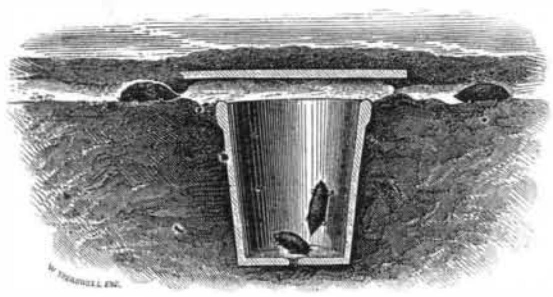
HOW TO CATCH MOLES.

We presume there are few of our agricultural readers who at some period have not heartily anathematized the moles. Although these little animals do a considerable amount of good in killing insects and worms which would destroy grain, they more than counterbalance the benefits they confer upon the farmer by the injuries they inflict upon the work of the gardener. They appear to have a taste for the choicest bulbs and for the roots of the rarest flowers, while their tracks very speedily ruin the appearance of smooth and neatly kept lawns.

The Patent Office records show that plenty of inventive genius has been expended in attempts to devise an efficient mole trap. Of these inventions we have tried quite a number in our efforts to rid our garden of the nuisance, but we have found none so satisfactory as the very simple plan represented in our engraving. As soon as a fresh mole run is



found, indicated of course by a ridge on the surface of the ground, a hole should be dug and a large sized ordinary flower pot set therein. Over the top of this receptacle, a piece of board is placed, leaving a space of about three inches between it and the edge of the pot so that dirt from above will not fall into the latter. The openings of the run lead, as represented, into this space. The earth is replaced and the surface of the ground restored. The mole in following his usual road blindly comes to the orifice leading to the pot, into which he incontinently tumbles. As he is unable to crawl up the sides or burrow through the hard earthenware, he decides to remain and wait for assistance, which generally comes in the shape of a gardener and a rat terrier. The transactions of the mole with the last mentioned of this pair are such as to destroy his taste for bulbs or for future mining investigations.

In using this device, we caught seven moles the first day and three on the second day after setting. Since then we have captured one occasionally. The result is a marked improvement in the aspect of our lawn and flower beds. The trap was contrived by George Becker, a gardener in Llewellyn Park, Orange, N. J., and is not patented.

Water Gas.

The improvements of W. D. Ruck are now in successful operation at the gas works of Chichester, England, and that city is now lighted by the new method, which is described as follows in *Engineering:*

The elements are water, coke, iron, and spirit. The water is converted into steam, which is passed through a superheater, and then through a set of retorts containing coke and iron, the charge for each retort being $1\frac{1}{2}$ cwt. of coke and 1 cwt. of iron One tun of coke put in and worked off, plus the steam, produces 132,000 cubic feet of gas, and to effect this 2 tuns of coke are used in the furnace. The gas thus produced is passed through a condenser and a washer similar to a Coffey's still, and afterwards through a purifier containing oxide of iron. From the purifier it is conducted to the saturator, where it passes through rectified petroleum spirit, which increases the bulk of the gas about 25 per cent, so that 132,000 feet becomes 165,000 feet, the cost of which is stated to be 40 centf per 1,000 feet.

In carrying out the manufacture of water gas at Chichester, the gas works have been only partially altered, so that the manufacture of coal gas is still carried on; the public, in fact, being supplied with a mixture of the two gases. This, it would appear, is the most economical method of applying the water gas, inasmuch as the coke from the coal gas can be utilized, and the latter gas can be made from cheap coal, as the former is found to be a very rich gas. Hence gas companies will probably find the water gas process useful as a supplementary manufacture while and whenever coal is dear, for it is not intended that it shall supersede the ordinary manufacture. At any rate, present experience at Chichester goes to place this beyond a doubt, for there a pure and brilliant combined gas is produced, having an illuminating power of 18·50 candles. The city and environs of Chichester have for some six or seven weeks past been lighted by a mixture of the two gases in proportions varying from one third to two thirds, the present proportions being equal parts. Arrangements have been made for lighting the city for twelve months with this gas. In order to demonstrate to those interested in gas making that the process can be applied to existing works practically and economically, more than a hundred gentlemen, the greater portion being gas engineers and managers, recently visited the works. They were conveyed from London to Chichester by special train, and when there saw the whole process in operation, explanation being given by Mr. Spice and Mr. Quick, the engineers to the new gas company. Mr. Spice was put under cross examination by several gentlemen who were skeptics on various points, but he reasonably and conclusively answered every argument brought to bear against the new gas, both with regard to details of manufacture and commercial points. At the Chichester Workscoal costing 30s. per tun was formerly used, while an inferior coal at 21s. is now employed in the retorts, the resulting coke being utilized in producing the water gas. The stability of the gas has been proved by keeping it for six months, at the end of which time it is stated no separation or condensation had taken place. Its travelling capacity is shown by the fact that it has been delivered by itself, and is now delivered in combination with coal gas to lights $2\frac{1}{2}$ miles from the works, and burns freely. That the lighting of the city is all that can be desired was admitted by the visitors who strolled through the streets after dark, previously to their return to London. The new gas has been subjected to the test of a reduction of temperature to the extent of 27 degrees without its illuminating power being affected. In fact everything appears to have been done to prove in it a commercial manner, the greatest proof of all being its practical adoption at Chichester, by which, up to the present time, it is shown to be a scientific as well as a commercial success.

DEEP SEA DREDGING APPARATUS.

The headquarters of the United States Fish Commission have been established for the present season at Casco Bay, Me., and the work to be accomplished consists in exploring the waters and sea bottom in the vicinity in order to obtain all ascertainable facts relative to the animals inhabiting that region. The Blue Light, a steamer of 85 tuns, has been fitted with all the latest appliances and machinery, and placed at the disposal of the Commission.

We extract from the *Tribune* the accompanying illustrations of the instruments employed in deep sea explorations, the most useful of which is the dredge, which, in its present

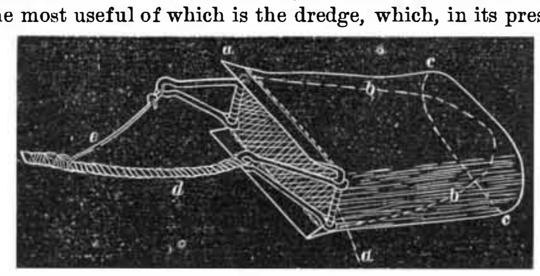


FIG. 1.

form, is capable of scraping, from the ocean floor, everything lying in its path. It consists of an open iron frame (*a* in the engraving, Fig. 1), which acts as a scraper, and to which is attached a fine meshed net, *b*, about four feet in length. Over the net a canvas bag, *c*, open at the bottom, is extended, serving to protect the former from injury while it is dragged over rocks. To extricate the implement in case it becomes caught on any obstacle at the bottom, the drag rope, *d*, is attached to only one of its handles, and is connected to the other by a light line, *e*. It follows that, when a hard strain comes, the light line breaks, and the heavy rope pulls thereafter at one end of the frame. The obvious result is to

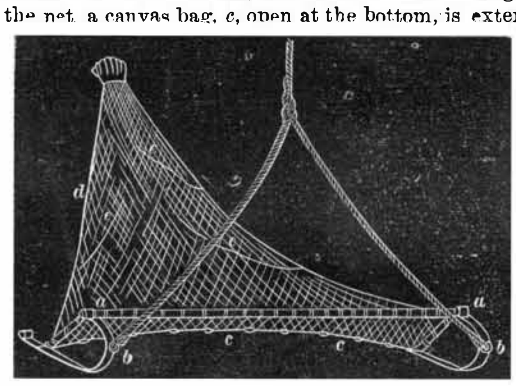


FIG. 2.

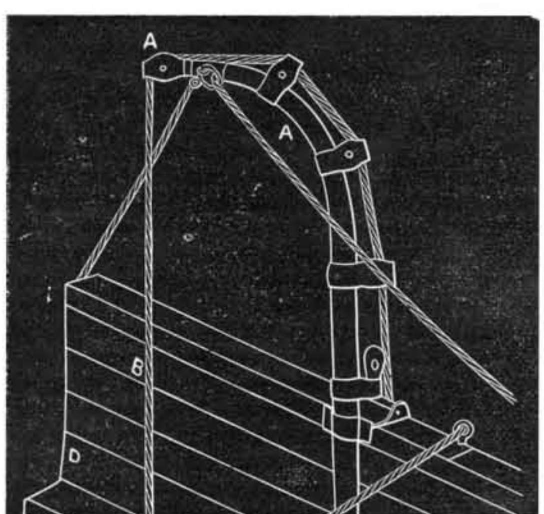


FIG. 3.

pull the scraper sideways out of its predicament. This is a simple modification of an old device, and is quite efficacious. To bring the scrapers down to their work, a weight of about twenty pounds is attached to the drag rope, one or two yards in advance of the dredge.

The specific value of the apparatus is as a scraper, as it brings up an abundance of material from the sea bottom; but where the bed is comparatively smooth, and the chief object in view is to obtain fishes and other active marine animals characteristic of the locality, the trawl (Fig. 2) is a more serviceable instrument. The front of the trawl is a beam, *a*, in our second figure, ten or twelve feet long, to the ends of which are affixed curved iron shoes or runners, *b*. From it depends a funnel shaped net, *c*, of perhaps thirty feet in depth, weighted by a string of leads, *d*, on the forward lower edge. These weights and that of the runners are sufficient to sink the trawl, and it does not usually need an extra weight in front, on the drag rope, as does the dredge. Projections or webs, *e*, proceeding from the inside of the net, called pockets, serve to prevent fishes captured in the net from getting out by the route that they go in. Over a smooth bottom and meeting no obstructions, such a trawl may be dragged along for hours at a time, till it grows so heavy with its accumulated treasures that its safety requires that it be hauled up and emptied. But, on the other hand, it may catch suddenly. Having caught, unless the strain is at once relaxed, it will be torn to pieces. On the other hand, if skillfully managed, it may be made to bring up almost anything which it incloses, and there is shown at the landing near the laboratory, on this island, a rock weighing nearly a quarter of a tun, which the Blue Light brought up in the trawl. The problem, therefore, is, when the trawl catches, to relieve the strain at once, and this accomplished in the following manner: The trawl, suspended by a strong rope, is let down rapidly from a davit on the bow of the steamer, until the slackening of the rope indicates that bottom is reached; the steamer meanwhile moving slowly backward till a suitable angle is secured, so that the trawl will drag properly over the sea bottom. Then, while the rope is still running out, a seaman swings himself out on the davit and ties one end of a light line, called the check-stop rope, with a skillful knot, fast to the drag rope, and the other end to the side of the vessel. The business of trawling is now fairly begun, and the steamer is backed slowly along over the ground selected, at the rate of about a mile and a half per hour.

Fig. 3 shows this check-stop arrangement; *a* is the davit, *b* the drag rope, and *c* the check-stop line.

The trawl is now dragging from the bow and suddenly catches on the bottom. The strain has been all along on the check-stop rope which now parts with a snap. Instantly the order is given to reverse the engine; but long before the motion of the boat can be changed, the slack of the drag rope, which this simple contrivance has provided, relieves the strain, and time is afforded to let it out until the motion changes. The boat is then run rapidly forward until it stands over the sunken trawl, the steam engine winding in the drag rope. Then, with a little dextrous management, the trawl is easily pulled away. This device entirely takes the place of the costly accumulators used in the telegraph cable service, instruments which interpose a sort of drum made of india rubber in place of part of the drag rope, the elasticity of the material serving to release a heavy strain.

The Heart and the Circulation of the Blood.

Dr. Marey, says *Les Mondes*, has recently demonstrated that the heart acts like all mechanical motors in that the frequency of the pulsations varies according to the resistance which it meets in driving the blood through the vessels. When the resistance becomes greater, the throbs diminish; they accelerate, on the contrary, if the opposition becomes less. During life, the action of the nervous centers makes itself felt on the heart, of which it renders the pulsations slower or quicker, whatever may be the resistance experienced. Dr. Marcy eliminated this nervous influence by removing the heart of an animal, and causing it to work under purely mechanical conditions. The heart of a turtle was arranged with a system of rubber tubes representing veins and arteries. Calf's blood, defibrinated, was caused to circulate, and a registering instrument noted the amplitude and frequency of the movements of the organ. When the tube containing the blood leaving the heart was compressed, the liquid accumulated in rear of the obstacle and the heart emptied itself with greater difficulty, the pulsations weakening perceptibly. On relaxing the pressure, thus allowing free course to the blood, the throbs accelerated rapidly.

Pure Sub-Iodide of Mercury.

Lefort recommends the following method for preparing the sub-iodide of mercury free from iodine and from metallic mercury: 60 grains of pure crystallized pyrophosphate of soda are dissolved in 300 grains water, and 30 grains acetate of the suboxide of mercury added. The solution requires several hours, during which it is frequently shaken. If the soda salt is chemically pure, the mercury salt dissolves perfectly; but this is seldom the case, and the excess of alkali precipitates some oxide of mercury, so that the solution requires filtering. It is then still further diluted with water, and a solution of 30 grains iodide of potassium in 2 ounces of water gradually added with constant stirring or shaking. This produces a precipitate which is at first a brownish green, but becomes a bright green, closely resembling oxide of chromium, and on settling acquires a yellow green color. If the mercury solution contains any mercuric salt at the start, some biniodide of mercury is formed, giving the liquid a pinkish color; but this is easily avoided by adding a slight excess of iodide of potassium, which is so dilute as not to decompose the sub-iodide, while it is able to dissolve the biniodide. The precipitate is washed with cold water by decantation, collected on a filter and dried with gentle heat in the dark.