Our Correspondence.

The Aquarium.

Messrs. Editors :—In a former letter, on this subject, on page 71 of the present volume of the Scientific American, the fish spoken of are, of course, not limited to the number or kind therein set forth ; but the balance between the animal and the vegetable life may soon be found by experience. Now, reader, let me go with you to some little brook or pond in search of stock for the tank. Having first made a nice little scoop net out of some fine gauze, and having one or two tin pails, we start. Here we come to some little brook, so small indeed and secluded, that we scarcely have any intimation that we are at it, except by the gentle hum of the water, as it dances along on its way to more stately, but not more picturesque streams. Now, let us sit down and keep our eyes as wide open as possible (for fear we may not see enough) ; and what is that queer-looking animal going down the brook, too lazy to walk, and so lets the current carry him down, and having in his possession two large claws almost (one would think) larger than his body? Why, that is the crayfish, more generally known by boys as the crab. We shall want one or two of them, so we very carefully put our net down behind him, and touch him with a little stick. In he goes, and you have him. Now, put him in the pail with a little water. But there goes something ! sure enough what can that little fish be that was going so very swift, and in an instant stopped in the weeds by the bank? Now, run the net against the current, and along these weeds, and, if it is in there, it will be ours. Here we go. Yes, it has gone. No ! up with it, and very gently let it drop into the pail ; but what is it? It is a darter, so called from the quick and abrupt motion with which it moves, and a very pretty little fish it is ; it never grows more than two or three inches long, and is one of the best fish for a tank. And there is another ; with a little care, and we shall have it. What kind of a fish is it? See how he stops and moves his delicate little fins in the water, and how its sides reflect the golden sunlight ! and then can any one say it is not beautiful. Here, we have him, and it is one of those world-renowned stickle backs, so called from the four or five little horny spires which appear on its back, which it can elevate or depress at its pleasure, and one of the greatest curiosities in the aquarium.

Now, let us go to some still pond and see if we can find a few snails. There they are—some with round, others with spiral shells. Let us take five or six of each kind, and put them in with the fish. Next look about for some tadpoles and polliwogs, which are known to almost every one. We may take two or three of these, and now we have enough. Let us start for home, and introduce our new companions to their small, but nice home.

First, we put in the crayfish, and if there is any rock work, he will be sure to get under it, even if he has to dig away the gravel in order to accomplish it. Next we may put in the tadpoles and polliwogs. They will wriggle along until they come to some piece of water weed, and then rest for a few moments. We will then introduce the snails, and shortly they will be seen to crawl partly out of their shells, and move up the glass, and around the plants, eating the decaying and surplus vegetation and animal matter, and thus becoming one of the most useful as well as interesting tenants of the tank. Last of all we introduce the fish, and there is not a nook or crevice, of any sort in any part of the aquarium, which will escape their notice. At first they swim against the glass sides of the tank, not being accustomed to it, but they soon learn how far their dominions extend, and learn to be content.

In another letter we will describe the conduct and habits of the little denizens. T. D. A.

Rochester, N. Y., Jan. 25, 1861.

Boiler Grate-bars.

Messrs. Editors :—I noticed in a late number of the Scientific American (page 23), an article on the subject of boiler grate-bars, taken from "King's Practical Engineering." The author is right about the play required for grate-bars, but I think any difficulty on this point may be effectually overcome by cutting off the upper corner of each grate-bar, leaving the end sharp, so as to leave no room for ashes, &c., to get in. The way to do this, however, is to cut off the pattern before the bars are cast ; this will save the pushing out of fire fronts, the bending of grate-bars, &c. It should be cast at an angle of about forty-five degrees.

C. B.

Des Moines, Iowa, Feb. 13, 1861.

Cotton Grown in New Jersey.

Messrs. Editors :—I send you a sample of cotton raised (out-door) in New Jersey, at Camden, on the Delaware, opposite this city. The seed from which it grew is the second growth planted at that place, in May last, by Mr. Henry Minton. He considers the yield a good one, considering the locality, the ground being low and wet. From about 35 plants he gathered about 10 lbs. of cotton, as per sample. His success, on a small scale, has induced a party to join him and try the experiment upon a larger one, and upon land better located ; and they intend to plant three acres with cotton seed next spring ; and, if it *pays*, Mr. Minton will have opened a new page in the agricultural history of New Jersey.

Thinking this a fact worth knowing, I forward it to you. U. B. V.

Philadelphia, Pa., Feb. 20, 1861.

[The sample sent us is very excellent short staple cotton.—Eds.]

A Good Word.

Messrs. Editors :—The patent granted to me a short time since for an improved clothes wringer, which was once rejected but finally obtained through your agency, is proving to be a first rate thing. We are unable as yet to supply the demand for the machines which is increasing ever day, as they are seen and tried ; and we find the *right* sells very readily. We have already received thousands of dollars for rights, and have not been away from home at all to try to sell it, and are having new customers every day. We appreciate the assistance you have rendered us in this case, and should we ever need such help again, shall know where to apply. Geo. J. Colby.

Waterbury, Vt., Feb. 16, 1861.

The Gold Fields of Australia.—There are some facts (says an exchange paper), given in the Registrar General's published statistical notes respecting the yield of gold, which have a very close and intricate bearing upon the present state of the labor question in the colony. From 1851 to 1859 inclusive, the gross product of the gold fields of Victoria are set down at $435,225,000, and the annual returns show that while the yield has undergone a gradual diminution since 1856, there has been an increase in the number of persons engaged in mining pursuits, and in the number of quartz-crushing machines and steam-engines employed in extracting the precious metal, or in facilitating the operations of the miner. In March, 1857, there were 62,211 mechanical appliances employed, consisting of 359 quartz-crushing machines and steam engines, 3,540 puddling machines, and 370 whims. In December, 1859, the number of miners had risen to 100,591, of whom 15,342 were at work upon quartz reefs, and the machinery employed was thus classified :—301 quartz-crushing machines ; 296 engines, whose aggregate horse power was 4,375½ ; 3,982 puddling machines, and 465 whims, of the total value of $5,779,615. The estimated value of the gold produced last year was $45,613,510 ; and deducting from this amount $1,155,920, representing ten per cent interest upon the capital invested in machinery, and ten per cent for its deterioration, it will give a net residue of $44,457,640, divisible among 100,591 miners, yielding to each individual an income of not more than $8 per week.

In some of the furnace-heated houses in this city, the air becomes so dry that it is a common amusement of the children to light the gas by a spark of electricity from their fingers. By rubbing the feet along the carpet the body becomes so charged with the electric fluid, that, on approaching the finger to the gas-burner, a spark is drawn forth sufficient to light the gas.

The Wealth of Boston.—The population of Boston, Mass., by the census of 1860, is 177,902, and the valuation of the property $311,978,663 ; this gives $1,754 to each inhabitant, being about $7,000 to a family.

Column of Varieties.

It has been estimated that there are five millions of horses in the United States.

The wheat raised in 1860 averages about three lbs. in weight per bushel more than the crop of 1859.

The British iron-clad frigates *Warrior* and *Black Prince* are to be fitted with powerful double engines, the cylinders of which will be 112 inches in diameter.

There are 1,102 newspapers and 481 magazines now published in Great Britain. Nearly one half of the latter are of a religious character.

There are at present no less that 3,343,000 bushels of grain at the two New York lake ports of Oswego and Buffalo.

The cubic contents of St. Paul's Cathedral in London are 5,000,000 feet. This is heated by 13 hot air stoves and an average temperature of 58° Fah., maintained during every day of winter.

A mail train recently ran between London and Rugby, a distance of eighty-three miles without stopping. The London *Engineer* states that this is believed to be the longest continuous journey ever made upon any railway.

Glycerine is now employed to float compasses on board of several of the Atlantic screw steamers. It is but little affected by heat or cold, and is well adapted to withstand atmospheric changes.

Steam is employed for heating carriages on the Lyons railway in France. It is conducted by pipes from the locomotive to all the cars. The joints are flexible, being made of vulcanized india-rubber.

A correspondent of the *Shoe and Leather Reporter* states that he has made careful experiments in tanning hides, and has found that 53 lbs. of tannin can be made to combine with 47 lbs. of well-cleaned raw hide.

Mr. Titus Salt, an English manufacturer, uses 3,000,000 lbs. of alpaca wool annually, besides a great deal of cotton which is mixed with the wool, to form warps for what are called "alpaca fabrics."

The *Ohio Farmer* advises wool-growers not to wash their sheep, but to shear the wool without being washed, and sell it in that condition. Manufacturers prefer unwashed wool, because much of that which is washed on the animal is injured by the operation.

The speed of boys' sleds going "down hill" sometimes far exceeds that of the fastest locomotive. A gentleman at Middletown, Conn., lately timed some boys "coasting" down one of the steep streets in that place, when he found that they went down at the rate of two miles per minute or 120 miles per hour.

The first observatory erected in America was in Philadelphia, in November, 1763, by a carpenter, who was employed by Mason & Dixon, when these mathematicians were employed to define the line which still bears their name. This observatory was erected for the purpose of ascertaining the southermost point of the city of Philadelphia.

An English writer in *Blackwood's Magazine* on iron-clad ships of war, says to the British government:—"Call in the mechanical and engineering skill of Great Britain and America openly in the face of all nations, and let others match us if they can."

On the 23d of January last, a trial trip took place on the Thames, near London, of a peculiarly constructed steamer, intended for the conveyance of troops upon the Lower Indus. She is 377 feet long, and has accommodation for 800 men and their officers, while the draught of water was only two feet.

Of the Chinese emperor, every one, even those of his own chamber, stands in the greatest imaginable awe, and on no pretext does any one address him save with the use of all his grand and glorious titles. It is the etiquette in the Chinese court for the emperor's physician to apply the same titles to his diseases as to himself, and accordingly they talk of "His high and mighty stomachache," "His imperial and godlike dyspepsia," and "His eternal and never ending diptheria."

The western coast of North America is so much warmer in the winter than the eastern coast, that a winter climate no colder than that of New York city extends as far north as 65 degrees, corresponding in latitude with the middle of Hudson's Bay and the almost uninhabitable regions of Labrador. The valley of the Saskatchawan, in latitude 52°, 1,000 miles northwest of Lake Superior, is very fertile, and wild cattle live through the winter upon the abundant grasses which it produces.

Improved Mole or Drain Plow.

The extreme simplicity of the mole plow would seem to preclude the possibility of its being the subject of a large number of patents; but experience in its use points out several modifications, and the great importance of the implement renders all these which are of any consequence well worth patenting. We continue our illustrated history of these modifications by an engraving of the plow as designed by Martin A. Howell, Jr., of Ottawa, Ill. The improvements embraced in this invention are two-fold: 1st, a rasp or saw is introduced for cutting off any roots that may be encountered; and 2d, a joint is made in the mole to enable corners to be turned with a curve, thus forming a drain through which water will flow more readily than through drains with square corners.

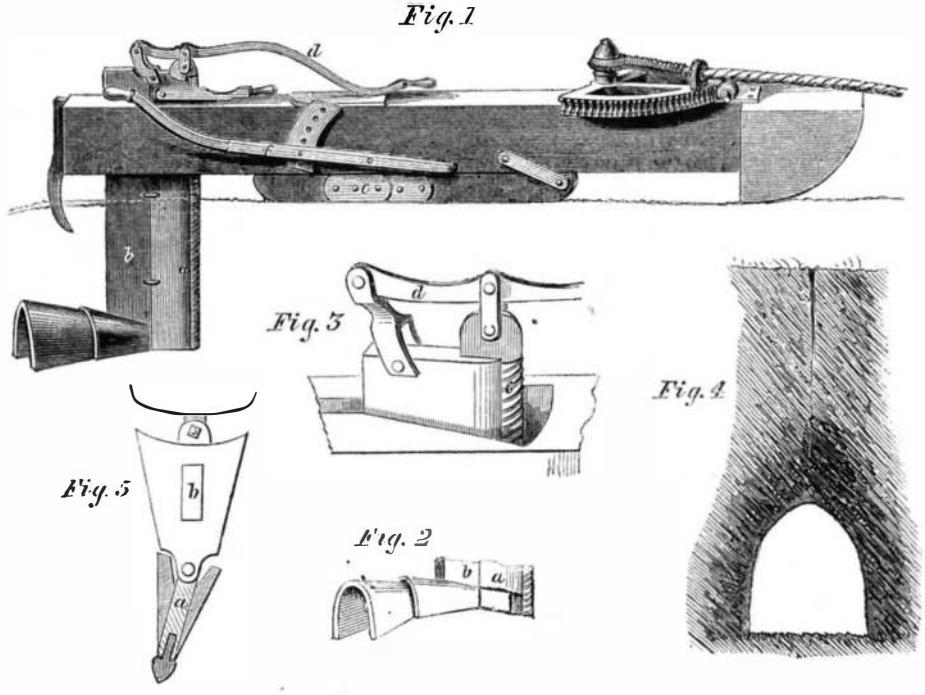
The inventor says:—"There are thousands of acres of swamp land lying idle which require a cheap mode of draining, the ordinary mode being too expensive. In timber growing countries the difficulty and expense of opening a drain through ground filled with stumps and roots, which do not rot in very wet ground, has caused many desirable tracts to be left untouched and worthless. Now, by underdraining these lands, the air reaches the roots and they soon rot out, when they can be removed. Many such tracts lie in old settled districts where the adjoining land is extremely valuable."

In the annexed engraving Fig. 1 is a view of the whole plow, and the other figures are representations of the several parts, Fig. 4 being a view of the drain. The two coulters, *a* and *b*, Figs. 1, 2 and 5, are connected by hinged joints as shown, and the mole is also jointed as represented in Fig. 2. For turning a corner the forward coulter is, by means of a lever or screw, inclined at a proper angle for sweeping the desired curve, when the rear coulter and jointed mole follow in its track; the large rear part of the mole compressing the earth, closing the coulter slit and finishing the drain in the most perfect manner, as represented in Fig. 4. The rasp, *c*, Figs. 1 and 3, for cutting off any roots that may be met with, is secured directly in front of the forward coulter in such a manner that it may be worked up and down by means of the lever, *d*. As the plow, drawn by a windlass, moves very slowly when a root is encountered, it may be cut off while the plow is drawn along, by moving the rasp, *c*, vertically up and down by means of the lever, *d*. The shoe, *e*, is to regulate the depth of the mole, it being adjustable by means of the lever, *f*.

The inventor says:—"The demand for work to be done by this machine in our best dry prairies and low wet lands, is such that it will require many machines in this county alone to fill the orders from those mostly who tested its operation last year."

The patent for this invention, which promises to be a money-making one, was reissued Feb. 19, 1861, and further information in relation to it may be obtained by addressing the inventor, M. A. Howell, Jr., at Ottawa, Ill.

Fig. 1



HOWELL'S IMPROVED MOLE OR DRAIN PLOW.

Improved Cork-Cutting Machine.

We know of no department of invention in which more money has been expended with less success than in cork-cutting machinery, and at last the long sought end is attained by a plan so simple that the wonder is that it was not thought of at the very beginning. Mr. Alexander Millar, of this city, has invented a cork-cutting machine, which is now in operation in the depot building of the Harlem Railroad, corner of Franklin and Elm streets, in this city, where, as we know from actual inspection, it is working in the most successful manner, turning out corks of all sizes from large bottle corks down to those suitable for homeopathic vials, and of the best quality.

Fig. 1

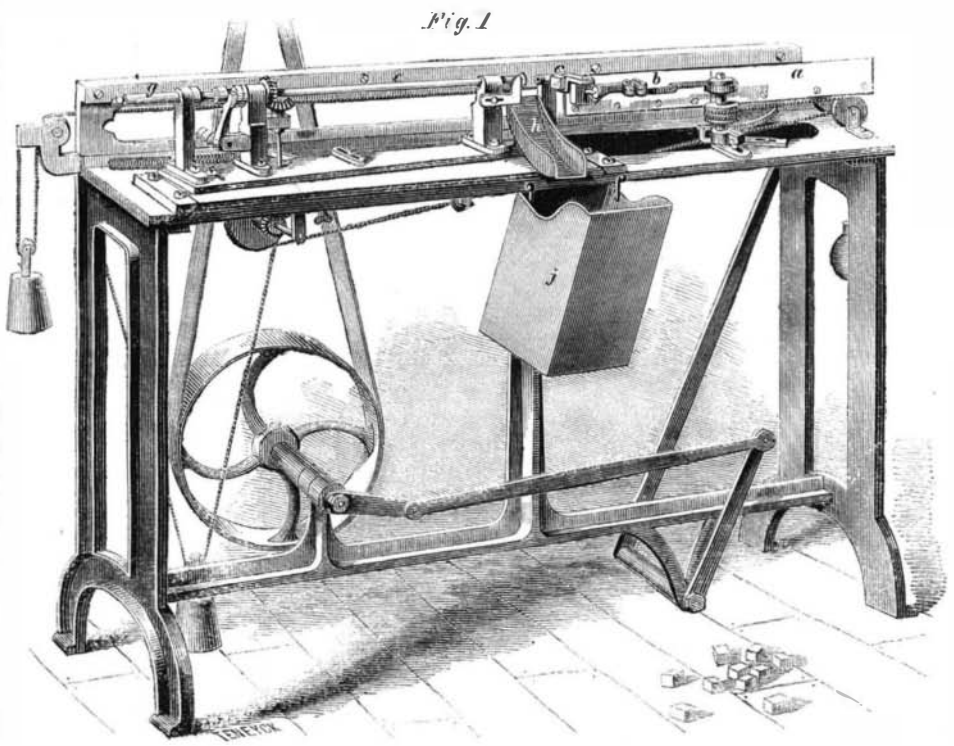
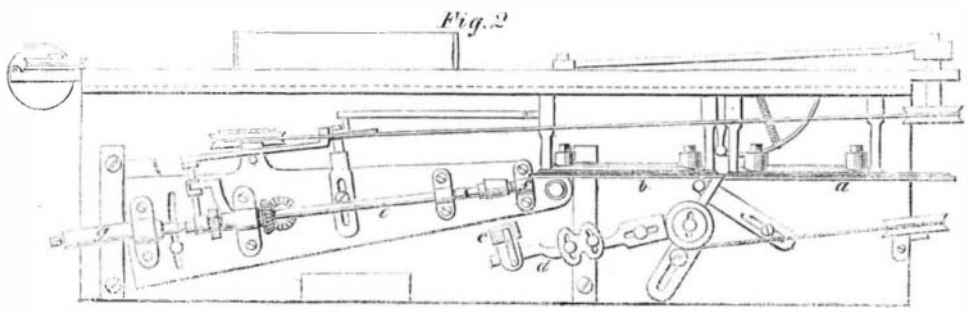


Fig. 2



MILLAR'S IMPROVED CORK-CUTTING MACHINE.

The machine is represented in the annexed engravings, of which Fig. 1 is a perspective view, and Fig. 2 a horizontal view from above. It consists essentially of a turning lathe in which the cutting tool is a long knife with a thin edge set at a slight angle with the axis of the cork, to give the taper to the cork, and sliding along as the cork revolves, so as to make a drawing cut. The knife is made in two parts, or rather there are two knives, *a* and *b*, Figs. 1 and 2, the knife, *b*, which comes first against the block to be cut, being a very little nearer to the block than the second knife, *a*, by which arrangement the corners of the block are cut off at its first revolution, and the turning down is completed at the second revolution. The square block of cork, *c*, to be cut is fed by hand into the swinging clasp, *d*, which, by an automatic movement, carries it forward between the serrated ends of the spindles, *e* and *f*. The spindle, *e*, has a sliding motion in its bearings, and it is drawn back by the mechanism to receive the block, and when the block is placed the spindle is released, when it is immediately pressed forward toward the spindle, *f*, grasping the block between the serrated ends of the two spindles. The swinging clasp, *d*, is now drawn back, the spindles commence their slow rotation, and the knives are drawn along, bringing the edge of the knife, *b*, first against the block and taking off its corners, after which the nearer knife, *a*, follows in a line a little nearer to the axis of the cork and finishes the operation.

The several motions are effected by well known mechanical devices, the most simple being invariably adopted. The pressure of the spindle, *e*, against the cork is produced by a spiral spring enclosed in the cylinder, *g*, which forces a steel pin against the end of the spindle; the pressure is regulated by turning a screw in the end of the cylinder which bears against the spring. The knives are also adjustable in their position. When the cork is finished, the spindle, *e*, is drawn back automatically, releasing the cork, which falls down the inclined trough, *h*, into the receptacle, *j*.

Patents for this ingenious and valuable invention have been secured through the Scientific American Patent Agency both in Europe and the United States, the American patent bearing date Jan. 29, 1861, and further information in relation to the matter may be had by addressing the inventor, Alexander Millar, corner of Franklin and Elm streets, New York.