

son two feet, and the sharp caulkers do not give one inch surface for it. Ice also is very different in its strength when formed in excessively cold weather; it is then flinty and brittle, cracks easily and requires some days of milder weather to make it bear well. This is one of the mysteries of the formation of ice. I have resided many years on Newburgh bay, and the matter of crossing it in winter either for business or pleasure is of some importance. Six inches of good ice is safe for a tun load on a sleigh, and for a few days safe for a wagon. A valuable team of horses was lost last winter with a load of 1,500 lbs. of coal on a wagon. The ice was six and one-half inches. A drove of cattle running too much together broke through ice measuring ten and one-fourth inches, in 1864. In very cold weather the water, where ice is formed, goes down to thirty-two and one-fourth degrees and is the same temperature at any depth. This year I have not seen it lower than thirty-two and one-half. When it rises to thirty-three the ice melts rapidly. Many years since a heavy gun was run over from West Point to Cold Spring, and the thickness of ice was published, I think, in the *Franklin Journal*. I have made many experiments on the ice and temperature of the water, and if interesting to your readers, will be pleased to give them to you.

W. H. DENNING.

Fishkill, N. Y., March 27, 1866.

[Definite information like this is always acceptable to us, and we are obliged to our correspondent. As the maximum density of water is 39.2°, we think it must be in exceptional cases only that it will be found at 32.25° at all depths.—Eds.]

#### The Cigar Steamer.

Messrs. Editors:—In No. 13, current volume, of the *SCIENTIFIC AMERICAN*, you comment upon the form of Winan's cigar steamer as follows:—"If the vessel was to be wholly submerged, the form would be excellent; but as she is to float at the surface, the submerged portion only will act upon the water, and it seems to us that the form of that portion is very badly calculated to overcome the resistance of the water."

May I trouble you for an answer to a question, relative to the same? If that form of hull is excellent when submerged, and subject to increased resistance from the water, why should it not be excellent when only half submerged with less resistance?

All aquatic fowls when swimming have an unequal immersion of body. No person will deny that their buoyancy is perfect, and speed very great, comparatively.

R. B. S.

Sing Sing, N. Y., March 22, 1866.

[If the cigar steamer was cut in two at the surface of the water, is it not plain that the lower slice—the submerged portion—would have a form entirely different from that of the whole vessel? If this submerged portion had a square house built on it, or a cabin with vertical sides, or any other form of superstructure, its power, in a smooth sea, of overcoming the resistance of the water, would be just the same as with its present spindle-shaped upper works. The best form for pushing the water aside is a wedge with a vertical edge; and the sharper the wedge the better. In the cigar model the several wedges that make up the bow under water, have rounded ends, and they are not so acute in proportion to the relative length and width of the vessel as in ships of ordinary construction.—Eds.]

#### Cold Cast Iron on Melted Cast Iron.

Messrs. Editors:—I have noticed the question repeatedly, why cold cast iron will float in liquid or melted cast iron.

I tried one experiment on the same by taking probably a pound, filed it bright, and removed all the sand and scale, and it sank like a stone in water. Shrinkage is about an eighth of an inch per foot, consequently sand and scale is buoyant enough on small castings to float.

DANIEL ZUERN.

Shamokin, Pa., March 28, 1866.

[Was not the piece of iron dropped from a considerable height, so that the momentum carried it under, and did it not rise immediately to the surface? Dr. Parmelee, of this city, tried a piece weighing thirty pounds, made perfectly clean, and it floated.—Eds.]

#### Lottery and Gift Swindles.

Messrs. Editors:—Does it not become your duty, through your widely-circulating journal, to give the public warning against the fraud and deception now being perpetrated by a company or companies of lottery dealers in your city? Honest, hard-working, poor men are becoming the dupes of their nefarious swindling. The agents of these lottery managers send out their circulars and list of prizes to be drawn in their "scheme," to individuals whom they designate as chosen by them to aid in their enterprise, offering them a carefully selected package for ten dollars, and binding themselves to pay two thousand dollars to the individual should his prizes fail to draw that amount. Who would refuse so good an offer from responsible men doing an honest business? The writer has received such a circular and proposition, but has not yet sent the ten dollars. Shall I send?

Respectfully,

J. C. R.

Grand Rapids, Mich., April 2, 1866.

[We answer, yes—send on your ten dollars. If you have not good sense enough to discover the cheat, after you have sent the ten dollars you will find out by experience what you may never learn from the advice of others.]

We are constantly receiving inquiries similar to the above, and with a view to see what could be done to break up such frauds upon honest and unsuspecting people we called upon Mayor Hoffman, who assured us that he had done all in his power to suppress them, and had warned the public through the newspapers to take no notice of such circulars when received. In spite, however, of every effort these lottery and gift swindles still flourish, and always will flourish until people learn the common-sense fact that when an advertiser promises to return two dollars for one, he simply means to swindle. If people will be galled by such transparent frauds, there is no hope of our enlightening them upon the subject. The carefully-selected package to which our correspondent refers as being offered for ten dollars, in all probability could be purchased for a dollar of any honest tradesman, of which class there are thousands in this city. But swindles take better with some people than honest dealing, there seems to be a sort of charm about these bogus operations.—Eds.]

#### A Sawyer Answered.

Messrs. Editors:—Having had some experience in making and running circular sawmills, I should answer the questions of "F. M. E." in the following manner:—Place the saw from the center forward parallel with the carriage, provided that does not throw it off more than one-thirty-second of an inch on the back side. Give the mandrel one-sixteenth-inch end play, and do not try to run the saw at a speed much above what you can maintain through the log, carrying from three-fourths to one and one-half inch feed. Place the guides as high as they can be. Now take hold of the pulley and pull the mandrel endwise until the collar strikes the box; then set up the guide on that side so as to crowd the saw a little; then pull the mandrel the other way, and set up the other guide the same. Have the play between the guides less than the end play of the mandrel. To joint the saw use a piece of grindstone, and run the saw fast; then it will not saw into the grindstone. I always leave just a shade of this jointing on the points of the saw teeth. File the teeth about one and three-fourth inch long on the under side, and have that side on a line that would cut off one-fifth of the saw. File the top of the tooth one and three-fourth inch from the point on a line to strike the point of the next tooth behind. I use an upsetting tooth to bring out the corners of the teeth as they wear off. Each side of the saw needs to be exactly alike, both as to set and angle of filing. Do most of the filing on the under side, and never turn a feather edge; better leave the tooth a little dull; the saw will not run so long, and soon gets out of round. Push the file the whole length with a straight and strong but slow motion. Any cutting edge on hardened steel cannot stand much speed.

TAYLOR D. LAKIN.

Hancock, N. H., April 2, 1866.

[What is the object of giving end play to the mandrel? Where it is done the saw has to do what the shoulders of the mandrel should.—Eds.]

#### A Magnetic Safe.

Messrs. Editors:—Please explain the following

phenomena, and thereby arrest an argument, which the parties seem determined to fight out all summer.

Take a mariner's compass in one hand, a bar of iron in the other. Hold the bar vertical on the north of the compass. Bring the two in contact at the upper end of the bar. Gradually push the compass down to the lower end, and note how the needle has been reversed. Reverse the bar, put the compass on the north, hold the bar horizontal, and account for the various positions taken by the needle.

Try the experiment on the iron safe which is in your office, with this modification. Do not hold it in your hand.

R. B. STUART.

Ossining, N. Y., March 30, 1866.

[The north pole of one magnet will attract the south pole of another. Almost any bar or mass of iron that is kept for a long time in a vertical position, or in a north and south position, becomes a magnet; and then one end will attract the north pole of a mariner's compass, and the other the south pole. We have repeatedly tried shovels, tongs, safes, and other pieces of old iron with a compass, and we have never found one that was not a magnet. Of course, if such a bar of iron could be poised with sufficient delicacy, it would point north and south, and thus serve as a compass.—Eds.]

#### Melting-pots.

Messrs. Editors:—A branch of the government may require melting-pots made of crucible clay. Should any maker advertise in your paper, I will write to him and will order through the proper office.

D. C.

Washington, March 28, 1866.

#### To Prevent the Loss of Aroma in Roasting Coffee.

The berries of coffee once roasted, lose every hour somewhat of their aroma, in consequence of the influence of the oxygen of the air, which owing to the porosity of the roasted berries, it can easily penetrate.

This pernicious change may best be avoided by strewing over the berries, when the roasting is completed, and while the vessel in which it has been done is still hot some powdered white or brown sugar (half an ounce to one pound of coffee is sufficient). The sugar melts immediately, and by well shaking or turning the roaster quickly, it spreads over all the berries and gives each one a fine glaze, impervious to the atmosphere. They have then a shining appearance, although covered with a varnish, and they in consequence lose their smell entirely, which, however, returns in a high degree as soon as they are ground.

After this operation, they are to be shaken out rapidly from the roaster and spread out on a cold plate of iron, so that they may cool as soon as possible. If the hot berries are allowed to remain heaped together, they begin to sweat, and when the quantity is large, the heating process, by the influence of air, increases to such a degree that at last they take fire spontaneously. The roasted and glazed berries should be kept in a dry place, because the covering of sugar attracts moisture.

For special cases, such as journeys and marches, where it is impossible to be burdened with the necessary machines for roasting and grinding, coffee may be carried in a powdered form, and its aromatic properties preserved by the following process:—One pound of the roasted berries are reduced to powder, and immediately wetted with a sirup of sugar, obtained by pouring on three ounces of sugar two ounces of water, letting them stand a few minutes. When the powder is thoroughly wetted with the sirup, two ounces of finely-powdered sugar are to be added, mixed well with it, and the whole is then to be spread out in the air to dry. The sugar locks up the volatile parts of the coffee, so that when it is dry they cannot escape. If coffee is now to be made, cold water is to be poured over a certain quantity of the powder, and made to boil. Ground coffee prepared in this way, and which lay exposed to the air for one month, yielded on being boiled, as good a beverage as one made of freshly-roasted berries.—Liebig.

MR. O. C. CRANE, of No. 330 Delancy street, has shown us a long cut taken from a piece of round steel, two and one half inches diameter, which is sixty-eight feet long in one continuous piece.