tub may be made from a portion of a cask, and if desired it may be sunk in the ground. Place in the tub good soil enough for the roots, perhaps a quarter full will be sufficient; put in the plant; it is not necessary to plant it, merely pressing the stem into the soil will answer. The big affair which passes for the root is really the stem, which lies along the bottom of the pond. One side of this produces roots which take a strong hold of the soil, as every one who has tried to get up one knows, while buds producing the leaves and flowers are on the upper side. When the tub is filled with water no further care is required during the summer, except to supply water as it may be needed, as it is not likely that the rains will make up the loss by evaporation. Unless the tub can be so protected that it will not freeze solid it should be moved to the cellar at the approach of cold weather. Only enough water need be left in the tub when it is moved as will be needed to keep the soil moist.

Deep Sea Trawling.

In the trawling and dredging operations of the Fish Commissioners' steamer Fish Hawk three different trawls or dredges are used—the beam trawl, the otter trawl, and the harrow dredge. Before the dredges are thrown out the depth of the water is ascertained by a sounding apparatus, a modification of Sir William Thomson's. No depths are ever taken without ascertaining temperatures. The thermometer used is the Negretti and Zambra, which has the advantage of recording temperatures more quickly than the Miller and Cassela. Lieut. Tanner, U. S. N., commanding the Fish Hawk, has devised an ingenious method of reversing the thermometer when it reaches bottom, so that no intermediate temperatures are recorded. The depth being ascertained, the operation taking but a few moments, and the temperature being recorded, dredging commences. The steamer has a reeling engine forward, around the drum of which a steel wire rope, three-eighths of an inch in diameter, is coiled. Two kinds of trawls are used for dredging, the beam trawl and the otter trawl. The beam trawl, which is copied after those used by the English and Dutch fishermen in catching turbot and sole in the German Ocean, is some 16 feet across, with a purse-formed net some 35 feet long, the meshes being about 1½ inch at the beam, and diminishing rapidly in size toward the tail of the net. A boom is rigged out from the foremast, which is at right angles with the ship. The trawl connected with the steel wire is hauled up by steam power and lowered into the water. The steel wire runs through three pulleys, and is attached by a rope to an accumulator, made of a series of rubber disks, which regulate the strain. In order to preclude chance of accident, it being better to lose the trawl than the steel rope, the trawl is fastened to the rope by means of a detacher, which has two jaws to it. If the trawl should catch on a rock and a tug take place, the steel rope being more valuable than the trawl, the attacher unloosens itself. At a strain of 4,000 pounds the trawl would be detached. The steel wire will stand a dead pull of 8,700 pounds. Care is taken to prevent all kinks in the steel rope when winding or unwinding, for a kink diminishes its strength just 50 per cent. The beam trawl is lowered gradually. When the beam touches the surface of the water, it being weighted down on both ends by strap-shaped irons called runners, it sinks parallel with the bottom. Then the vessel is allowed to drift backward, if such be the condition of the tide, or she is moved away from the trawl by reversing the screw. The trawl is then like a big bag, with its mouth wide open, which is drawn dredge-like across the bottom. In a sailing craft, as the luggers, the trawl is worked from the stern, the vessel being kept under easy sail. After the trawl has remained down some 20 minutes it is hauled up. As the hoisting engine is on the upper deck, it would be inconvenient to dump what is taken in the trawl. As the net comes up, the top being suspended from the wire rope from the beam, the tail of the bag is opened on the lower deck, the end of the purse being unloosened, and the varied contents pour into a trough, which has a series of wire bottoms of various degrees of fineness. About 40 minutes are sufficient to make a dredging.

The otter trawl works somewhat in the same way as the beam trawl, only instead of a transverse beam of wood or iron, the sides are held by two pieces of heavy wood, in shape something like center boards. These are weighted at the bottom with iron keels. The net is about the same shape as the beam trawl. The two weighted pieces of wood sink the net, the net itself having floats of cork above and leads below. As the net is drawn under water by the movement of the vessel, the two pieces separate, flaring out. As the net is hoisted the pieces of wood close up, and the mouth of the bag is shut. The advantage of the otter trawl is that it is less costly and more easy of storage, being the form usually employed by English yachts. It is more convenient for dredging in shallow water, but is not, perhaps, quite as certain in its effects as the beam trawl.

A third kind of dredge is used for clay bottoms and only for scientific purposes; this is the harrow dredge. In using this the object is to tear up the bottom some feet in advance of the bag, so that the forms embedded in the bottom may be secured. There is an iron harrow, which is in front of a net which is covered with canvas to protect it from tearing, the mouth of the net being extended by an iron frame. The possible use of the first two trawls by our fishermen is a fact which ought not to be overlooked. It is true that at present we do not have on our coast any varieties of flat fish of as good quality as those caught in the German Ocean. But still the contingency might arise when such nets could be found serviceable. The pole flounder, which is by far the finest variety of flat fish we have in our waters, can only be caught to advantage by means of trawls, and when once the merits of this fish have been determined, there is no doubt that our fishermen will profit by such experiences as the United States Fish Commission has given them.

Swarming Extraordinary.

D. N. Kern relates in the *Ohio Farmer* the following experience with a swarm of Italian bees: The first swarm came out May 5, and was put in a hive filled with comb. On the 19th of May the second swarm came out, and was hived with a weak swarm. On the 20th the third came out, and was hived with the second and the weak swarm. On the 21st the fourth swarm came out. Mr. Kern caught the queen and killed it, and put the swarm back to the old colony. On the 23d the fifth swarm came out. He caught two queens and killed them, and put the swarm back again. On the 24th, at nine o'clock A.M., the sixth swarm came out. He caught two queens again and killed them, and put the swarm back again. The same day, at three o'clock P. M., the seventh swarm came out again. This time he hived them in an old straw hive, and set them on top of the old hive. In the evening of the 25th he shook them down in front of the old hive again, and that settled for the time the swarming fever of the old hive. But on the 26th of June, the first young swarm threw out a very large swarm, and on July 3d threw out a second swarm, and about five minutes later a swarm came out of the old hive again. He hived both swarms together and sold them for $200 cash. All these swarms made 235 pounds of comb honey.

New Substitute for Rubber.

This artificial composition, which answers the purpose of genuine caoutchouc or gutta percha, can be employed, according to Dankworth and Sanders, of St. Petersburg, either alone or in connection with other resinous substances. According to *Ackermann's Gewerbezeitung*, this new product affords an inexpensive means for a perfect isolation of wires for electrical purposes. The composition is elastic, tough, not so sensitive to external influences as caoutchouc or gutta percha, and is not injured by high pressure or high temperature. It is prepared in the following manner:

A quantity of coal tar oil, or equal parts of coal and wood tar oil, which is to constitute a third part of the whole mixture, is poured into a large kettle, together with an equal quantity of hemp oil, and is beated for several hours, either over steam or an open fire, to a temperature which lies between 252° and 288° Fah. (it should not exceed the latter), until the mass becomes so ductile that it can be drawn in long threads, and the remaining third, consisting of a quantity of linseed oil, which has been thickened by boiling, is then added.

With this composition from five to ten per cent of ozokerite and some spermaceti should be mixed. The mass is then heated again for some hours at the same temperature as above, and finally from seven to twelve per cent of sulphur are added. The mixture thus obtained is cast into forms and treated the same as caoutchouc.

The proportions of the three oils may be slightly varied according to the practical purposes for which the composition is to be used.

Wood Products of Norway.

The *Building News* (London) states that a great revival has lately taken place throughout Norway in all departments of the timber and planed-wood trades, which have suffered severely from a protracted depression. The wood pulp manufacture, however, has fared better, the demand from Great Britain and France being persistently on the increase. At the commencement of the year there were 21 factories at work, the production for the last three years being as follows: 1877, 295,700 cwt., value £78,300; 1878, 386,482 cwt., value £96,000; 1879, 400,000 cwt., value £90,000. Although the production in 1879 exceeded that of the previous years, prices were lower, from the great local competition; but as esparto grass has risen in value, it will very soon favorably influence the price of wood pulp, the more as the English paper makers contracted pretty largely for paper pulp during the winter, to the amount of 2,000 tons in excess of the ordinary demand. The wood pulp used in England contains about 50 per cent of moisture, but the French paper makers prefer having it air-dried, containing only 8 per cent. There are also four mills employed in making millboard from paper pulp. These are used for band-boxes, and are all sent to England.

Fine Linen.

According to the *Building News* a piece of linen has been found at Memphis containing 540 picks to the inch, and it is recorded that one of the Pharaohs sent to the Lydian king, Crœsus, a corselet made of linen and wrought with gold, each fine thread of which was composed of 360 smaller threads twisted together! The ancient Egyptians wove a fabric called the "linen of justice," or "justification." So beautiful and valuable was it that it was esteemed the most acceptable offering to the "Restorer of Life." A few hand looms can still be seen at work in the Eastern bazaars of Cairo, the cloth woven in which rivals in texture, color, and design the finest glass screens of Munich.

Correspondence.

Fire Apparatus in Cities.

To the Editor of the Scientific American:

In our large cities, when a building is discovered to be on fire, any one having the required key opens the door of the nearest of the little iron fire alarm boxes secured to the telegraph poles, giving an electric signal indicating the location of the burning building. This signal is transmitted to the fire department stations, where but a moment before mild looking horses were quietly munching their feed, and a general air of peace prevailed among both horses and men. But at the sound of the signal a scene of the wildest methodical activity prevails. Of their own accord the horses hasten to their places in front of the steam fire engine; one man lights the previously arranged fuel under the boiler of the engine; another harnesses the horses; the driver springs to his seat, grasps the reins, the station doors are opened, and away they start. All this within about seven seconds after the sound of the signal. Arriving at the fire the engine's pump is connected by hose to the nearest hydrant; a hose carriage is driven alongside and lays a hose from the engine to the burning building; by about the time a nozzle is coupled to this hose the engine has sufficient steam to commence pumping; the hose fills out roundly, and a stream of water is conducted to the burning building. And so with each steam fire engine that has been signaled; men with ladders climb with their hose to the roofs of the burning and adjacent buildings to secure advantageous positions for conducting the water; and if the burning building is of only ordinary size and combustibility, the fire is very soon conquered. But in case the fire occurs in a large warehouse stocked with combustible merchandise, and gains considerable headway before it is discovered, which is frequently the case with our present iron shutters, it may then become startlingly apparent that the inch and a half or two inch streams of water are unable to speedily conquer the element. Recently the writer happened to be in a good position to view a fire of this kind. It appeared as if the streams of water were almost entirely evaporated in passing through the flames, that very little water reached the source of the fire, and that the utmost exertions of the firemen were required to save the neighboring warehouses, and possibly the whole river front of buildings, from destruction. It occurred to me, as I watched the flames streaming high in the air, that in such a case a fire apparatus capable of throwing a stream of water four or eight inches in diameter to a distance of five hundred feet, when directed at an inclination of 45°, was needed. Such an apparatus would have to be in connection with several of the fire hydrants now in use in order to receive sufficient water. Or perhaps the delivery hose of several of the steam fire engines connected to one large swivel nozzle mounted on wheels, and planned similar to those used in the gold regions for washing down auriferous banks of earth, would answer. Such a stream, by reason of its weight and solidity, would pass through the flames to the source of the fire, and thus prove more effective than several small streams. It appears that each small stream of water acts on the principle of an ejector carrying with it by friction fresh air, thus in a measure aiding combustion. The safety and prosperity of our cities are so dependent upon our fire departments, that any means for rendering them more efficient is of vast importance, and successful inventions in this line would be pretty sure to afford inventors a rich harvest.

L. L. D.

New York, October 6, 1880.

RECENT INVENTIONS.

An improvement in grain separators has been patented by Messrs. William S. Bright and Samuel Thomas, of Letart, W. Va. The object of this invention is to furnish grain separators so constructed that the light grain, the cheat, and chaff will be separated from the grain by an air blast, and the cockle and other small seeds will be separated by screens.

An improved filter has been patented by Mr. Louis R. Sassinot, of New Orleans, La. This invention relates to a means for filtering the water collected in cisterns of ordinary construction in order to render it fit for drinking, cooking, and other purposes.

An improved stove truck has been patented by Mr. Hiram Shuman, of Buck, Pa. The invention consists in combining with a platform parallel locking shafts supported on fixed and swiveled casters, and an intermediate shaft parallel to the shafts, levers being attached to the latter and connected with the intermediate shaft.

An improved elevator for barrels, etc., has been patented by Mr. Latham W. Greenleaf, of Terre Haute, Ind. This is an improvement on the elevator for which Letters Patent No. 220,137 were granted to the same inventor September 30, 1879, the object being to better adapt them for use in elevating and lowering barrels and other articles from one floor to another in storehouses, warehouses, and other places, and which shall be so constructed as to load and unload themselves while in motion.

An improvement in stone crushers bas been patented by Mr. Charles G. Buchanan, of Brooklyn, N. Y. The object of this invention is to produce a parallel and sliding motion upon the lower portion of the crushing plates for the purpose of increasing the pressure, and, if desired, reducing the product to a greater degree of fineness.