

past five years in tinkering old ships of war, not one of which is thoroughly fit for severe service. Three million two hundred thousand dollars has been appropriated for eight new sloops, it is true, but this is not included in the above amount; nor is any portion of the same, except one million dollars, chargeable to any other necessary expenditure save repairs. The money that has been wasted is sufficient to have provided a powerful fleet, armed with every accessory of modern warfare, instead of a navy the crack ships of which could not, as the Key West drill proved, steam at a higher rate in company than four and a half knots per hour, and which are armed with guns contemptible before the modern European ordnance.

A very brief examination of the present condition of the array of vessels now borne on the navy register, as recently given by the *Army and Navy Journal*, will show to the reader that the status of affairs is the reverse of encouraging. Beginning with the wooden vessels, there are five large steam frigates; one is utterly rotten and worthless, and the newest of the rest, the Franklin, built shortly after the war, is armed with old-fashioned smooth bore 9-inch guns, and can, as the writer knows by personal experience, just hold her own against a stiff gale, under full steam power. The next class or second rate includes thirty-three vessels; three are old paddlewheel ships twenty years and over old, one being changed to a screw steamer. Eight are "Isherwood's failures," rotten, not worth repairing, and will shortly be broken up. Five are old-fashioned but in moderate condition; the boilers are so placed as to be unprotected. Four have Isherwood engines and Martin boilers, and are small vessels built of white oak, moderately rotten. Five built before the war are the best vessels in the service. Six are not munched, one never will be, the rest have engines—Isherwood again—every one of which has gone into the scrap heap. One is being tinkered at, and has cost two and a half millions alone thus far for repairs, and one has never been to sea except for a deceptive trial. Her total weight is 4,339 tons, and of this her machinery and coal alone weigh 2,010 tons.

The third class numbers twenty-four vessels; one, the Swatara, has been rebuilt and fitted with compound engines. She consumes 15 tons of coal under six boilers per 24 hours, and makes an average speed of 6½ knots. Five are in fair condition, though merely old-fashioned gun boats. One has had her machinery condemned and is being repaired. Two are old sailing vessels on which attempts at conversion into steamers are being made. Two are unsafe in a seaway; two are condemned and are to be broken up. Another is old and useless. Two are in Asia and cannot get back; two are unseaworthy. Two more are worthless, and are to be repaired, if possible. Five are three-gun gunboats, (boilers above the water line and bad machinery), and the last is an old paddle wheel steamer, 25 years old, stationed on Lake Erie. The fourth class includes a couple of old blockade runners and some dispatch boats.

The ironclads number fifty-one. There are twenty "light drafts," which are condemned and perfectly worthless. The department is selling them at any price. Next, there are seven of about 1,200 tons displacement. These have laminated armor, which guns equal in power to the 7, 8, and 9 inch Woolwich rifles can pierce like so much cardboard. Six monitors have about 1,500 tons displacement, open to the same fatal objection. Four are double turreted, and displace 3,000 tons. These have green white oak hulls, thoroughly rotten, and armor also no shield to modern heavy projectiles. Four more are on the stocks, have never been launched, and are so much decayed that it is recommended that they be broken up. Three are a remnant of the old Mississippi flotilla, of course now of no value. The Dictator has weak armor; but if this could be replaced with solid plating and modern guns be mounted in her turrets, she would be one of the most formidable ironclads afloat. The same may be said of the unfinished Puritan. The Roanoke is an old frigate razed and covered with worthless armor.

Add to this category a few tugs, two torpedo boats, and a few ancient sailing vessels (used for practice, store, and receiving ships), and the entire United States Navy is summed up.

PRINTING THE PATENTS.

Recently, in the House of Representatives, the committee on appropriations reported a clause authorizing the expenditure from the patent fund of \$40,000, for producing copies of current and back issues of the patents, whereupon several gentlemen took occasion to express their sentiments.

It is gratifying to observe that all of the speakers were in favor of having the back patents printed as early as practicable; and although they did not sanction a sufficient appropriation for the work this time, they did something towards it, and expressed the opinion that next year it should be wholly accomplished. Mr. Meyers thought that the proposed printing would greatly benefit inventors. "We should," he said, "consult their best interests, and in doing so will always best develop the inventive genius of our people."

Mr. Conger said: "I think it very necessary and essential to the interest of inventors, who pay all these expenses in the end, that as large an amount as it is possible shall be appropriated."

Mr. Garfield was in favor of a larger appropriation, but thought it impracticable at present to use it, owing to the crowded state of the Patent Office, and the consequent necessity of hiring space, at a heavy cost, if additional drafts men were to be employed.

NINE THOUSAND dollars has thus far been contributed toward the Agassiz monument.

THE CULTIVATION OF OYSTERS.

In our last issue, we traced the oyster from the spawning bed through its four or five years of development. It is now on what may be called the fattening ground, the firm gravelly bottom of a channel between rocky islands, swept by a tide which runs like a river in flood. Here the oysters spend their last season, with as much enjoyment, we fancy, as oysters are capable of. The conditions of oyster life are here evidently at their best, for the oysters improve astonishingly, doubling in bulk of meat, it may be in six months. Here the crooked are made straight by their own efforts, the slender grow broad and round, the lank become stout, and the flesh of all grows plump and hard to the very gills. Notice the difference between the opened "natural" and a "transplant" of corresponding age, especially in front of the circular muscle commonly called the heart!

But the oyster is not yet in condition to tickle the palate of the epicure. It is full of bitter, salt sea water; the gills are discolored, and the whole system needs renovating. It must have a drink of fresh water. The common run of oysters are taken direct from the "salt" to the market. Not so the fancy product of cultivation. These are taken to the mouth of a sweet-watered river and placed for a few hours in a shallow float, which swims near the surface of the water. Here the oysters "drink," as it is technically called, spirting vigorously, and freeing themselves of all deteriorating matter. Open one now. It lies plump and white in the shell, rounded to the gills, which are scarcely visible, in every part clean and tempting to the most fastidious. Taste it, and know how sweetly delicate an oyster may be!

Not many people know it, but there is as great a difference between a thoroughbred oyster, properly handled, and an ordinary oyster such as one sees in the markets, as there is between a rough seedling pear and a Bartlett which melts in the mouth. Those who have learned the difference experimentally will eat no other where the cultivated are to be found.

The variety we have been studying are genuine "saddle rocks," raised on their native soil. Other varieties differ in color and flavor, and have their local admirers; but none surpass the true saddle rock in all the qualities that form the perfect oyster.

We set out to describe the cultivation of oysters, and have done so as one might describe the cultivation of wheat in Nebraska, omitting to mention grasshoppers. It will not do, however, to leave out the shadows of the picture. The oyster eater may care but little for the long battle that has been waged with various enemies to secure the development of the savory morsel that lies before him on the half shell; but to the man who raised the oyster it is a matter for serious consideration. If a crop of wheat required five or six years to come to maturity, and during all that time was subject to invasion by destructive insect pests, not to mention human marauders and elemental dangers, it would bear some resemblance to a crop of oysters. The likeness would be still closer if the attacks were made invariably in the dark. It is hard watching against enemies which work under cover of from ten to a hundred feet of water.

The chief animate enemies of the oyster and the oyster cultivator are (barring oyster thieves) the starfish, the drill, and—shall we say it?—the periwinkle. The starfish is perennial. It is to the oyster grower what the grasshopper or the army worm is to the farmer on *terra firma*. Its worst assaults, too, are made in like manner, that is, in overwhelming masses. The sea is full of them, and at times they will come up from deep water in solid column, broad enough to run over large areas, and so numerous that not a living



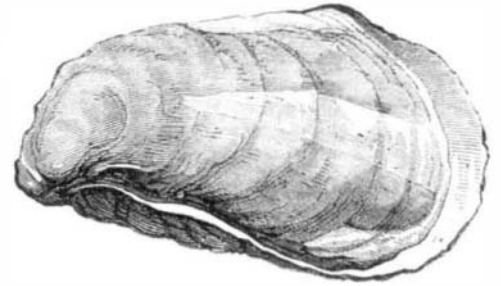
STARFISH AT WORK.

thing remains in their path. Miles of oyster beds have been laid waste by them, and the perpetual possibility of such invasions makes the oyster grower's investment extremely precarious. It is only by constant dredging that it is possible to do anything on the north shore of the Sound, the cost of carrying on the war, with the losses entailed, making the heaviest of the oyster breeder's taxes. On the Long Island shore they have been, we are told, less troublesome of late. By persistent labor many grounds formerly given over to their ravages have been recovered; and when steam comes to be more generally used in dredging, it is possible that the pest may be quite overcome and exterminated.

A short time ago one of our scientific cotemporaries published a digest of a French report, in which the starfish was described as helping to complete the work of destruction be-

gun by the drill. It would be fortunate, indeed, for our oyster breeders if the stars were thus dependent. It is true enough that the drill paralyzes the oyster (chiefly those under three years old) by boring a hole into the oyster's heart, as its large muscle is called; but the star waits for no such intervention. On the contrary it destroys both the drill and the oyster, and every other mollusc it comes across.

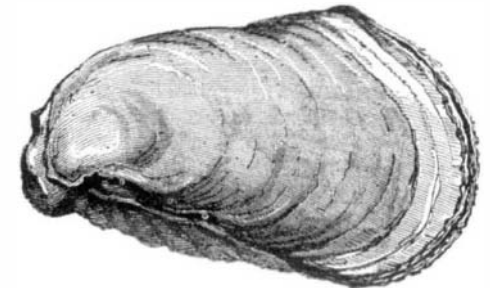
In the current issue of the *Popular Science Monthly*, Mr. Lockwood gives a more correct account of this baleful star's proceedings. He errs, however, in saying that the star merely clasps the oyster, then patiently awaits its opening, whereupon it drags its victim as a burglar might blow chloroform through the crack of a partly opened door. The rapidity with which stars destroy oysters, and the invariable corrosion of the outer edge of one of the valves of the oyster's shell, making it shorter than the other and the junction of the



WORK OF STARFISH.

two imperfect, is evidence enough that the burglar waits for no opening of the door. By what process the shell is eaten away, whether by an acid secretion or otherwise, we do not know. That it is eaten away, the shell of every oyster killed by stars bears unmistakable testimony.

The case of the periwinkle is less clear. The assertion of certain naturalists that the 'winkle is a harmless and innocent vegetarian is met with such derision, by oystermen, as shepherds would be likely to greet the assertion with that wolves eat nothing but grass. They regard 'winkle as the chief destroyer of mature oysters, and will show you just how the oyster's nose is broken off between the tough foot of the 'winkle, and its outer shell. They have caught the rascal in



WORK OF PERIWINKLE.

the act time and again, with more or less of the oyster devoured. It is a pretty case of conflicting testimony as it stands, possibly one of mistaken identity.

The drum fish, which makes such havoc among the oysters of other localities, is but an occasional visitor in the Sound, and never in sufficient force to do much harm.

It must not be supposed that this exhausts the list of the difficulties and dangers which the oyster grower has to contend against. Inanimate as well as animate Nature bears hard upon him in more ways than we have space for mentioning. Nevertheless endurance, pluck, and energy prevail in this as in other forms of industry, especially new ones, in which everything has to be learned by experience. Though greatly extended during late years, the business of oyster culture is yet in its infancy. It cannot fail to become more and more important as rapid transit broadens the area over which live oysters may be distributed, and more of the inhabitants of the interior learn to know the oyster's capabilities.

In closing, we must express our special indebtedness for information, for opportunity to study the workings of oyster culture on the spot, and for the specimens selected for these illustrations, to the Messrs. Hoyt Brothers, oyster farmers and dealers in fancy oysters, at Norwalk, Conn.

Prizes for Chemical Discoveries.

The following prizes for chemical discoveries are offered by the *Société d'Encouragement*, Paris: Disinfection and prompt clarification of sewage, \$200, 1875. Inknot attacking metallic pens, \$200, 1875. Economical production and application of ozone, \$600, 1875. Fixation of atmospheric nitrogen, either as nitric acid, ammonia, or cyanogen, \$400, 1876. Artificial production of graphite, suitable for lead pencils, \$600, 1877. Artificial preparation of a compact black diamond, \$600, 1877. Industrial application of oxygenated water, \$400, 1878.

The Railway World.

This is the title of a new and handsome weekly paper, 16 quarto pages, \$4 a year, lately established at Philadelphia. It is the successor of the *United States Railroad and Mining Register*. If we may judge from the contents of the first number, the new periodical is in the possession of the real requisites for success, namely, ability and enterprise. We cordially wish for it the highest prosperity.

It is reported that the owners of the Great Eastern are contemplating the project of turning the ship into an immense hotel, and sending her to the Centennial Exposition.