SCIENTIFIC MUSEUM.

Arrow Root in Florida.

The Everglades are separated from the sea by a strip of land varying from four te ten miles in breadth, and from two to three hundred miles in length, almost completely encircling it, and covered with a rich growth of pine. Scattered about at their feet is a modest little plant, the arrow-root; the tops of which resemble tansey. Covered by a thin soil it is easily dug and removed. Its appearance is similar to the sweet potatoe, but more irregular in shape, and with a thicker, tougher covering. Carried by mules to the mill situated upon the edge of some one of the numerous streams running from the glades to the sea, they are thrown into a large cylinder, the circumference of which is formed of bars of wood, and separated from each other a few inches. The cylinder revolves and a stream of water constantly flows upon the roots; they are thus thoroughly cleansed, and their surface coming in contact with the rough edge of the transverse bars, the roots are peeled and ready for the grinder. This machine reduces them to a pulp, which is passed through vats of fresh water, and thoroughly cleansed from all impurities. The mass is now a milky white, resembling curd, and must be spread upon frames with cotton-duck bottoms, to the thickness of three inches, and exposed to the sun. This drying process is quite rapid in that hot climate, and is the last preparation (save raking the pulp and breaking the mass into small grains) in the manufacture. It is then boxed and ready for market. The whole process of digging, peeling, washing, grinding, and drying, may be gone through with between sun and sun.

The simple manner of manufacturing arrow-root requires but a small outlay for machinery, and the mills now making the article are all small and the production not extensive. It makes excellent starch, and the supply of roots is almost unlimited, and the production can be easily increased, so that if the potatoes fail, the pine woods of Florida will turn out a substitute.

Rough Plate Glass for the Roofs of Hot Houses.

Some time ago rough plate glass was proposed for hot houses in place of the clear translucent kind. In respect to its use the London Gardeners' Chronicle says:—The garden committee directed the rough rolled plate glass to be tried in the garden of the Horticultural Society at Chiswick. For this purpose a small pit, unventilated except by sliding the sashes, and heated by hot water pipes, was selected. In the last week of Aug., 1851, this pit was filled with soft wooded plants, which can only be kept in health in the presence of a large quantity of light. The experiment was thus set in action without any special care having been taken to make it succeed; on the contrary, everything was against success. It is needless to say that the months of October, November, and December were more than usually gloomy, and that neither January nor February offered any advantage over those mouths in ordinary years. In addition to this it was often necessary to leave the plants in the dark all day long, in consequence of the sashes being covered with frozen mats, which could not be removed.—Nevertheless, and notwithstanding these impediments, the experiment was perfectly successful. On the plants being produced, at a subsequent meeting of the Horticultural Society, by Mr. Gordon, to whom the experiment was confided, they appeared in the most beautiful health, with firm, short wood, broad, thick, clean, bright-green leaves, and in the case of the Gesneea and Pentas, with flowers pertect in color, size, and form. In short, it may be said, without the least exaggeration, that more pertect examples of high cultivation were never seen, and few so perfect. It was clear that there had been no deficiency of any element or condition which is required for the most perfect health. This conclusive proof of the excellence of rough plate glass possesses the highest agricultural interest. It shows that gardeners are now secured effectually from the scorching effects of the sun during summer, and that all the costly as well as inconvenient contrivances for shading may in future be dispensed with."

Wells, Pumps, &c.

(Continued from page 136)

Air Vessels in Pumps—Some experiments have been made by Messrs. Kirchweger and Prusman, engineers, of Hanover, on the positive effect produced upon the action of pumps by the application of air vessels on the suction pipes. Air vessels have been applied for many years on delivery pipes, but it is only lately that their value has been properly estimated, although it is obvious that it is of as much importance that the pump should be filled with water, as that the delivery should be constant.

The apparatus employed by the German engineers is represented in section in fig. 1. A is a reservoir, which represents the source whence the pump draws its water; B is the suction pipe, and C is a valve-chest, containing a ball-valve, surmounted by a cock discharging at the side. The plug of the cock is stationary, whilst the shell is moved by the handle, E. D is the air vessel.

Fig. 2 shows the details of the valve on a larger scale.

It is obvious that, by causing the cock to revolve by means of the handle, E, a certain volume of water will escape each time the passage is opened, the height of water column in the pipe, E, answering to the pressure of the atmosphere in causing the water to fill the pump.

The result of the trials was, that when the air vessel was removed, and the opening stopped, an increased velocity of rotation of the cock gave less water; but with the air vessel the increase of velocity gave more water.

The trials were made with different speeds

Figure 1.

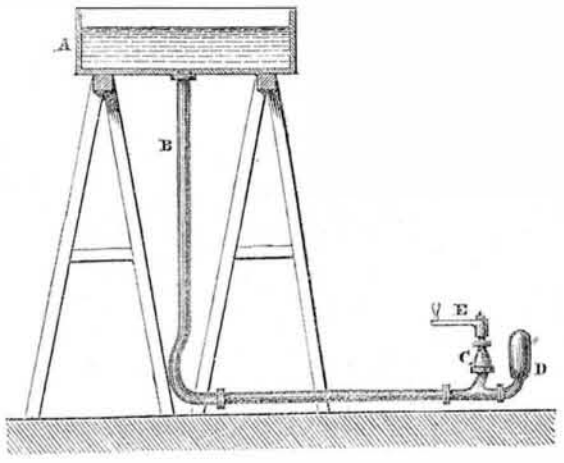
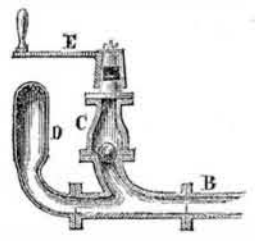


Figure 2.



and different pressures of water, with the results shown in the following table:—

No. of turns per minute.	Gallons of water delivered per min. under a mean pressure of 17 ft.	12½ ft.	8¾ ft.	2¾ ft.
With air vessel.				
80	12·9	12·78	8·79	2·83
100	15·6	15·43	11·25	4·82
120	17·15	16·63	12·23	5·44
140	18·28	16·75	12·98	5·54
Without air vessel.				
80	9·45	8·62	6·902	2.36
100	8·03	8·08	6·05	1·98
120	6·55	6 54	5·42	1·88
140	5·42	6 29	5·17	1·51

The capacity of the air vessel is 66 cubic inches.

The weight of the ball valve 2·315 lbs.

The area of the valve seat=11.5 inches.

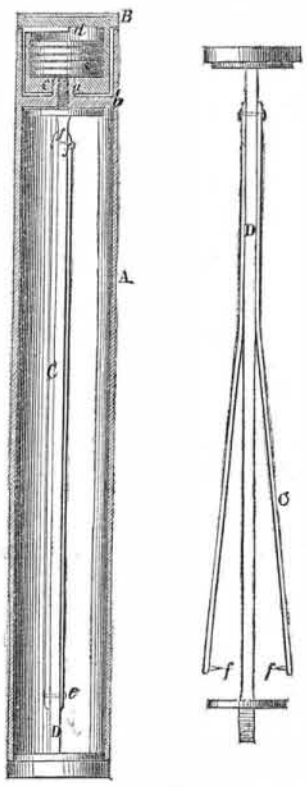
The smallest diameter of the feed pipe is 1·48 inches.

The quantities delivered at 80 to 100 turns are the mean of four trials; those of 120 and 140 turns are the mean of 3 only.

If these trials are to be taken as the exact result which may be expected under similar circumstances with a pump, it is evident that a large increase of duty may be expected, by adding an air vessel on the suction side of a pump, working at a high speed. For, it will be observed that, whilst at 80 turns the increase is only 20 per cent., at 100 turns it is 133 per cent., at 120 turns 189 per cent., and at 140 turns 266 per cent.

Counterfeit Coin Detector.

Fig. 1. Fig. 2.

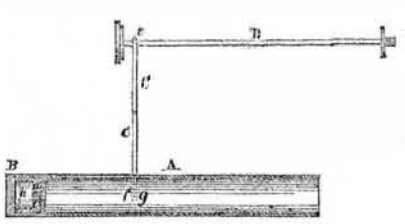


The annexed engravings are views of an instrument for detecting counterfeit coins, invented by H. G. Robinson, of Schuylkill Haven, Penn.

Figure 1 is a longitudinal vertical section of the instrument taken through the centre. Fig. 2 is a detached view of the clamps, and fig. 3 is a longitudinal vertical section of the case, the clamps being withdrawn and applied to the case for the purpose of weighing the coin in the receptacle at one end of the case. Similar letters refer to like parts.

A represents a cylindrical case or tube, having at one end a receptacle or gauge box, B. This box is also cylindrical, and fits within the case, A, and is secured there by a screw, *a*, attached to a partition, *b*, which screw passes into a nut, *c*, in the bottom of the box, B. The receptacle or gauge box, B, may be sufficiently large or deep to contain several pieces of coin. At the upper or outer end of the box there is a recess, *d*, cut through and around just one half the circumference of the box; this recess will consequently admit a coin to be passed through it as large as the box will contain. The width of the recess must equal the width of a genuine coin of such a size as the box is capable of holding. The remaining portion of the case, A, inclosesa pair of clamps, C; these clamps are attached at one end to a rod, D, by a pivot, *e*. The opposite ends of

Fig. 3.



the clamps are provided with points, *f f*. The rod, D, has a screw thread cut upon it, at one end, which screw-thread passes into the centre of the screw, *a*, as the rod, D, is turned; and the rod and clamps are thereby secured within the case, A. In order to detect counterfeit coin, the gauge box, B, is withdrawn from the case, A. If the coin will pass snugly through the recess, *d*, into the box, it must of course be of the same dimensions as a genuine coin, and if a counterfeit it will be lighter. The clamps, C, are then withdrawn from the case, A, and the small points, *f f*, are inserted in fulcrum holes, *g g*, one on each side of the case. These fulcrum holes are placed at certain points in the case, so that when a genuine coin is in the box, B, and the box adjusted within the case, A, the case will exactly balance or be in equilibrium, when it is suspended at the fulcrum holes, (see fig. 3), the coin being represented by *h*. If a counterfeit coin be of the same weight as a genuine one it will necessarily be larger, and will not pass through the recess into the box, B, weighing, in this case, would be unnecessary.

If the receptacle or gauge box, B, contains several coins, they must be all removed when a coin is to be tested by weighing, and the coin to be tested should be moistened to cause it to adhere to the end of the box, as seen in fig. 3. as a change of position of the coin would cause great inaccuracy in weight. Bank notes may be wound around the rod, D, and clamps, C, within the case, and the implement will thus form a convenient receptacle for both coin and bank notes, equally as portable as the ordinary wallet or pocket-book.

Measures have been taken to secure a patent, and more information may be obtained by letter addressed to the inventor.

Scientific Prediction Fulfilled.

The Boston Journal states that McKay, of the clipper Sovereign of the Seas, built in Boston, previous to sailing from this city, (N. Y.,) for San Francisco, in August last, addressed a latter to Lieut. Maury, of the National Observatory at Washington, requesting a copy of the fourth edition of his Sailing Directions, for the use of the voyage. Lieut. Maury answered the letter, stating that if Capt. McKay would follow the directions laid down, the Sovereign of the Seas would be able to cross the Equator in the Pacific on or before the 25th day of October, and would reach San Francisco in one hundred and three days.

The Sovereign of the Seas crossed the line only 14 hours behind the predicted time, and dropped anchor in the harbor of San Francisco in one hundred and three days and two hours after leaving New York.

This prediction on a voyage of 17,000 miles, is a forcible illustration of the benefits of modern scientific research.