

SOME INTERESTING ECHINODERMATA.

Not the least remarkable among the animals belonging to the class of Echinodermata, or urchin skinned animals (so termed on account of the numerous spines and anchors protruding from their skin), are the holothuridæ. A property peculiar to the majority of holothuridæ consists in the capability of ejecting their entire entrails on being excited or scared.

On account of their extreme excitability they are little adapted for collection and preparation for museums. Dried they look like a piece of old leather, while, if placed in alcohol, they cannot be distinguished from an old bologna sausage. Says Brehm: "The only manner in which I could succeed in retaining them in a nearly natural attitude, with the feelers spread, was to replace the salt water in which they were kept, gradually by sweet water. Even if the tentacles had been kept withdrawn for days, they would, in that case, stretch them out gradually and die. A colored picture, painted from nature, will be of better service for illustrating the form and structure of the animal than an individual preserved in any manner."

Some species of this family are much esteemed by the Chinese and the inhabitants of the Malay Archipelago as an article of food. Tre-pang, as it is called, is of considerable importance as an article of trade. The Chinese ascribe to it aphrodisiac properties; many Europeans eat it on account of its ready digestibility. Like the edible birds' nests they have no peculiar taste, being merely formed of animal protoplasm.

The holothuridæ just mentioned are supplied with special breathing organs—a sort of water lung, consisting of a numerously branched tube traversing nearly the entire length of the animal, into which also end the alimentary channel and the digestive sac. The animals are enabled to inhale and exhale water by means of this lung, some four or five rapid inhalations being followed by a vehement expulsion of the water inhaled. The lungs, as well as all other vascular organs, may be ejected, but they are reproduced in eight to twelve days.

The holothuridæ which are without lungs also lack the sucking disks, and form a distinct group. Their organs of respiration consist merely of a ring encircling the œsophagus, to which are attached a row of blubbers and the tentacles. In this respect they resemble the young of other families of holothuridæ. Even when grown up, the lungless holothuridæ use, like the larvæ of those possessing lungs, the tentacles as organs of motion.

The most important species of this class of animals is the anchored holothuridæ or synaptæ, which is illustrated by the accompanying engraving, which represents two of these curious animals as drawn from nature at the Naples aquarium.

The entire surface of the skin is provided with characteristic two-armed calcareous anchors, the shafts of which pass through a perforated plate and end in small circular knobs by which they are held in position. These anchors are large enough to be noticed with the naked eye. Of the two species illustrated, one, *Synapta inharrens*, shown in the engraving in two thirds of its natural size, is found along the northwestern coast of France. The other, *S. Besseli*, is an inhabitant of the southern seas; in appearance it is similar to the *S. inharrens*, and we have therefore only represented the anchors, as they are especially well developed in the latter species. Another European species, so far found exclusively in the neighborhood of Trieste, has become celebrated on account of being the seat of a parasitic snail, the nature of which was determined chiefly by Johannes Müller.

Besides the capability of expectorating and reproducing their entrails, the synaptæ possess another means of mutilating themselves, and this is so habitually done that an un-mutilated animal is rarely met with. Baur says with respect thereto: "The mutilation as practiced by synaptæ consists in the separation of entire sections of the body by means of violent muscular contractions. The sections separated move about for some time, but die ultimately. They are unable to reproduce the forepart with mouth and tentacles. Every headpiece, however, may reproduce the sections separated, but this is not generally the case until almost the entire

body, up to the calcareous ring surrounding the œsophagus, has disappeared. The capability of reproduction is destroyed when this ring is severed from the mouth by a small incision. It seems, however, as if the calcareous ring only served as a protection to a band of very fine nervous threads which are cut by the same operation."

Some synaptæ of southern seas become so large as to be taken for sea snakes. Semper relates having caught a *Synapta Besseli* off Bohol Island measuring over six feet in length. Their motions are very slow. Curled up they rest between stones and in the sand, and move, when disturbed, slowly forward by progressive contractions of the body aided by the tentacles. The anchors are certainly never used for locomotion. If they have been hooked into a body they invariably break off as soon as the animal moves. Although the anchors are movable they have no connection whatever with the nervous or muscular system, and consequently cannot be controlled by the animal.

The synaptæ climb only when roughly touched; ordinarily

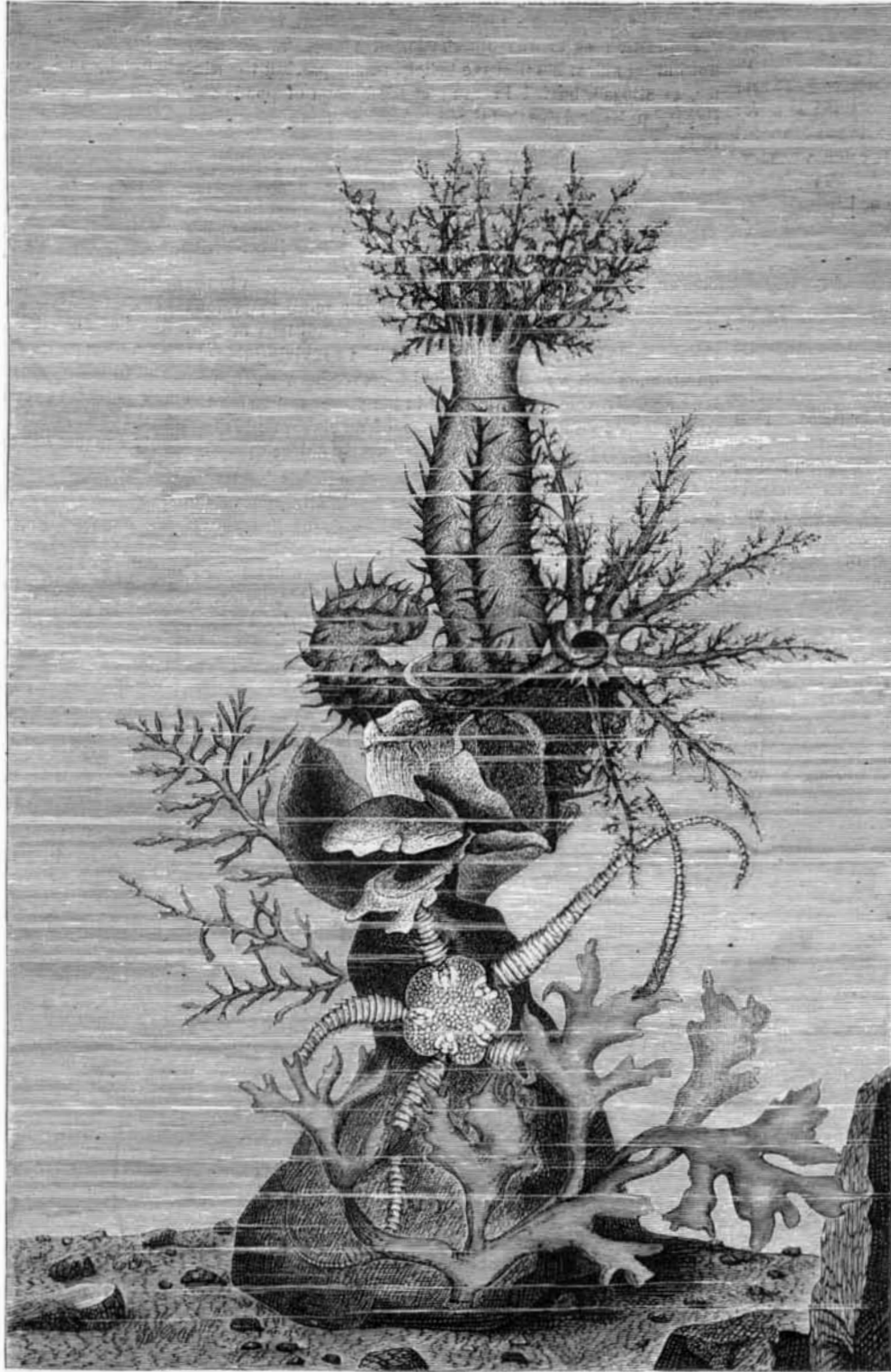
tance in determining the stage of development attained by allied species. The larva gradually develops into the chrysalis, which has the shape of a barrel. It is flattened at the top, round at the bottom, and encircled by fourings. Within this inclosure the synapta acquires its ultimate form, the tentacles become visible, the vesicles attached to the calcareous ring are being formed, the longitudinal muscles are developed. Finally the cover of the barrel opens, and the tentacles at once protrude and become more elongated. Gradually the walls of the barrel unite with the skin proper of the synapta, forming its exterior covering. They are now about 0.05 inch long, and the calcareous circular bodies are still attached to them, but are ultimately lost.

Habits of Wild Animals at Night.

A reporter of the New York *Sun* had an opportunity recently of visiting a menagerie at night, and he thus tells what he saw and what the animals did on being disturbed of their night's rest. He commences by describing the monkeys, which, he says, were clustered together on the floor in the corners of the cage. The attendant, who showed the reporter about in the dim light of a couple of gas burners, scratched the cage with his cane, and instantly a dozen whitish spots appeared on the surfaces of each of the clusters. These were the faces of the monkeys. They were held perfectly still for a short time, but when another gas jet was lighted nearer the cage several monkeys broke away from their companions to leap from perch to perch and squeal like bats. Dr. Starr, the attendant, said that the monkeys sometimes roosted like chickens on their perches, but such a peculiarity was not observed in any of the cages. Mr. McClean, a very trustworthy keeper, says they often indulge their propensity for fun by pulling each other's tails and pinching each other at dead of night, when the whole cage will set up a chatter. Monkeys never snore, but there is always heard a sniffling sound, the premonitory symptom of consumption, of which they generally die on account of the coldness and changes of a northern climate. In separating into different clusters to sleep each species seeks to keep by itself as much as possible.

Dr. Starr said the pelican usually squatted on the floor of his cage like a duck in its coop, but it was found roosting on the edge of a water tank in its cage. Its big webbed toes are furnished with long, sharp, curving claws, and clutched the metal covered edge with a firm hold. Its beak, nearly a foot in length, rested along its back. When a keeper's hand was thrust warily between the bars, the long beak, as it seemed, with a single motion, moved viciously from its back and struck a bar of the cage against which the hand had rested. After that it stood up on guard, showing its big brown legs, and awkwardly brandishing its beak. The snakes lay motionless, most of them being in a cluster. The ostrich lifted itself from a squatting position on the floor of its cage when the visitors approached, looked out of one eye inquiringly, and tetered its long neck up and down, as if it were balancing its body with it on its two ungainly legs. The kangaroo lay a long time without moving. At last, aroused

by the conversation of its midnight guests, it suddenly lifted its head, and with its tail gave a thump or two on the side of its cage. Its tail is very long, thick, and powerful, and when it is attacked in close quarters it is said to whirl about and use it like a club. After a short time it sat upon its haunches, and began to yawn and scratch its sides with its short forelegs, like a monkey. The front of the mandrill baboon's cage was closed with a horizontal shutter. When this was being removed the creature's paw missed a keeper's hand only by half an inch. It stood on all-fours, about three feet high, and glared through the bars with its gray, sunken eyes, throwing a queer expression of cool contempt into its blue cheeks and bright carmine nose. It would occasionally thrust out its chin, decked with a short, sandy beard; but it is said to be very treacherous, and when it is angry it has been known to put forth strength equal to that of two men. It took a chew of what a keeper said was tobacco, rolled it about in its mouth, and appeared to enjoy it. Dr. Starr said that it could smoke, but that it was not allowed to have matches. The capibara, a kind of hairless



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they pass between stones and plants without adhering to them, and in a new species, *S. glabra* (three feet long), recently discovered, these organs were so deeply embedded into the skin that they were at first considered anchorless.

We are at present pretty well informed as regards the different stages of development of holothuridæ.

The microscopically small larvæ may be easily caught with a fine net on the surface of the sea during quiet weather. The later stages may be procured with a dragnet.

The larvæ present an appearance decidedly different from that of the adult animal, being built very symmetrically, and having the form of a flatboat, the fore and aft ends of which are bent over to form a partial deck with curved edges, lined with very fine hair, by the aid of which the minute animal is enabled to swim, conical end forward. The most important inner organ is the digestive canal. We notice in the larvæ a few bags, which ultimately form the main body.

From another rudimentary organ the vascular system is developed. There are two circular masses of lime near the anus, which disappear in the adult, but which are of impor-

South American hog, scrambled up when it heard a noise, and ran to its trough, over which it stood looking expectantly at those who had disturbed it. The little sun bear was rolled up in a black ball in a corner of its cage, while the first sight of the grizzly in another apartment of the same cage showed it swaying noiselessly to and fro. The striped hyena was roaming about in its cage. A ridge of coarse hair arose along its back when it was disturbed, and it retired to the rear of the cage to glare at its visitors. It kept up a low but unceasing growl. It retains the wild instincts of its ancestors, and the keepers say that this low growl can be heard nearly all night. It howls a prediction of a storm several hours before the storm comes.

Savage hisses were heard from two black leopards before the visitors arrived at their cage. When a neighboring gas jet was lighted their glistening teeth and red gums came into view. Their upper lips were drawn back as they crouched on the floor, and their short ears were laid back until it seemed as if there was no room for any brains in their serpent-like skulls. They are the fiercest of all the beasts in the menagerie, and so wild that when they are changed to a new cage they will not eat for several days. A large spotted hyena was found growling in the dark, and twisting uneasily on its back with his clumsy feet in the air. He weighs 250 lb. He immediately got up, and retiring to the back of the cage, glared menacingly. A wildcat sprang to the rear of its cage when it was approached, and crouched as if for a spring. A moment afterward it sat up looking as innocent and unconcerned as a house cat after it has eaten a canary. It killed three of its brothers last summer. A jaguar glanced carelessly at the midnight party as they passed its cage, but otherwise affected to disregard them. Two lions, born in Central Park two years and a half ago, lifted their nozzles from their front paws, stretched out in front of them, and showed their fine large fronts, while they blinked lazily at a newly lighted gas jet. Showmen like lions, on the whole, much better than tigers, because they are not so treacherous; but they say that a bad lion is worse than a tiger. Before approaching within reach of a lion, a keeper always tries its disposition by coaxing words and by offers to pet it. If it holds down its head to be scratched, it is considered to be in a safe mood to handle. The rhinoceros sleeps with a hoarse snore, and resembles a huge over-fat hog as its body spreads out over the bottom of the cage. The one in Barnum's menagerie is said to weigh 7,900 lb. All of the framework of the wagon on which its cage rests is made of steel. It is said that it would be the most dangerous animal in the menagerie if it should escape in an angry mood. Though usually very sluggish, it is terribly quick in action when angry, and there is practically no limit to its strength.

The four or five baby elephants stood in a row, fastidiously selecting choice spears of hay with their restless trunks, while Emperor and his huge mates lay sprawled out on their sides, their upper sides being rounded up into formidable mounds of flesh. The effect of the light was to make several of them lurch backward and forward sideways, and finally sit up on their haunches in their clumsy, broken-jointed fashion. The sea lion sleeps on its platform and not in the water. The giraffe usually holds its long neck nearly erect, with its legs doubled under him like a horse.

Keepers in a menagerie divide their charges into six classes—hay animals, cat animals, monkeys, elephants, birds, and fishes. If a keeper of the cat animals is killed, or if he leaves his situation, the management look about for an experienced man to take his place. If they cannot find any, they promote one of the oldest and trustiest hay animal keepers to the vacant position. The cat animals comprise everything of a naturally savage nature, including the lions. The hay animals include deer, giraffes, and the like. In the elephant class are included rhinoceroses and hippopotami. It requires a particularly steady and trustworthy man to care for the "cats," which can never be handled or changed from cage to cage without precautions, no matter how tame they may seem to be.

NATURAL HISTORY NOTES.

The Peripatus.—In Mr. Moseley's recent work, "Notes by a Naturalist on the Challenger Expedition," the author gives the following description of the *Peripatus capensis* found at the Cape of Good Hope. This curious creature is believed to be a nearly related representative of the ancestor of all air-breathing arthropoda—i. e., of all insects, spiders, and myriapods. Before Mr. Moseley collected, examined, and dissected specimens at the Cape, nothing was known of its development. The animal has the appearance of a black caterpillar, the largest specimens being more than three inches in length, but the majority smaller. A pair of simple horn-like antennæ project from the head, which is provided with a single pair of small, simple eyes. Beneath the head is the mouth, provided with tumid lips, and within with a double pair of horny jaws. The animal has seventeen pairs of short conical feet, provided each with a pair of hooked claws. The skin is soft and flexible, and not provided with any chitinous rings. The animal breathes air by means of tracheal tubes, like those of insects. The sexes are distinct; the males are much smaller and fewer in number than the females. The animal is provided with large glands, which secrete a clear viscid fluid, that it has the power of ejecting from two papillæ, placed one on either side of the mouth. When touched or irritated the animal discharges this fluid with great force and rapidity, and in fine thread-like jets. These jets form a sort of network in front of the animal, looking like a spider's web with dew on it. The viscid substance (which is not irri-

tant when placed on the tongue) is exceedingly tenacious, like bird-lime, and when the author put some on a slip of glass some flies approaching it were at once caught and held fast. This slime is used not only as a means of offense, but to catch insects on which the animal feeds. The animals live in or under dead wood, are nocturnal in their habits, and their gait is exactly like that of a caterpillar.

That the *Peripatus* is a very ancient form is proved by its wide and very peculiar distribution. Species of the genus occur at the Cape of Good Hope, in Australia, in New Zealand, in Chili, in the Isthmus of Panama, and in West Indies. If its horny jaws were only larger, Mr. Moseley thinks they would no doubt be found fossil in strata as old as the old red sandstone at least.

The Hibernation of Swallows.—It was an old and popular superstition that swallows, late in autumn, hide themselves in holes in the earth, in marshes, or under water; and it also used to be asserted that great lumps or numbers of the birds were frequently fished up, fixed to one another by their claws and beaks, and that these when laid in a warm place quickly revived, although they before seemed dead. Curiously enough, Dr. Elliott Coues, in his work on "The Birds of the Colorado Valley," published by the government, revives this old question as to the hibernation of swallows. He does not indeed affirm his positive belief in their passing the winter, as alleged, buried in mud at the bottom of ponds and rivers, but he declares that the occurrence of this phenomenon rests on as good evidence as many other things which are accepted as facts in natural history, and that his mind, at any rate, is open to conviction. He says: "I see no reason why a swallow should not stay a while in the mud in a state of suspended animation, or greatly lowered degree of vital activity. The thing is physically and physiologically feasible, and is in strict analogy with observed phenomena in the cases of many other animals; and it is not more marvelous than catalepsy, trance, and several other conditions of life, the rationale of which is still obscure." In reviving this old question, which we supposed had for ever been set at rest long ago, Dr. Coues has done all in his power to furnish the means for its solution, in the shape of an elaborate bibliography of the subject, extending over nearly a dozen pages.

The Germination of Mushroom Spores.—It has been generally supposed, and in fact it is asserted in all works on the subject, that the spores of the common edible mushroom cannot be made to germinate until they have passed through the body of a horse or some other graminivorous animal. Mr. W. G. Smith, an eminent authority, denies this, however. He says, in the current number of the *Gardener's Chronicle*, that "it is a mistake to suppose that the mushroom spores will not germinate until they have passed through the stomach of a graminivorous animal, for I have several times seen the spores germinating upon clean glass. I first noticed the fact by accident, after I had left a number of freshly fallen spores under the microscope all night. On looking at the slide in the morning nearly every spore had germinated. But then the spores were perfectly fresh and alive. My observations lead me to think that spores very soon die in unsuitable dry air or when they fall upon any unsuitable matrix. Many other fungus spores will germinate upon glass, it being always remembered that for this purpose the spores must be perfectly fresh from the hymenium of the parent fungus. Fungus spores will grow freely upon damp blotting paper; they cannot be seen when upon this material, but they can be easily transferred (by mere contact) to a damp glass slide. Several dung-borne agarics (as they are often termed), including the mushroom, are not uncommon on the sea sands, in positions where graminivorous animals rarely disport themselves."

A Rival of the Shellac-producing Insect.—The *Colonies and India* states that an American explorer has recently discovered in the little known district of Yucatan, bordering on British Honduras, a valuable insect, possessing properties which ought to make it a rival of the cochineal and shellac-producing insects. This is the *Neen*, or *Nin*, a species of *Coccus*, which feeds on the mango tree and similar plants, and exists in enormous quantities in Central America. It is of considerable size, of a yellowish brown color, and emits a peculiar oily odor, containing as it does a large quantity of fatty oil, or rather grease. This grease is used by the natives for various purposes, being highly prized as a medicinal oil for external application, and it is also employed for mixing paints. It can be made to change its condition very considerably by different processes. When exposed to great heat the lighter oils evaporate, leaving a tough, flexible mass, resembling half softened wax, but unaffected by heat or cold, and which may be used as a lacquer or varnish. When burnt this material produces a thick semi-fluid mass, somewhat resembling a solution of India rubber, which after a few days becomes hard and solid. As a cement this substance will be invaluable, and it might also be used for waterproofing purposes.

Electrical Eels.—According to the *Popular Science Review*, M. Fritsch, after an examination of a fresh specimen of *Gymnotus electricus*, concludes that this fish is allied to the siluroids rather than to the eels, and hence the term "electrical eel," by which it has hitherto been popularly known, is a misnomer. He finds this opinion especially upon the structure of the brain, which has the olfactory tubercles small and the cerebellum very large, as in the siluroids; whereas in the true eels these parts present exactly the opposite character. Further, in the *Gymnotus*, as in the siluroids, the maxillaries are rudimentary, and the margin of the up-

per jaw is formed by the intermaxillaries; in the murænoids, on the contrary, the maxillaries form part of this margin and bear teeth. The structure of the opercula constitutes another agreement with the siluroids. From consideration of these and other characters M. Fritsch is inclined to place the *Gymnotus* close to the malapterini, which also include an electrical species.

The Ivory Nut Palm.—A writer in a recent number of *Science Gossip* states that in 1843 Mr. William Purdie was dispatched to New Granada to collect plants for the Royal Gardens, Kew. He was specially instructed to find a few special plants, one of which was the ivory nut palm. In his account of this Mr. Purdie says: "In a journey of 600 miles, from Santa Martha to Ocana, in New Granada, at the village of Semana, seventeen leagues from hence, and near the great river Magdalena, I entered the mountains, and saw for the first time the ivory nut palm (*Phytelopus macrocarpa*), called *Tagua* by the natives. The habit of this palm is to have little or no stem, what there is is decumbent; it is not a robust tree. Old plants have from fifteen to twenty primate leaves, which when fully grown measure nearly twenty feet in length, of a delicate green color, very graceful, and similar to those of the date palm. The male and female flowers are borne on separate plants. The male flowers are produced generally in six clusters from the bases of the leaves and on short footstalks. The clusters are compact and form a nearly globose head, which, on account of the style-like projections resembling the rigid hair of a negro, is not inaptly called *Cabeza del negro* (negro's head). These heads lie close to the ground, each cluster containing four or five seeds. The seed contains at first a clear insipid liquid, which afterward becomes milky and sweet, and ultimately hardens and becomes the "vegetable ivory" of commerce. Each of these nuts is about the size of a green walnut, and is covered with a yellow, sweet, oily pulp, which is collected and sold under the name of *Pepo del Tagua*. A spoonful of the latter with a little sugar and water makes the celebrated *Chiche de Tagua*, said to be the most delicious beverage of the country.

The stem of the male plant is larger and more erect than that of the female, and the singularity of its inflorescence is only equaled by its beauty. The fragrance is most powerful and delicious, exceeding that of any other plant, and so diffusive that the air for many yards becomes alive with myriads of insects. Mr. Purdie states that he had to carry some of these blossoms twelve miles, and though he killed a number of the annoying insects that followed him, yet the next day a great many still hovered about the flowers, having come all the way from the woods where the latter grew.

Propagation of Rock Fish.—(*Roccus lineatus*.)

A notable achievement in fish culture is reported by the *Baltimore Sun*, namely, the successful hatching of several hundred rock fish or striped bass, as they are more commonly known in this market. The credit is due to Major T. B. Ferguson, of the United States Fish Commission, who thinks it one of the most important gains of fish culture, since the rock fish is good at all seasons and is one of our leading sources of sea food. Hitherto the spawning time of this fish has not been known. The young rock fish now at Druid Hill Park hatching house are the produce of three ripe rock fish taken May 6th at Dr. Capehart's fishing shore, "Avoca," on Albemarle Sound, N. C., near the mouth of the Roanoke river. From these three fish nearly two bushels of eggs, estimated at three millions, were taken and impregnated, but the proper preparation had not been made for their treatment, and the result was not as prolific as could have been desired. Indeed, although the fish commissioners have been long bent on finding out the habits of the striped bass, the capture of these ripe fish was a surprise. They were taken and spawned by Wm. Hamlen, of Baltimore, who resides on Federal Hill, and has been in the employment of the Maryland Fish Commission for several years. Mr. Hamlen was fortunate also in hatching the first smelt, under Major Ferguson, in the Raritan river, and last season he was successful in securing herring eggs, from which 500,000 fish were hatched at Avoca, on Albemarle Sound, and brought to Washington and Baltimore for distribution.

The striped bass hatching was in connection with United States fish hatching work under the superintendence of Major Ferguson, who has thus been instrumental in achieving success first with smelt, then with herring, and now with the striped bass. The eggs of the ripe rock fish are green, opaque, and smaller than the eggs of shad. After impregnation they become fifty per cent larger than shad eggs, and their specific gravity is lighter. They are almost perfectly transparent, and have only a small speck. They have a large umbilical sac, a quarter of an inch long, and almost invisible. In water at the temperature of which shad eggs will hatch in four or five days, rock fish eggs will hatch in thirty-six or forty-eight hours.

The Obelisk.

Mr. Dixon has partially gained his suit against the underwriters for the salvage of the Cleopatra and the obelisk when cast away off the Spanish coast, and *Iron* says the result gives general satisfaction. It is also satisfactory to find that the "Needle" itself has been successfully coated with an indurating solution which it is hoped will protect it for many years from the action of the sulphurous acid that the sea coal fires of the metropolis disgorge into the atmosphere to the detriment of most descriptions of stone. The monolith had been greatly injured on the surface from exposure to atmospheric influence in Egypt, especially since it was