

THE NEW YORK AQUARIUM.

BY WALTER L. BEASLEY.

The New York Aquarium at Battery Park is remarkable in more respects than one. Its attendance record of over 1,625,770 the past year, an average of 4,440 daily, stamps it as one of the most popular show-places provided by the city. Two years ago it was turned over to the management of the New York Zoological Society, who fortunately secured as the director Mr. Charles H. Townsend, formerly chief of the Fisheries Division of the United States Fish Commission. Many innovations, such as lighting, beautifying the interior, lining exhibition tanks with rockwork, supplying them with marine and fresh-water plants, so that the fish can be seen with a natural background, have been introduced. A fish hatchery has been established in one of the large floor pools, where the general public can view the process of raising fishes from eggs. The rotunda inclosure, with its one hundred wall tanks and several spacious floor pools, shelters two thousand captive sea-dwellers of different kinds, little and big, perhaps the largest colony of live fishes ever gathered under one roof in the world. Over two hundred different species are represented. The aquarium also has a finer collection of brilliantly-colored tropical fishes than is to be found elsewhere. These include, notably, the spotted and green morays, the latter six to eight feet in length, the blue and green parrot fish, the queer trigger fish, butterfly fish, angel fish, four-eyed fish, mud parrot fish, squirrel fish, doctor fish, and trigger fish. To suit the various temperatures necessary for the various species, the Aquarium maintains four distinct water systems, warm and cold for ocean species and medium and cold for fresh-water types. In mid-winter the water for tropical fishes is daily heated from 38 deg. to 70 deg., and in summer a refrigerator system is put into operation for the benefit of the trout and salmon. Owing to the fact that the

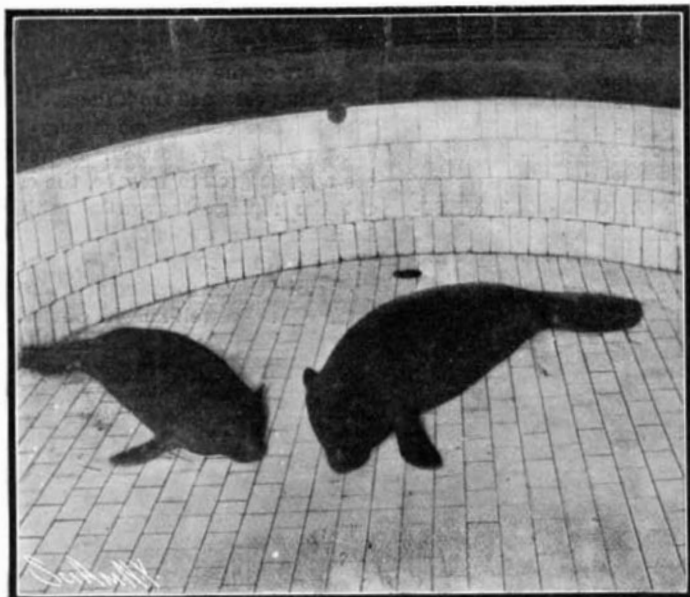
floods of the Hudson River saturate and roil the waters of the bay, destroying more or less sea life in the Aquarium every winter, a new reservoir has been constructed to furnish the Aquarium with a good stored supply of salt water from the open ocean. This will permit the introduction of many additional salt-water creatures from along our coasts. A valuable and suc-

engage in this aquatic nature study last year. The length of life of some of the specimens is quite remarkable, considering their confinement, and the fact that they are deprived of natural food. Among the oldest inhabitants are some striped bass, which have been over ten years in the tanks. Another veteran is a monster Mississippi catfish, now weighing about sixty pounds, having increased his weight one-third in four years, and this in spite of the fact that he lies dormant when the water gets cold, and does not feed at all from September to April. The more delicate among the gayly colored tropical fishes from Bermuda, however, begin to die off at the approach of winter and cold weather.

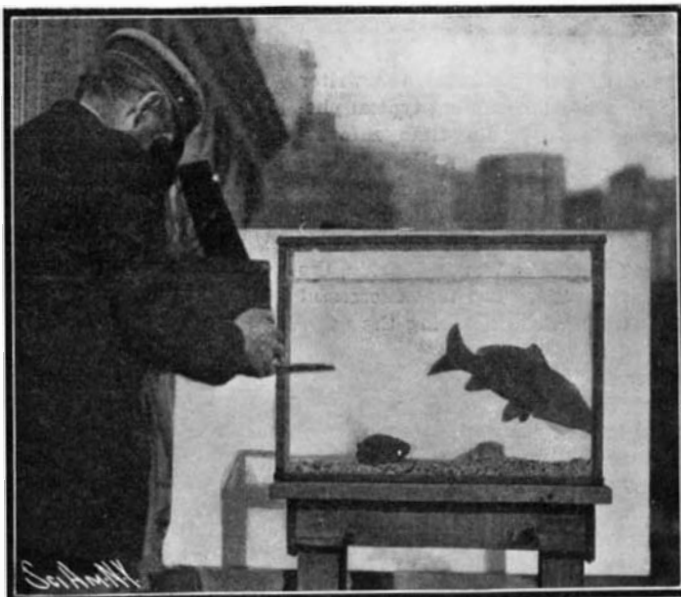
To obtain photographic records of some of the rare specimens, a portion of the open roof is used as a studio. The desired subject is brought to the tank from the tanks within a deep bucket, filled either with salt or fresh water. By aid of a scoop-net, he is deftly dumped in the waiting glass case. Here his movements are watched, and when a favorable attitude is struck, such as a free swimming one, the whole body clearly outlined, the exposure is made.

One of the busiest places in the Aquarium's plant, and one rarely seen by visitors, is the fishes' kitchen. Here, in a roomy ice-chest, on tables and in barrels, are stored the numerous food-stuffs daily served out to the two thousand finny guests. A steward devotes half of each day to preparing the diversified dishes, which by trial have been found to be the most tempting and agreeable to their appetite. Several attendants are kept busy during the afternoon in serving out the rations. The food

varies to suit the size of the specimen, and consists of meat, sliced, chopped, or minced, liver, fish, mostly cod and herring, clams, live minnows and shrimps. The Aquarium collector is kept constantly occupied foraging for foodstuffs in adjacent bays and shores. Natural, live food is preferred in summer time, while in winter a large amount of market food is necessarily



The Sea-Cows Sprawling on the Bottom of the Drained Pool.



The Fish Studio of the New York Aquarium.



The Sea-Cow's Dinner of Eel Grass.



Feeding the Crocodile.



The Fishes' Kitchen. Preparing Dinner for 2,000 Specimens.

INTERESTING GLIMPSES OF NEW YORK'S AQUARIUM.

cessful educational feature is provided in the shape of well-balanced aquaria, located in the laboratory for the use of teachers and students from college and normal down to the public and private schools. Mr. L. B. Spencer, of the Aquarium's staff, is in charge of this department. More than four thousand pupils and their instructors availed themselves of the opportunity to

consumed. Oysters and soft-shelled clams are fed to the drums and sheepheads. They crush the shells, and extract the meat. A dainty dish in the shape of baked cornmeal cakes is given to the carp. Strips of cod fastened on a long stick, and let down in the tank, are kept moving to and fro in front of the open jaws of the green morays, who, if in eating mood, will quickly reach up and swallow the morsels. The board bill for sustaining the vast collection is \$100 per month.

Through the courtesy of the director and Mr. W. De Nyse, in charge of the marine department, the writer was afforded special facilities for obtaining typical photographs of the animals around feeding-time, a favorable opportunity for obtaining characteristic and life-like positions. Among the chief attractions of the Aquarium at present, from the fact that they are rare and almost entirely new to popular eyes, are the pair of sea-cows or manatees from Lake Worth, Florida, the only ones in captivity at present. The first successful picture ever secured at close range, showing the peculiar head and nostrils of this creature raised out of water in the act of taking food, is herewith reproduced. In its Florida habitat the animal is especially shy and cautious of man, diving and disappearing instantly on near approach. Owing to their strange tropical habits, they are given special treatment and care, such as a suitable warm temperature of 70 deg. to 72 deg. for their pool water and the living food. Eel-grass and lettuce leaves strongly tempt their appetites. The former is used in more abundance when obtainable. The larger specimen is a female, eight and a half feet long, and weighs 600 pounds. The male is about two-thirds the size and weight of its mate. They were captured by Alligator Joe, of Palm Beach, a celebrated hunter of that region, and were taken in a large drag-seine. Numerous trials were made for a month, and at least seven manatees broke through the net and escaped, before two were finally secured. They reached the Aquarium in June two years ago, and have considerable swimming space in their tile-lined pool, twenty feet long by thirteen wide, holding four feet of water, which is renewed nightly. Feeding the sea-cows is watched with unusual interest by the visitors. Mr. W. De Nyse, with a suspended handful of eel-grass can coax the female to raise her head and neck completely out of the water. The manatee has a peculiar structure, having no front teeth nor hind limbs nor hip bones, but being supplied with a huge, beaver-like tail. Its bones are said to be the heaviest known among mammals. The best view of the animal is obtained when the water is drained off the pool for tank-cleaning, leaving the whole form strikingly outlined. When this is done, the large female rolls upon her back, and remains in this position until the water returns. The pair have a habit of keeping close together, and rubbing noses at intervals. The American home of the manatee is the Indian River and lagoons and Everglades of the eastern coast of Florida.

The nine-foot crocodile from the Florida keys is one of the most reluctant and irregular feeders at the Aquarium; days and even weeks will pass before he takes food. He is roused from stupor on being punched with a long pole. He then shows his anger by growling and opening his ponderous jaws, when the attendant swiftly lodges a big fish, which is held in readiness, down his throat. Crocodiles are becoming exceedingly scarce, and liable to ultimate extinction, owing to constant killing in order to obtain their hides. Young ones are likewise sold to tourists for pets, and seldom live more than two years.

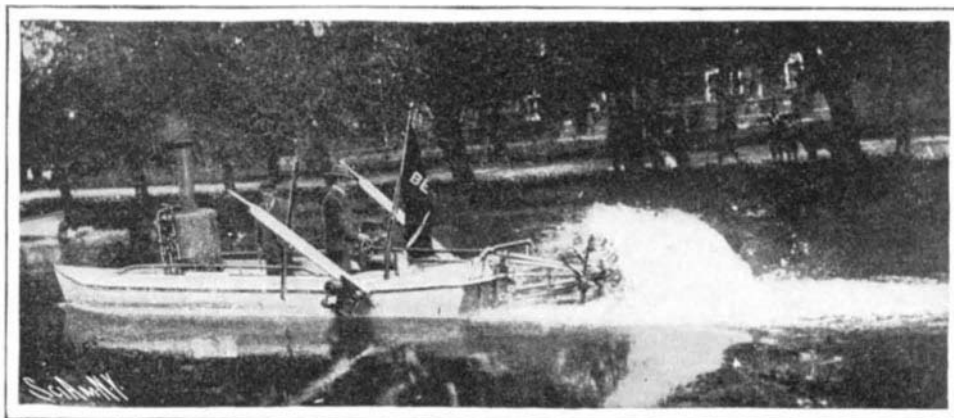
An ingenious, compact apparatus, described as a quick-start lubricator box, has been placed on the market in England. The appliance comprises a small horizontal cast gun-metal box, measuring 10 inches in length by 2½ inches wide and 2½ inches deep, provided with a metal lid. At the bottom of the box are arranged a series of orifices corresponding to the number of lubricating pipes which it is desired to connect thereto. For instance, one pipe leads to the crank-pin, another to the slide, a third to the eccentrics, and so on. The part to which each pipe leads is plainly indicated above the respective orifices. Placed horizontally above the orifices, and between them and the bottom of the box, is a small spindle constituting a

kind of plug of a multiple cock with a series of longitudinal passages corresponding to the number of pipes. This spindle is carried in a boss at one end, while at the other it extends through a stuffing box and is provided with a small lever. The spindle can be rotated by means of this lever, and all the orifices can be opened or closed simultaneously, and the oil supply connected or interrupted without removing the wicks. From above each orifice in the base of the box extends a small brass tube to within about one-half inch of the top, and there takes the wicks, which siphon the oil to the various pipes below. By an indication placed on the spindle the engineer can see whether the lubricator is in or out of action.

A NOVEL POWER LAUNCH FOR CLEARING WEED-INFESTED WATERWAYS.

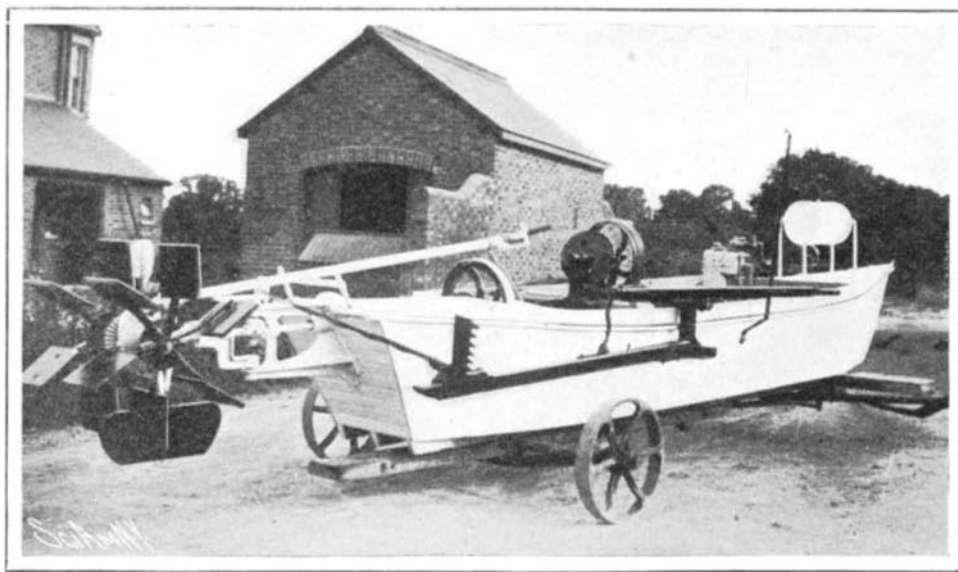
BY THE ENGLISH CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

The problem of clearing rivers and other important waterways of weeds and various aquatic growths, which



The Weed-Cutting Launch Under Way.

offer a serious menace to navigation, especially in tropical areas, is one of acute difficulty. Yet their removal is one of imperative necessity, since if unmolested they thrive and multiply to an alarming extent. This fact has been powerfully emphasized in Florida, where the rivers are practically overgrown with the water hyacinth. But experience gained by experiment has demonstrated that the only successful method of combating the growth of such pests is to cut them frequently, so that their vitality becomes impaired, and they gradually become exterminated. The plants must be cut just before they reach the surface of the water, and cut again and again throughout the season of growth, so that the leaves may never have the opportunity to breathe and then they will slowly weaken and



The Launch on Dry Land, Showing Operative Mechanism.
THE SAUNDERSON GASOLINE POWER WEED-CUTTING LAUNCH.

finally succumb. But the difficulty and expense of cutting these aquatic growths by existing methods is so great that it has militated against this course of action.

A motor launch equipped with a novel cutting appliance for such operations, however, has been devised by an English firm, and has proved highly efficient in operation. This vessel when loaded draws less than 12 inches of water, rendering it convenient to handle and the most difficult and shallow places readily accessible. The propelling arrangement comprises an ingenious stern-wheel system, the main feature of which enables it to be turned in little more than its own length even when traveling at a fair speed. The stern wheel is held in position by a radial arm, hinged vertically on the stern end of the boat, so that the whole wheel may be directed like a rudder at any angle of the boat by a simple lever or by wheel steering, and thus the power of the engine is applied to the turning of the boat. On account of this and the shallow draft, it

forms an ideal craft for lakes and rivers in all tropical countries. These launches are built in various sizes. They are driven by gasoline or heavy oil motors ranging from 4 to 20 B. H. P., or steam motive power. They are built of selected timber in two thicknesses, ¾-inch thick each, and are strong and durable. Above the waterline their appearance is much the same as an ordinary launch. When driven by steam power, the engines used are of the high-speed vertical type, fitted with link reversing motion and governors. The oil and petrol engines are of the vertical inclosed type, the reversing motion being obtained from the special gearing of the stern wheel. The cutting machinery is both ingenious and effective in its operation. However slimy and tangled the aquatic growth may be, the cutters do not clog, and cut the strongest growths with complete and equal facility. The cutting device consists of two spring-steel blades arranged in V form, having steel sections riveted to them, forming a scalloped cutting edge, very similar to the well-known Christie bread-cutting knife.

This machinery is fixed on a bed-plate for operation, either by hand or mechanical power, and has also a hand weed hook or sickle for clearing small confined areas where the ordinary mechanism cannot be employed.

The blades are attached to a wood lever, 7 or 8 feet in length, and are oscillated by a simple cam movement, which is secured to a wood bedplate, carrying the entire apparatus, which may be attached to any kind of boat or punt. The cam shaft is driven by hand in case of the hand-power cutters, and by belt from the main shaft of the launch in the power cutters.

The launches and machinery are of varying cutting capacity, ranging from 2½ acres to 5 acres per hour. One of these novel appliances, built of steel and driven by steam, has recently been acquired by the Egyptian government. To prove its efficiency, the apparatus was submitted to a severe test. A large quantity of water weeds were first cut in the ordinary way, and were then collected as they floated on the surface of the water. They were then piled up in a stack on the water until there was a solid mass of weeds, on which several men could stand. This mass, two or three feet thick, resembled the sudd. The next step was to clear the mass, and this was done by hand weed-saws, and power weed-saws worked by the launch engine, which cut clean through the mass vertically and divided it into big blocks. These blocks were then towed away and allowed to float out to sea. The weed-saws are made on the same principle as the ordinary weed cutters, with scalloped cutting edge, but are worked vertically instead of horizontally.

Hydraulic Plants in Italy.

The use of water power for operating electric plants is constantly on the increase in Italy, especially in the northern part of the country. Not long ago two large hydraulic stations were set running. One of these is situated at Turbigo and has a capacity of 8,000 horse-power. It furnishes current for the region of Gallarate, Varese and Legnano. The other plant is at Zogno in the Brembana valley, and supplies a total of 8,500 horse-power. Besides the two plants which are now running, a third hydraulic station which will be erected at Trezzo d'Adda will distribute 8,500 horse-power to the region around Monza and Bergamo. Among other plants which are now building may be mentioned the hydraulic station which the Conti company are erecting in the neighborhood of Vigevano, which is a small industrial center to the southwest of Milan. It will have a capacity of 7,500 horse-power. When the last two plants have been completed, the Milan district will have as much as 60,000 horse-power in the different hydraulic stations. This development of water power is an important factor in the north Italian region and will contribute greatly to the growth of the industries, seeing that each horse-power furnished by the hydraulic plants represents an annual economy of \$20 in imported coal, that is to say, a sum which would go to the benefit of England or America.

The directors of a certain continental gas company recently made a tour round Berlin to ascertain if there was left in the whole city a flat-flame gas burner. Their exploration failed to produce such a burner until they came to their own works, where one was found.