

Correspondence.

A Suggestion as to Railway Sleepers.

To the Editor of the Scientific American:

Your article in a late number of the SCIENTIFIC AMERICAN, calling the attention of inventors to devise a substitute for the increasing demand and diminishing supply of railroad sleepers, suggests one feasible and practicable way of meeting this great demand. There are thousands of acres along the lines of all roads that might be planted to chestnuts. The chestnut tree will grow on all except wet land, and when once planted is always there, as they sprout from the stump.

The chestnut is a rapid grower, and is all useful for sleepers, poles, and stakes. About fifteen will grow on an acre at six feet apart, and at twenty-five to thirty-five years (according to soil) they will be worth a dollar each—better than money at compound interest.

Would it not be well for railroad companies to consider this, and encourage the planting of chestnut trees?

E. MYRICH.

Ayer, Mass., May 5, 1884.

The Walled Lakes of Iowa.

To the Editor of the Scientific American:

In the SCIENTIFIC AMERICAN of April 19, in speaking of the walls around lakes, whether they are the work of an extinct race or natural formations, you say that in his "Geology of Iowa," Prof. Charles A. White presents as a theory "that in shallow portions of lakes, the ice along the shore freezes fast to everything along the bottom, whether sand, gravel, bowlders, or mud, and the expansive power of water in freezing is exerted upon them, acting upon them from the center of the lake in all directions toward its circumference." I have resided on the shore of a walled lake for 24 years, and have recorded observations and measurements two or three times a day of the outward movement of the ice, for months at a time, together with the temperature.

Ice never expands when freezing, but water in the act of changing into ice expands. After the ice is once formed, it is subject to the same laws as other bodies, and is expanded by heat and contracted by cold. The ice in these lakes, as months of careful measurements and observations have demonstrated beyond a doubt, invariably expands when the temperature is rising and contracts when the weather is growing colder. I have seen it shove up on the shore ten to fifteen feet in the course of a month without gaining an inch in thickness, keeping about twenty-two inches thick. The most fragile vessel can be filled with water and frozen solid without bursting, provided a small vent hole is kept open for the escape of the surplus water. The only expansion in freezing is just this, and no more: each crystal of ice as it forms occupies a larger space than the water did of which it is composed. When a tight vessel with water begins to freeze ice soon forms all over the top, surrounding the water with an unyielding coat. The little crystals of ice as they are formed are forced into the water, causing such a pressure that the water bursts out at the weakest point. This same cause, heat and cold causing the expansion and contraction of ice, is the principal cause of the glacial movement, forcing rivers of solid ice to move on down to the sea or plain with a slow but irresistible movement.

E. H. ATWOOD.

Maine Prairie, Minnesota, April 26, 1884.

Sea Monsters Unmasked.

In all probability, monsters wonderfully and fearfully made equaling in ugliness those described in the fables of history, inhabit the sea and occasionally present themselves to view, assuming to the excited beholder both the appearance and movement of a serpent. In the SCIENTIFIC AMERICAN of Dec. 27, 1879, one of these monsters was most graphically portrayed by Daniel C. Beard, who in his description pointed out the fact that a giant cephalopod moving upon the surface of the water would appear to have all the characteristics of a huge serpent. "The fin, or what was supposed to be the serpent's tail, can be readily accounted for by the fact that in some species of the cephalopod the longest tentacle widens and flattens at the end, and might easily be mistaken for a caudal fin."

Mr. Henry Lee, in his work "Sea Monsters Unmasked" (London, 1883), admits the probable existence of monster sea serpents, and clearly shows that nearly all of those which have been seen can be accounted for by the forms and habits of known animals—calamaries or squids of great size. During the past ten years our knowledge of the inhabitants of the vast deep has been enlarged and extended, especially in regard to the so-called monsters; deep sea dredgings have brought up fishes of unknown species; cuttle fish measuring more than sixty feet have been met with on the coast of Newfoundland.

The cuttle fish is described as being most sensitively timid, watching its captor, and upon the slightest movement belching forth its ink, which rolls over and over like a volume of smoke and mixes with the water with marvelous rapidity. It is very intelligent, soon learning to discriminate between friend and foe, and in time becomes quite tame, ceasing to shoot its ink unless irritated.

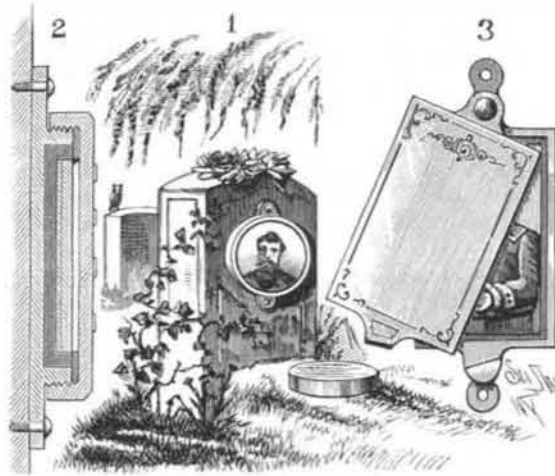
Squids propel themselves backward by forcing out a stream of water from a tube pointed in a direction contrary to that in which the animal is going. The body tapers toward the

tail, which is provided, at a short distance from the end, with two flat fins, one on each side, so that this portion of the body resembles in shape the government "broad arrow." When swimming in smooth water, the tail is raised above the surface to a height which might be three feet or more in a large individual; "and, as it precedes the rest of the body, moving at the rate of several miles an hour, it of course looks, to a person who has never heard of an animal going tail first at such a speed, like the creature's head. The appearance of this 'head' varies in accordance with the lateral fins being seen in profile or in broad expanse. The elongated tubular looking body gives the idea of the neck to which the 'head' is attached; the eight arms trailing behind (the tentacles are always coiled away and concealed) supply the supposed mane floating on each side; the undulating motion in swimming, as the water is alternately drawn in and expelled, accords with the description, and the excurrent stream pouring aft from the locomotor tube causes a long swirl and swell to be left in the animal's wake, which, as I have often seen, may easily be mistaken for an indefinite prolongation of its body. The eyes are very large and prominent, and the general tone of color varies through every tint of brown, purple, pink, and gray, as the creature is more or less excited, and the pigmentary matter circulates with more or less vigor through the curiously moving cells."

The author concludes that we here have the "long marine animal" having "two fins on the fore part of the body near the head;" the "boiling of the water," the "body round and of a dark color," the "waving motion in the water behind the animal, from which the witnesses concluded that part of the body was concealed under water," the "head raised, but the lower part not visible," the "head being long and small in proportion to the throat, the latter appearing much greater than the former," causing the spectator to think that "it was probably furnished with a mane."

TOMBSTONE.

The invention lately patented by Mr. S. R. Miller, of Mount Union, Pa., relates to that class of tombstones on which the photographs of the deceased are held in suitable



MILLER'S TOMBSTONE.

frames. The photograph is placed within a glass covered casing which is bolted to the tombstone, and which is made air and water tight, so that the picture will not be injured. When the casing is made circular as in Fig. 1, a cap is screwed on firmly. When the picture holder is square as in Fig. 3, the cover is pivoted at its top, so that it can be swung to one side. The inner side of the cover is provided with a packing of rubber—shown in the sectional view, Fig. 2—so that the cover will at all times form an absolutely close joint with the frame.

Preservation of Cast Iron.

The common practice of painting the unfinished portions of machines is not very attractive, and that of making all cast iron of some uniform color for all machines is almost offensive. In most cases the use of paint on the cast iron is intended to make a contrast between the unfinished material and the polished parts; incidentally it is also to prevent oxidation and a blotchy appearance. But if the oxidation was general, and even, and permanent, nothing could be finer; for the red oxide of iron is even more agreeable to the eye than the blue-green oxide of copper or bronze, which is so much admired. There is no question about the durability and the permanency of iron oxide in color and texture any more than of that of bronze or brass; the browned gun barrels of fowling pieces are instances.

Experiments have been made to avoid the daubing annoyance of paint by less mechanical means. The cast iron, after being pickled to remove the scale, was left to dry with the acid still on it. Then it was cleaned with a wire brush, and scraped with a coarse file. The result was a mottled surface, the lower portions being a grayish brown, and the outer or upper portions bright. The surface was then swabbed with crude petroleum, and before it was dry was rubbed with a wire brush. Such treatment insures an unchangeable surface, and gives an agreeable color. Even without the petroleum the rust of the acid insures a very pleasing and permanent effect; but the petroleum prevents after stains, and mellows and blends the tints. In either way used it is an improvement on paint. Cast iron has a beauty of its own that is no more dependent on paint than that of bronze or brass.

Sorghum Sugar.

Prof. Collier, late chemist of the U. S. Department of Agriculture, has long been an ardent believer in the idea that sorghum is in time destined to furnish all the sugar needed in this country, and probably yet more for export. He has just published a volume* presenting the most important facts bearing on this subject, as obtained from extended examinations of different varieties of sorghum, and the actual working results of numerous trials on a practical scale. In an address before an agricultural convention in Connecticut, four years ago, the Professor predicted that, within five years from that time, we would be producing our own sugar. He then referred to the large possibilities of making sugar from corn stalks, then, as now, almost entirely wasted; pointed out the wasteful manner in which sugar was made at the South and in Cuba from the sugar cane, and claimed that, either from sorghum or beet raising, though preferably from sorghum, we could more regularly and economically obtain all the sugar the country would consume.

We are very far as yet from having attained the development of this industry that was then predicted, but that we are progressing toward it there is much proof. Counting the average consumption of each individual at about forty pounds a year, we produce only about one-eighth of the total supply required. The trouble seems to have been that, though the sorghum has been demonstrated to have sufficient saccharine matter, and can be raised at a cost not greater than that of sugar cane, the amount of crystallized sugar obtained therefrom has generally been far below what had been expected. In some of the trials most excellent results have been reached, but more often, owing to the planting of wrong kinds of sorghum and defective methods of manufacture, the results have been disappointing to those who at first were most confident of an early and brilliant success. Prof. Collier has enjoyed exceptional advantages for the observation of all that has thus far been done in the United States in this direction, and now admits that "there are still many unsolved questions relating to the perfection and cheapening of working processes," but claims that, with proper conditions, and attention to the rules for practice which experience has shown to be necessary, the "successes will greatly outnumber the failures" in the manufacture of crystallized sugar from sorghum.

Turning and Grinding.

A good finish to a turned cylinder, as a shaft or stud, can be obtained by means of the turning tool—the square nosed tool fed with water. But it may be safely asserted that the apparent truth will not stand the test of trial, except as an approximation to truth. It is almost impossible—probably it is absolutely impossible—to turn a shaft or stud perfectly true; and in most cases the deviation is so great as to be sensible to the touch. Resting thumb and finger against opposite sides of a turned and finished shaft while revolving fast will in most cases prove that, however carefully turned, the shaft is not round. Still more exact tests have demonstrated that the best specimens of turning, from the cleanest and most homogeneous steel, retain in a proportion the faults of the less carefully wrought specimens.

The reasons are obvious; the stud or shaft is suspended on centers at the ends, the intermediate length being unbraced, except in the occasional use of the steady rest. And the tool post and carriage and the tool of a lathe are parts which as a whole are not absolutely rigid. In turning, also, the speed is not so rapid as to prevent vibration, or repulse and return.

The best results are obtained by grinding; a swiftly revolving corundum wheel traversing the more slowly revolving shaft. By this means the plug and template gauges are constructed, which are so perfect that the plug inserted in the template is air tight, although it turns so freely as to suggest perfect lubrication. This method of finishing for fits is becoming quite general in the fitting of journals in the best machine tool manufactories; almost absolute perfection in the fit of boxes and bearings having been already assured.

A Sheet Iron Hen.

The *Inter-Ocean* describes a novel invention as follows: It was not patented through the SCIENTIFIC AMERICAN Patent Agency.

An ingenious fellow in Ohio has constructed a sheet iron hen that promises to lay him a golden egg. It is finished up to life, full size, cackles, clucks, and looks with one eye at a time so naturally that it will deceive the oldest hen hawk in the country. It is so arranged that when a hawk, mink, or polecat pounces on to it, the back springs open and the wings fly up and force the assailant on to a ravenous buzz saw that makes 1,700 revolutions per minute. After moving half a minute the saw stops, the hen closes up, folds its wings, and begins to cackle as though it had just laid an egg. One winding up will answer for three massacres, provided the rather delicate machinery does not get clogged up too much with the blood, bones, and feathers. He set a freshly painted one out in the sun to dry the other day, which attracted the attention of a fine old cat belonging to a doctor who had been poking a great deal of fun at the fool thing. The hen is there, but the cat is hence.

* Sorghum; Its Culture and Manufacture Economically Considered as a source of Sugar, Sirup, and Fodder. By Peter Collier, Ph.D. Robert Clarke & Co., Cincinnati, Ohio.