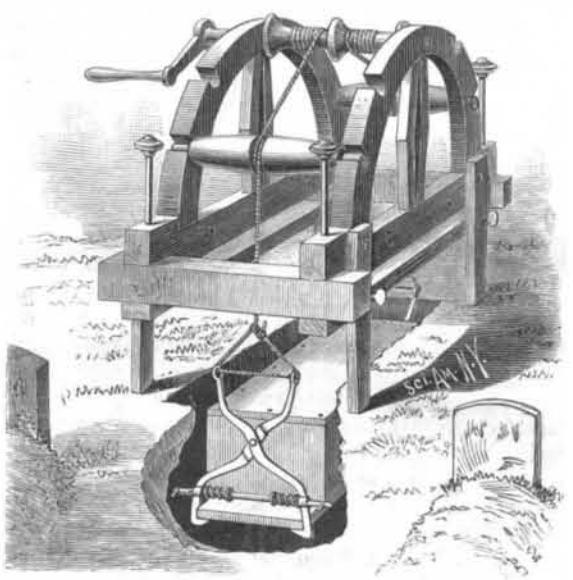
Pleasing Experiments with Glass Tubes.

A most remarkable phenomenon is produced in glass tubes placed in certain circumstances. When these are laid before a fire in a horizontal position, having their extremities properly supported, they acquire a rotary motion round their axis, and also a progressive motion toward the fire, even when their supports are declining from the fire, so that the tubes will move a little way upward to the fire. When the progressive motion of the tubes toward the fire is stopped by any obstacle, their rotation still continues. When the tubes are placed in a nearly upright posture, leaning to the right hand, the motion will be from east to west; but if they lean to the left hand, the motion will be from west to east, and the nearer they are placed to the upright posture the less will the motion be either way. If the tube be placed horizontally on a glass plane, the fragment, for instance, of coach window glass, instead of moving toward the fire it will move from it and about its axis in a contrary direction to what it had done before; nay, it will recede from the fire, and move a little upward when the plane inclines toward the fire.

These experiments succeed best with tubes about 20 to 22 inches long, which have in each end a pretty strong pin fixed in cork for their axis.

IMPROVED BURIAL WINDLASS.

A strong bench, of longer and wider dimensions than the horizontal measurements of a grave of the largest size, has four legs pivoted to the frame so as to fold up against the sides when the bench is being carried about or stored away. The legs are provided with thumbscrews, which hold them in either a folded or open position. On the top of the bench is an arch-shaped frame of two parallel beams spanning the frame from end to end and suitably connected to it. At the crown of the arch is a rope drum, having a crank for turning it, and having cords extending each way from its respective sides along the arch and over rollers mounted on the outer sides of the arch, to guide the ropes for being raised



McDONALD'S BURIAL WINDLASS.

and lowered at the ends of the grave. From the cords are suspended grappling tongs, so pivoted and connected to the cords that the weight causes the hooks to gripe firmly. The board on which the coffin rests is grasped by the hooks. When the coffin has come to reston the bottom of the grave, the tongs are disconnected by springs placed on a bar passing through each leg, which press the legs apart. Until the coffin is ready to be lowered the legs are kept a certain distance apart by means of pins which are passed through the bar outside of the legs. The pins are then shifted to other holes in the bar, sufficiently distant from the hooks to allow them to escape from the board by the pressure of the springs when relieved of the weight of the coffin. Series of bearings are made in the arch, so that the rollers can be shifted from one position to another, according to the length of the grave. The construction of the windlass and tongs and the arrangement of the rope will be readily understood from the engraving.

This invention has been recently patented by Mr. John P. McDonald, of Litchfield, Illinois.

Color in Electro Gilding.

It is of the greatest importance to possess a knowledge of the art of regulating the current and general working of hot electro gilding liquids, so as to make the process useful in producing not only deposits of gold, but those of any desired color.

As a general rule, it will be found best to obtain any excessive color by additions to the bath, and not by attempting to work it up to this by the current or temperature. Thus, to obtain red or green gold of decided color, it will be necessary to make additions of acetate of copper and nitrate of silver. But if it is not required to perpetually gild in this color, or at least until all the added metal is worked off, the bath will be spoilt for ordinary gilding. It is, therefore, always wiser, when excessive color is required, to either make up a separate solution for that particular color, or to make the main bath up in that manner if the work is always to be carried on.

To make up a bath for red gilding, grind a little of the acetate of copper (crystallized) to powder, dissolve in water, and add to the bath, with stirring, every evening as much as may be required. In a new bath, where there will be no troublesome sediment to disturb, the addition may be made at any time, and the quantity augmented if the color is not sufficiently deep. It must not be forgotten, however, that gold so colored is not so fine as a yellow gold. Attention should be given to some of the directions which follow, so that the battery power and temperature may be regulated to assist in the production of deep color, it being important that too many foreign substances be avoided in a good bath.

To obtain green and white gilding the addition is a solution of the crystallized nitrate of silver. This is added in the same way as the copper. A very little (a few drops) will generally produce green gilding, and a little more, white.

To deposit a gold of pink appearance is a more troublesome matter. The surface is first coated yellow, then thinly red, and over this is produced an exceedingly thin coat of silver in a silvering solution. Such surfaces are very lasting, and should be burnished.

A good cyanide gilding solution should be of sufficient strength to allow of its producing from a pale and poor looking deposit to a deep and nearly red rich gold. For such purposes the solution may even contain as much as 1½ ounces of gold per gallon, but over this it is not advisable to go, for the reason that the paler tints are not readily obtainable. The poorer solutions will produce fairly pleasing tints when the current is strong and the temperature high, but the darker shades are very apt to have a dingy appearance, instead of that mellow and clear surface which is the chief aim of the practiced gilder.

A dead gilding will be produced by the addition of a little of the fulminate of gold in solution to the bath immediately before gilding, or dip the articles (brass and copper) before gilding in a mixture of sulphuric and nitric acids.—*Watchmaker.*

The Old Mohawk and Hudson Railroad.

Some interesting particulars of this road are contributed to the New York *Times* by W. W. Crannell, of Albany, N. Y.

The first railroad constructed in this part of the country was the Mohawk and Hudson Railroad, extending from Albany to Schenectady. The work on the road was commenced in 1830 and completed in 1833. It was constructed with an inclined plane at each end of the road; the one at Albany a little more than half a mile in length, and both of them having a rise of 1 foot in 18. The road was laid out about 16 miles in length, 6 of which were at a level, and the rest of it, with the exception of the two inclined planes, had an ascending grade of about 1 foot in 250. The width of the excavations was 36 feet, that of the embankments 26 feet. The deepest excavation was 47 feet, the highest embankment 44 feet, and the greatest altitude above tide water at this city, 353 feet.

Stone blocks laid on broken stone were placed 3 feet apart, from center to center, and cross sleepers of wood, 7 inches in diameter and 8 feet long, rested upon them, supporting the timber rails, on which were placed iron bars, ⅝ by 2½ inches, with the upper corners rounded to 1½ inches in width. The width between the rails was 4 feet 9 inches. The capital stock was fixed at $300,000, with permission to increase the same to $500,000. When the road was completed it was found to have cost $1,100,000.

In July, 1831, the locomotive De Witt Clinton arrived, at which time the road was completed for 12½ miles. Although the locomotive was found to be defective, it made the run over the completed road in one hour and forty-five minutes. An English locomotive, called the Robert Fulton, of double the power and weight of the American engine, was procured in September. The vehicles for passengers were built at the factory of James Goold, in this city, and were mere stage coach bodies placed upon trucks and supported upon thorough-braces, in the manner of stages, and capable of carrying about fifteen passengers each.

The time when the directors of the road felt prepared to crown the success of their labors by a grand excursion was on September 24, 1831. The Governor of the State, the mayor of the city, the editor of the *Journal*, the editor of the *Argus*, Billy Winne, the old penny post, and other distinguished and representative citizens were invited to celebrate the great event. There were five cars crowded with guests, and there was a crowd of spectators to see them off.

The greatest man on the train, in his own opinion, was the English engineer; but, alas! the English engine balked; there was some trouble with the feed pipe. The editor of the *Journal* suggested to the editor of the *Argus* that they borrow a horse whose feed pipe was in order. A man in the crowd shouted, "Give 'er a peck of oats, boss;" another cried, "Twist her tail;" and still another suggested that they "turn the wheels to start her off." After waiting until noon, the De Witt Clinton was substituted, and started off with a train of three cars, the remainder of the party following in the two other cars drawn by horses. After partaking of a late dinner in Schenectady, the locomotive returned with the entire train of five cars in thirty-five minutes. The American was now called the Brother Jonathan and the English engine the John Bull, and great was the talk of the superiority of American over British mechanism.

The Patentees' Rights Endangered.

A correspondent in the New York *Times*, referring to the obnoxious bills recently passed in the House of Representatives, the text of which was printed in the last issue of the SCIENTIFIC AMERICAN, justly confirms what we have said would be the serious consequences to patentees and patent property if the measures should become the law. The provisions in these bills are of a most dangerous and pernicious character, and so unusual in their scope that it is doubtful if the Supreme Court would not adjudge them unconstitutional.

Adopting the language of the *Times* correspondent, we proceed to state substantially what has appeared before in these columns on the same subject.

The bills provide that no damage shall be recovered for an infringement where, upon the trial, it shall appear the defendant was a mere user for his own benefit of an article purchased in open market, without notice that the same was subject to patent. An inventor suing for an infringement can only know at a trial if he will have a heavy bill of costs to pay for suing an infringer. A person owning a patent has not the same right that a person owning a bundle of rags has. A wrong doer may take away from him the exclusive right to his discovery, but cannot convert a bundle of rags purchased in open market. A greatly improved or perfectly adapted article bears on its face the result of study and invention, and nine out of ten thinking men would presume it was worthy of a patent, so that it carries with it actually, if not legally, a notice of its being the intellectual property of some one sufficiently to put any ordinary, careful man on his guard, as much so as though the tags of an owner were appended to it.

Would a man have the right to your horse simply because he did not know it was yours and had bought it in open market? Is this the exercise of the power conferred on Congress to promote the progress of science and useful arts by "securing to inventors the exclusive right to their discoveries"? Let inventors and manufacturers apprise their representatives in Congress personally and by letter of the dangerous and hostile character of such legislation. Such suits every lawyer knows are extremely rare. Who sues for such small damages? But it is in effect a bill for aiding infringers while pretending to protect innocent users. It is a dangerous sham and an entering wedge to hostile legislation.

Meat for Chickens.

We do not think that we can be mistaken in the belief that we should be far more successful in the raising of young chickens by giving them a great deal more animal food than we are in the practice of doing. Corn meal mush, boiled potatoes, and similar substances generally compose, as we all know, the principal food of young chickens; but we can see no reason why these young birds should be exceptions to the ordinary rule of young birds in general, which feed very largely, indeed chiefly, on animal food; even those which, when they are mature, live mostly on fruits and seeds, are fed when in their nests on worms, grubs, and insects. We notice the old birds all day long busily engaged in supplying their young with food, but always with animal food. In fact, it is very rare that we have seen anything else. Why, then, should chicks be an exception?

The recommendations, almost without exception, in our poultry publications are to give more animal food to our grown fowls if we expect them to give us more eggs, especially in winter, when they can help themselves to none. That it is a great inducement to make them lay more generously, we have too many proofs to admit of any doubt. Besides, it is claimed that animal food has other advantages in the way of good health, etc. Why, then, let us ask again, should the young chickens not be benefited with at least a moderate supply of animal food? All chicken raisers know the great losses always suffered in the growth of them, and may it not be owing to a large extent to the withholding entirely of this strengthening food, which is of so much benefit to the matured bird? We, therefore, suggest to our farmers to change their method of feeding their young chickens by giving them a due proportion of animal food, chopped up in very small pieces, and thus find out, each one for himself, whether it is not a very decided benefit in raising to maturity an additional number of the chicks into strong, healthy fowls.—*Germantown Telegraph.*

High Heels.

Since the high heel made its appearance, medical men have more than once borne witness to its bad effects. The late Mr. Hilton condemned it. Others have done the same. Of late years public opinion has done away with certain of the long established extravagances of dress, and has given rise to methods more agreeable to the symmetrical development of the body. We hope that in the process of reform the feet, in which too often vanity pays a price which is dangerously expensive, will not escape notice. The evils of the high heeled boot or shoe are due to the fact that it is an essentially badly fitting article. It is made in defiance of the relation which it ought to bear to the anatomy of the foot, and to the direction in which the pressure of the body weight falls upon the latter. Hence the peculiarly cramped walk of ladies of the present day. Any one may observe the consequences of the "advanced position," nearly under the instep, and the increased height of heel in the substitution of a forward inclination of the body, and a trip suggestive in a measure of the stumbling gait, for the upright carriage and the free and graceful swinging movement natural to the leg in walking. These matters as far as they are merely relative to deportment do not strictly concern us, but there are attendant circumstances which deserve comment. The boot or shoe, in order that it may not shift on the foot, which has lost much of its usual purchase of direct downward pressure, must hold it firmly and even tightly, and in particular it is necessarily constructed so as to hold with undue firmness just above the back of the heel. With some persons perhaps no inconvenience results, with others, who have fine skins, chafing is readily produced. This is in itself a trifle, and is presumably altogether too inconsiderable to affect the will of fashion, but it may nevertheless be the slight beginning of graver troubles. Probably there is no practitioner fairly long acquainted with town practice who cannot recall a case or cases in which extensive inflammation of the leg with abscess formation has followed even such a slight abrasion, and the exciting cause, when looked for, was discovered in the patient's shoe. There have even been instances, fortunately rare, but still occasional, where abscesses arising round some neglected trifle of this kind have ended fatally. These are facts which cannot be denied and should not be overlooked; but even if they could, is there any woman with a mind of her own who will say that the dainty step so much desired by some, bought as it is at the cost of healthy muscular exercise, is not overvalued? We rather hope that the honest feeling and the sound judgment which have guided that sex in many better purposes will ultimately overcome the false sentiment which now leads certain of its members to support an unbecoming and injurious custom.—*Lancet.*

Difficulties of Building in Winter.

Limes and cements are liable to injury from frost if not thoroughly set or sufficiently hardened, the line of demarkation between setting and hardening being by no means clear, although said to be determined by the loss of plasticity. When this is quite lost, however, crystallization has ensued, and consequently hardening, though not to its full extent. Besides, what becomes of the phrase "setting hard," if mortar does not harden until after it sets? Evidently another term is required to denote ultimate induration as opposed to the hardening acquired by crystallizing. Lime mortar has been known to set so extremely hard that it has defied all fair means to injure it when only two days old. Frost does not usually penetrate into mortar joints to a greater depth than half an inch, or thereabout, and common pointing that will never indurate (however picturesque it may be made to look with lamp black or otherwise) is chiefly affected by it. This sort often stands when frozen, but peels or scales off when thaw sets in. Perhaps few incidents have caused more bickerings between builders and their supervisors than the failure of pointing from frost, and this because the contract has not enjoined that the work was to be delivered up complete and sound with all damage or imperfections that may have arisen during its progress repaired, rectified, and made good. Pointing executed with strong lime and little sand well troweled and consolidated by pressure into the raked out, cleaned, brushed, and wetted edges of the bricks is, like a good struck and cut joint, more adapted to remain unimpaired during a severe winter than a tuck pointed joint, however accurately trimmed. When not brought to a smooth, impervious face, joints remain porous, and are in danger of disfigurement from frost. A like disaster may happen when they are not weathered to throw off water, or through an exudation of the water of crystallization occurring during a freezing temperature. The porosity of Portland cement induces stucco made therewith to flake and peel off in frosty weather if cracked or laminated through careless admixture or rendering. This cement retains in setting a considerable portion of the water used in bringing it to a paste, and notwithstanding that it sets quickly and parts with all superfluous water, it takes months to indurate and dry.

Frost is doubtless particularly detrimental to all green work, which requires, therefore, efficient protection in the shape of boards, straw, and such like coverings. External work must not be proceeded with during frost, nor while frost is in the materials. In the one case there will be upheaval followed by collapse, and in the other destructive settlement. Buildings, however, already roofed in can be advanced during frost by stopping doors and windows with screens and lighting fires. Concrete, which plays so important a part in the stability of structures, should never be made in frosty weather. In spite of this fundamental precept some imagine that it can be done with impunity, because hot lime will take the frost out of the ballast, without reflecting as to the effect on the ultimate hardening its rapid rate of cooling may exercise. Concrete made in temperate weather, and exposed to frost, sometimes shows minute cracks on its surface that are the result of contraction; but these are too insignificant to interfere with the permanent expansion of concrete properly prepared with hot lime or cement, and which, by its great lifting power, affords so splendid a means of underpinning. Portland cement concrete compounded in frosty weather suffers a retardation in setting, and, consequently, its perfect cohesion may be fairly suspected when it eventually consolidates.

It would thus appear that in addition to its powers of weakening, disrupting, and gnawing, frost furthermore affects building materials by squeezing them as far as its severity will permit. It is also evident that the divergence in their relative loss of bulk, through contraction, is too trifling—excepting in the case of continuous girders, etc., unprovided with expansion arrangements—to produce anything like dislocation when mixed up in a building, and attaining, or not, an approximately equal temperature. The sensation of cold, which is misleading, would give the idea that such an attainment is impossible, since stones and metal feel so much colder than timber. All inert bodies, however, exposed to the same temperature, acquire it within a reasonable time. There are, of course, instances where an even temperature is never reached, as in the case of chimneys, etc., presently noticed. As to the motion superinduced by contraction and expansion, slight as it is, it no doubt produces countless fine cracks or threads in masonry and mortar joints, and perhaps helps to explain why old work can be lifted off sometimes piece by piece, or taken down with so much ease. The necessity of screwing and bolting the parts of large clock frames so strongly and tightly together would not be so apparent were tower walls motionless. In habitable structures, parts of chimneys, rooms, etc., or of the same constructive piece, its interior, ends, and sides, for example, are unequally, irregularly, or intermittently warmed and chilled day by day, and all the year round, throughout a wide range of temperature, whereby another class of cracks arise that are wrongly attributed to settlement, imperfect seasoning, inequality of bearing, etc., according to the nature of the thing affected, but which reach their maximum by the aid of frost. Then there are other points, such as the rate of cooling, specific heat of materials, etc., besides the puzzling question why foundations are left like buried pipes to go with the ground, whereas the superincumbent walls and what they carry have ample room, though no facilities for motion similarly to iron rails, girders, ribs, or piping provided with elongated bolt holes, expansion joints, sliding joints, or friction rollers, as severally required. Thus the whole subject of the total debilitating effect of frost on a building becomes very complex.—*Building.*

Postal Facilities in Germany and France.

Some comparisons are made by *Le Génie Civil* between the cost and character of domestic postal service in Germany and in France, which are of special interest to us Americans, just beginning, as we now are, to dream of emulating the convenience, security, and cheapness with which transportation of this kind is performed abroad. In regard to simple letters, it seems that the postage on those circulating within the country is, for those weighing less than half an ounce, two and a half cents in Germany, and three cents in France; the rate in both cases being higher than the new rate here. With letters of more than the standard weight there is, however, a very great difference between the German practice and that of other nations; thus in Germany a single rate of five cents pays for the transportation of any letter more than half an ounce and less than eight ounces in weight; while an eight ounce letter in France would require to be prepaid with fifty-one cents' worth of stamps, and in the United States with thirty-two cents' worth. Postal cards cost in France two cents each and in Germany about one cent and a quarter; and sealed postal cards, at the same price, have just been introduced into the latter country. Postal orders, which cost in France twenty-five cents for the smallest sum, are in Germany only one-fifth as much, and in the latter country an extra payment of one cent entitles the sender to have the money carried by the postman to the house of the person addressed, and there paid to him. In the same way, the postmen are obliged to receive money from any one who wishes to send a postal order, and give a receipt for it, entering at the same time in a book the name of the person to whom the order is to be sent; and the postmaster then makes out and forwards the order required. A species of missive used in Germany, but nowhere else, so far as we know, is the express letter, which, for an extra postage of six cents, is forwarded to the person addressed without passing through the post office of the town in which he lives; a messenger, who travels on every mail train, taking the letter immediately on the arrival of the train, either by day or night, to the house of the one it is intended to reach. As the boxes in the stations are open to receive letters until one minute before the departure of the train, an express letter of this kind can be transmitted very quickly.—*Amer. Architect.*

A Wonderful Bell.

The temples at Kroto, Japan, says a correspondent of the Philadelphia *Press*, are mainly of interest on account of their great bell, which swings in a monster wooden belfry half way up the hillside, back of the buildings proper. This bell is a huge bronze cup with nearly perpendicular sides and a flat crown, and, like all other Japanese bells, is sounded by means of a huge beam kept in place by ropes, but, when occasion requires, brought against the rim of the bell with great force. It requires twelve coolies to manipulate this beam. Formerly it was only rung once a year, but now it may be heard two or three times every month. It is one of the greatest wonders in Japan. It is 18 feet high, 9½ inches thick, 9 feet in diameter, and weighs nearly 74 tons. It was cast in a monster mould in the year 1633. As the bell was cast with the rim up, the gold entering into its composition—computed to be about 1,500 pounds—sunk to the crown. It has a magnificent tone, and when struck by the open palm the vibrations may be heard at a distance of one hundred yards.