Correspondence.

The Editors are not responsible for the opinions expressed by their Correspondents.

Small Fast Steam Propellers.

To the Editor of the Scientific American:

The men in our shop were much interested in your account, of vessels of this class now in use in England, in your issue of the 15th inst., having just completed a small propeller which has proved to be very fast, an account of which may interest your readers generally.

The stock yards of this Company being across the Mississippi river, five eighths of a mile from the station, access to them is had with a small steam propeller, the *Robert Harris,* almost exactly like that described in your paper. She is built of oak, 50 feet long and 7 feet beam, and draws about 30 inches aft and a foot forward. She has a locomotive boiler 11 feet long, with fire box 2½ feet by 3½ feet with 27 two inch flues 7 feet long. She has two direct acting vertical engines, cylinders 5 inch bore and 10 inches stroke. Her screw wheel is forward of the rudder, and is 4 feet in diameter and has a quarter pitch. She has a small Seller's injector as well as a force pump. The engines are fitted with the circular slide valve, recently advertised in your paper, and work with extraordinary ease, power and economy of fuel. She will carry 20 to 30 passengers very comfortably.

Originally it was intended to use an upright boiler, such as is used by the steam launches in the United States navy, but the government inspector forbade its use after it was completed, and being pressed for time, a horizontal locomotive boiler was taken, with flues 3 inches apart as the law requires.

From the very limited fire surface and the very long time required to get up steam, an utter failure all round was confidently predicted by the knowing ones. On the contrary, however, our little vessel is a complete success. In speed, capacity, and economy of fuel, she cannot be excelled anywhere. A single shovelful of coal and a stick of wood will send her across the river in less than four minutes, and she will make ten miles an hour up stream or 15 miles down stream, all day, without any extra pushing. A few days ago, she ran a full mile with three shovels of coal and blew off at 100 lbs., as she landed with plenty of steam to carry her back to where she came from. The engineer reports that, though she is twice the size of the boat used last year, he can run her 50 miles with the fuel the other boat would burn in going 20 miles. To-day, interested by your paper, we timed her twice crossing the river. With 55 lbs. of steam and 104 revolutions, carrying 16 passengers, she crossed in 7 minutes. Coming back, with 90 lbs. of steam and 140 revolutions, she came over in 3½ minutes.

Here I would like to say a few words in favor of two excellent devices, the water injector and the circular slide valve. The former, though an old invention, is much less in use than it ought to be. Every locomotive ought to have a pair of them. With this most useful machine, water may be kept up in a boiler without working the machinery at all, and it is really indispensable in every well regulated establishment using steam power.

The circular slide valve is a most promising invention. Exactly what it will do, in gain of power over the common flat slide valve, has not yet been ascertained, but it will certainly do even more than the inventor promises, a gain of one third to one half. The pressure on the valve is completely removed by its use, and with it, the corresponding strain and friction on all the reciprocating parts. I have long been of the opinion that railway master mechanics have gone to a most wasteful extreme with their wide ports and huge barn door valves. If they really wish to know how much power and fuel they are wasting, and how much strain and friction they are thereby creating, for nothing except to make useless labor and expense, a trial of this device will both surprise and undeceive them.

I would like to inquire, of some of your experts in building and running propellers, if such a speed as you name, 600 revolutions, is usual, or if it can be maintained any length of time without rattling the machinery to pieces? High speeds and momentum in high pressure engines seem to be the tendency of the day, but of course there must be a limit somewhere

Should any of your readers happen this way, I would cordially invite them to inspect our quick, efficient and powerful little craft, whose success has given us all such satisfaction.

A. GRAY,

Chicago, Burlington and Quincy Railroad, Locomotive Department, Burlington, Iowa.

The Open Polar Sea.

To the Editor of the Scientific American:

The subject of the polar sea is attracting much attention at this time, and I beg leave to submit the following as a scientific consideration:

The whirling of the earth, causing the polar indentations, also drives the water from the poles with a centrifugal force towards the equator; as water, poured on a whirling grindstone or globe, inclines towards the largest circle in the plane of rotation. And as the surface waters are less oppressed by weight above, as the lower waters are, they move more freely towards the equator than the under waters; and while they are passing towards the equator, it naturally creates a counter current towards the poles, for ever rising up at those points like some vast ocean spring, free from ice, till it meets the frozen circle, surrounding the open sea, on its way towards the equator again. Of course this surface current, as well as the under counter current, may be compared to an endless chain in a perpetual motion, for ever rising at the poles; which is, in my humble opinion, the great secret of the open polar sea.

Mr. Morton, of Dr. Kane's expedition, found, in latitude 83° N., open waters moving briskly southward; and the Dutch have lately found open waters warmer than the surrounding air. These facts induce the conclusion that the rapid whirling of the earth produces these two currents; and hence the open polar sea, or ocean spring, perhaps a thousand miles across.

The grand consideration that the whirling world so depresses the polar waters, producing these two wonderful currents and the open sea at the poles, commands our highest admiration and veneration for Him who made all things.

Paris, Texas. J. H. FOWLER.

Iron Ship Building in Wilmington.

To the Editor of the Scientific American:

In an article in your paper for this week, entitled "Iron Ship Building in Wilmington," you state that the Christiana creek is a wide and deep stream which forms a junction with the Delaware River at Chester. The above description is wrong, as the Christiana enters the Delaware River at not less than eleven miles below Chester City, and the yards you mention are several miles up the said creek. But at Chester we have the "Delaware River Iron Ship Building and Engine Works" (formerly the Reaney Engineering Company), now employing between 700 and 800 workmen, with four large iron ships on the stocks, and one just launched. Two are for the Pacific mail service. The yard is the largest in the country, and its business facilities are unequalled. It is situate directly upon the Delaware, having a river frontage of 65 feet. The Delaware is, at this point, one and one half miles from shore to shore. The principals are John Roach and Sons, formerly of New York.

Feeling great pride in our rapidly growing city of 12,000 inhabitants, we do not like to be confounded with Wilmington or Philadelphia; but being just between the two, we intend to stand on our own bottom and build iron ships against the world.

Chester, Pa. N. RULON.

Molasses or Hydrochloric Acid for Flowers.

To the Editor of the Scientific American:

Several years ago I became passionately fond of flowers, and I purchased a great many. I gave them all the attention I could possibly spare, and watched over them anxiously for a long time; but I found to my disappointment that before several weeks had passed, they all suddenly assumed a poor and dying appearance.

I changed the earth, enlarged the pots, and did everything imaginable, but they did not seem to improve at all. About this time, I removed the earth around the roots of a favorite geranium, and pouring molasses (the unrefined will serve the purpose well) around the roots, I covered it up with earth, and waited patiently for a change. You would have really been surprised to have seen the great improvement in the flowers. I tried several others with the same result.

If any one thinks that molasses is too expensive to be used for such a purpose, I would assure him that hydrochloric acid answers equally as well. It should be diluted in water (say one ounce of the acid to three or four quarts of water), and the flowers should be washed with it at the usual time. If these simple facts are of any value to lovers of flowers, I trust this will be made public. E. S. G.

Philadelphia, Pa.

HORSE HAIR.

Horse hair is brought to this country from South America, Siberia, and portions of Europe. The greater part of all imported comes from South America, being obtained from the immense numbers of horses, which, in a wild state, roam over the pampas of that continent. The manes and tails of horses which die in this country, although contrary to popular supposition, form but a small portion of the supply; the hair thus obtained is generally of poor quality, and unfit for use in the manufacture of hair cloth.

The material is imported in bales weighing about one thousand pounds each. These contain either "mixed hair," that is, hair of different lengths, or else are filled entirely with long hair. The former variety is the cheapest, costing in the bale from thirty-five to forty cents per pound in gold; the latter averages about seventy cents. As the material in its raw state is in a tangled and dirty condition, the first process through which it passes is sorting, during which the different colored hairs are placed in separate heaps. This work is done by boys, and its object is to facilitate the subsequent dyeing, as the black stain used is much more readily imparted to hair that is naturally of a dark color than to that of the lighter shades.

The bundles of sorted hair are then hackled, by which process the hairs are made straight and the foreign substances and dirt mingled with them removed. During the hackling, great care is taken not to break the hair, as upon its length its value depends—long hair being much more scarce than the shorter varieties and consequently far more costly.

A number of tufts of hackled hair are next placed between the teeth of a couple of cards. The latter, as our readers are doubtless aware, consist simply of flat pieces of tough wood on which pointed spikes of steel of about three inches in length are inserted. One of these cards is placed on its back on a table and the bundles of hair laid side by side between its teeth; when this card is full, the other one is placed upon it, points down, so that the bundles are firmly held by the double set of spikes. The hair, it must be remembered, is still of different lengths, and it is the object of this carding to arrange the long and short hairs in separate bundles.

The workman, therefore, begins by pulling out, from the bundles between the cards, all of the long hair in the ends nearest to him, and then keeps on removing more and more, until the set of extremities at which he is working are perfectly even, no one hair projecting more than another. Then he fastens the ends, removes the upper card, reverses the bundles and repeats the same process with the other extremities. When he finishes, the hairs between the cards are all of exactly the same length, and the separate tufts are now ready either to be made into curled hair, to be sold to the brush makers, or to be woven into hair cloth.

Curled hair is the material generally used for stuffing mattresses, cushions, etc. Other substances are occasionally employed for the purpose. Moss, sponge, sisal, (a species of Manilla hemp), African fiber, excelsior, (a fancy name applied to a preparation of wood shavings), tow, and a vegetable fiber from California known as eureka, are the most common; but none is as durable, cleanly, or elastic as pure curled hair.

The process of curling is begun by making the lengths of hair which are found to be too short for other uses into a rope. The workman, taking a bundle of loose material in his hand, attaches it to a revolving hook and, walking backwards, continually adding more hair, spins a long, tight strand. Two of these strands are twisted into a cord which, when finished, is reeled up into large coils. It is then boiled and immediately afterwards baked, this process setting the "kink" in the hairs, rendering them thoroughly elastic. In this condition, curled hair is sold to the trade; it only remains to untwist and pick out the rope by hand to obtain the desired quantities. The present price is for the pure material from forty-five to sixty cents a pound, according to quality. In the manufactory, one workman can make up from two hundred to two hundred and fifty pounds of curled hair per day.

Hair cloth, principally used for covering furniture, is manufactured from the longer and better qualities of hair. The bundles of hair, destined to be made into cloth after being carded in the manner above described, are removed to the dye house. There they are attached to a large iron grating which, when filled, is lowered into a vat of boiling dye, in which it remains for about five hours. The hair is then detached, and is ready for weaving.

This work is done by girls. The warp of the cloth is of black cotton thread. Linen thread is a better material, but makes a stiffer and harsher fabric, less suited for upholsterers' uses.

The hair composes the weft, and its length depends upon the width of cloth to be made, the usual proportion being a thirty-five inch hair to a thirty inch cloth. Each hair is introduced separately, being caught in a long shuttle or rod, the end of which terminates in a catch hook. The shuttle enters the shed of the warp, and the weaver, with her left hand, hooks the hair into the catch hook which draws it through to the other side. The batten is then driven home, and a new shed opens. These movements are made with great rapidity; and as the threads of hair must be fastened to the shutter bar with mechanical regularity, it is only after long practice that the requisite skill is attained. Formerly, two weavers were required to every loom, one to hand the thread and the other to fasten it to the shuttle; but the improved machines at present in use are easily managed by one person. We learn that still further improvements have been lately made, so that one workman can attend to six machines, the thread being attached to the shuttles, and the other work now done by hand accomplished entirely by automatic appliances.

After leaving the loom, the cloth is pressed between hot metal plates, and afterwards rubbed to give it the necessary polish. As furnished to the trade it is generally black, and its principal use is, as we before mentioned, for covering furniture. A very fine variety is sometimes made for sieves, and another quality is used by ladies in order to give volume to certain portions of their attire.

In price, hair cloth averages about one dollar per yard, varying from forty-five cents to two dollars and seventy-five cents. In width, it is manufactured in all sizes between fourteen and thirty-two inches. It is largely imported into this country, although it is estimated that the home manufacture amounts to over 20,000,000 yards, yearly.

A Lecture on Thomson's Galvanometer.

DELIVERED TO A SINGLE PUPIL IN AN ALCOVE WITH DRAWN CURTAINS.

The lamp light falls on blackened walls,
And streams through narrow perforations;
The long beam trails o'er pasteboard scales,
With slow decaying oscillations.
Flow, current! flow! set the quick light spot flying!
Flow, current! answer, light spot! flashing, quivering, dying.

O look! how queer! how thin and clear,
And thinner, clearer, sharper growing,
This gliding fire, with central wire
The fine degrees distinctly showing.
Swing, magnet! swing! advancing and receding;
Swing, magnet! answer, dearest, what's your final reading?

O love! you fail to read the scale
Correct to tenths of a division;
To mirror heaven those eyes were given,
And not for methods of precision.
Break, contact! break! set the free light spot flying!
Break, contact! rest thee, magnet! swinging, creeping, dying.

$\frac{dp}{dt}$ *in Nature.*

EXTENSIVE deposits of crystalized sulphur have been discovered in the Beaver Mountains, three hundred miles from Salt Lake City.