

IMPROVED FISHWAY.

The engraving shows an improvement in fishways lately patented by Mr. W. H. Rogers, of Amherst, Nova Scotia. It is built in with the dam or rests against it, and affords to the fish a ready means of ascending the stream without regard to the number or height of the dams. The fishway has an inclined flat bottom and vertical sides forming a channel or trunk. The bottom has a rise of about one foot in eight or ten, and the sides extend above high water. The lower portion of the channel is divided into a zig-zag passage way by diagonal partitions, which are attached in alternation to opposite sides of the fishway. These partitions retard the flow of water and afford an easy passage for fish.

To the upper side of the upper edge of each partition a flange is attached for the purpose of checking the water so as to form pools of comparatively dead water in which the fish may rest on their course up the fish way.

The lower entrance to the fishway is formed in the lower part of the dam. The fish readily find this entrance, as the water flowing from it is comparatively sluggish.

The fishway is held together by a strong wooden framing, and in the sides there are openings provided with slides which may be opened whenever the water gets too low to flow over the upper end of the way.

This simple device admits of utilizing streams for power without interfering with the fish and without wasting an undue quantity of water.

California's Grain Product.

During the fiscal year just ended California has shipped about 580,000 tons of wheat (including flour) and 34,000 tons of other grain. As a larger area has been devoted to cereals this year, and good crops are now assured, the surplus for the coming year will doubtless be larger than last year's.

NOVEL CORN SLED.

The engraving represents a novel device for moving shocks of corn or other grain or fodder from one place to another without altering the form of the shock. The device is very simple, and can be easily and quickly operated. Two side frames, A, are supported in front upon pivoted runners, B, and at the rear on a folding runner, C, which may be operated by the lever, D, and link, E. The frames, A A, are jointed together at the rear upon the pin, F, and are drawn together in front by a chain, G, attached to one frame and running over a pulley in the other frame. Each side frame is provided with a number of fingers or pins, H, which alternate in position with the pins of the other frame.

To use the apparatus, the chain, G, being unhooked, the side frames are spread apart and drawn forward on opposite sides of the shock to be moved. The chain, G, is then fastened, and draught being applied to it the two side frames are drawn toward each other, forcing the pins, H, into the base of the shock. During the operation the runner, C, is in the position shown in Fig. 3, and now by pressing down the lever, D, the shock is raised from the ground and the runner is placed in the position shown in Fig. 1, when the sled with its load may be drawn forward. The operation of unloading the sled is simply the reverse of what has just been described.

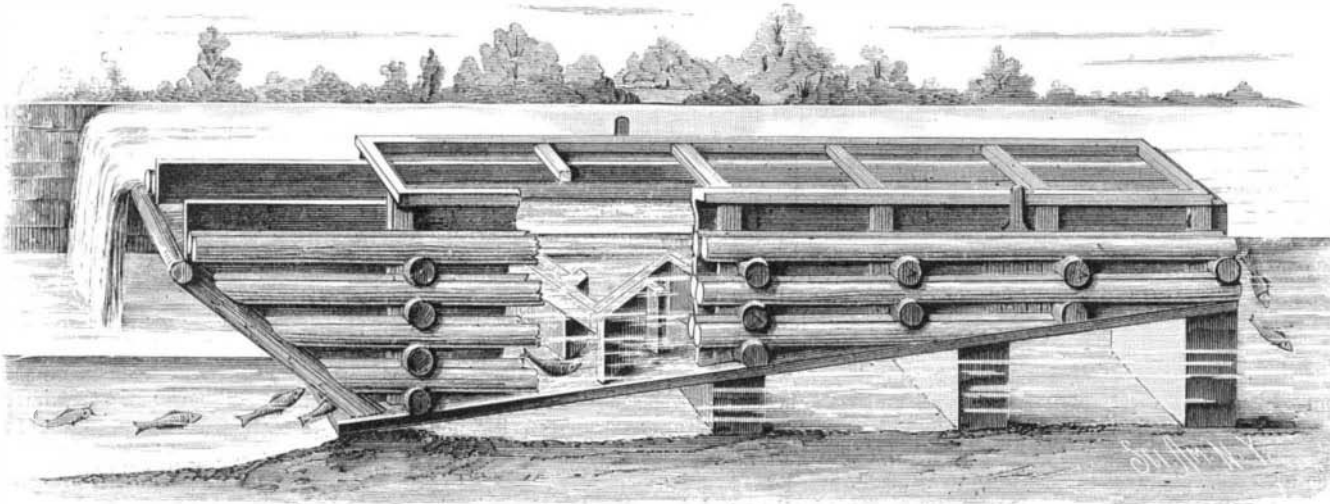
This invention was recently patented by Mr. William H. Wood, of Elizabeth, Allegheny County, Pa., who may be addressed for further information.

A LARGE CANAL BOAT.—The largest canal boat that ever passed through the Erie Canal, arrived at this city June 16, with a cargo of 8,500 bushels of corn. The boat—the Henry J. Robinson—is 96 feet in length, 18 feet breadth of beam, draws 9½ feet of water, cost \$5,500, and was built at Rochester, New York.

Government Fish Hatching.

At the hatching establishment of the U. S. Fish Commission at Washington about 20,000,000 shad have been hatched this year. Of these 15,000,000 have been turned into the Potomac River, and the remainder have been distributed mainly to the waters of California, Iowa, Kansas, Kentucky, the Carolinas, and Virginia. Yesterday 100,000 young shad two days old were shipped to Sandusky, Ohio, and the same number to Terre Haute, Ind., to stock the streams there.

During the year the Commission has distributed 25,000,000 fish. Carph have been sent to nearly every State in the Union, 3,000 applications for them having been received during the year.

**ROGERS' FISHWAY.**

The floating hatchery, Fish Hawk, soon starts on her first voyage to sea, to secure a supply of codfish eggs. Thus far the experiments in hatching cod have been encouragingly successful.

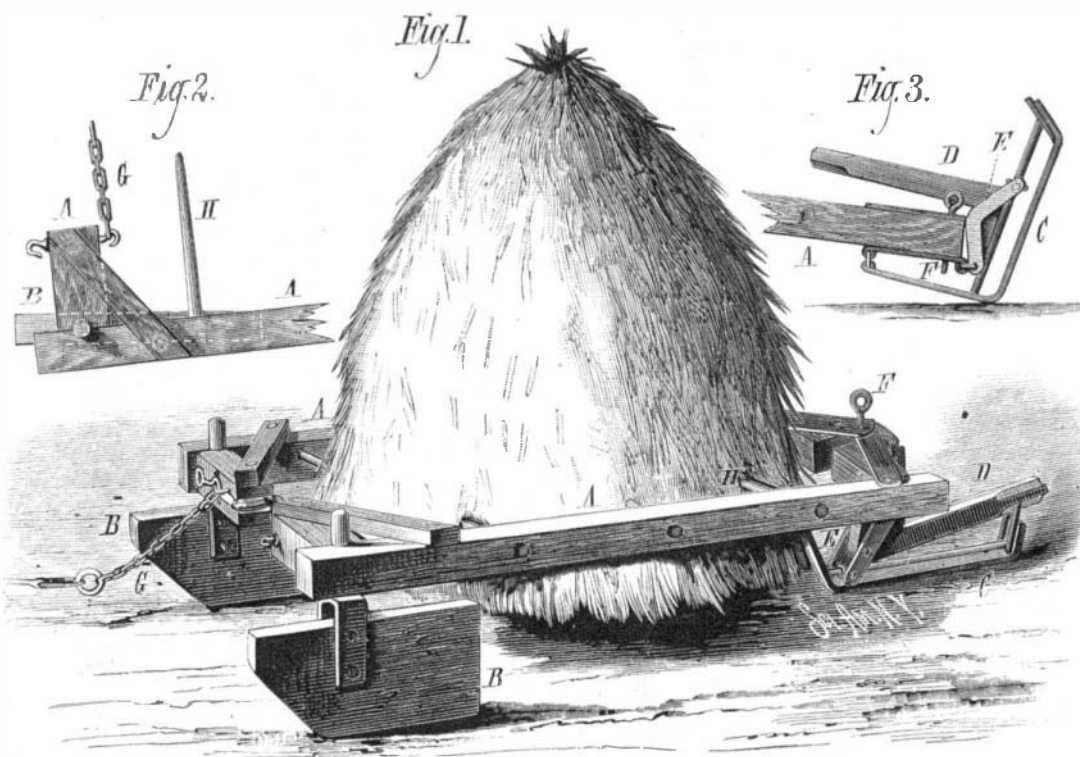
At the establishment of the Fish Commission at Druid Hill Park, Baltimore, salmon eggs are now being hatched. Arrangements have been made for regular shipments of the eggs of that fish from California. Good results are expected. It has been demonstrated that salmon will thrive as well here as in the waters of California.

Wonderful Sensitiveness of Photo Plates.

Photo plates made by the new photo gelatino-bromide process have such a remarkable sensitiveness that soft harmonious negatives may be secured in one-sixtieth of a second. The opportunities for instantaneous pictures are thus greatly extended. At a recent meeting of the Society of

domestic work of the ship. The Admiralty, however, being desirous of extending the usefulness of these small craft, commissioned Mr. John Samuel White, of East Cowes, to build six sea-going life pinnaces of slightly larger dimensions, and which should realize a higher rate of speed than had yet been obtained from similar boats. The recent trials of these pinnaces at Portsmouth have been followed with great interest, and the results are in many respects remarkable. The boats measure 48 feet in length (or 3 feet more than the largest at present in use), 9 feet 3 inches in breadth, and 4 feet 9 inches in depth; and have a draught, when all their machinery and gear are on board, of 2 feet 8 inches forward and 3 feet 5 inches aft. They are built wholly of wood, and upon the diagonal principle, and are driven by compound engines, of which the high pressure cylinders are 7¼ inches, and the low pressure cylinders 11½ inches in diameter, having a stroke of 8 inches. The screws, which are

four-bladed, have a diameter of 3 feet 2½ inches, a mean pitch of 4 feet 7½ inches, and a length of 5¼ inches. The boiler is fitted with a closed stoke-hole, the furnace being supplied with air by means of fans exactly after the manner of a torpedo boat. The total weight of the fully-equipped pinnaces is 152 cwt., that is, 86 cwt. the machinery with steam up, and 66 cwt. the hull. When tried on the measured mile by the Dockyard authorities the engines developed 120 horses, with 340 revolutions per minute, and realized a mean speed of just over 13 knots, which is almost equal to the speed of the second class torpedo boats which, as a matter of course, can only be used for torpedo purposes. The steam pressure was at 120 lb., and the engines were worked expansively with the cut-off at 9-16ths of the stroke. The increase from 9½ to 13 knots at a bound has given great satisfaction, and, as the consumption of fuel has been reduced from 6 lb. to 3 lb. per unit of

**WOOD'S CORN SLED.**

Arts, London, Mr. Gale exhibited photographs in which was shown the picture of a swallow poisoning in the air over a pond, the shadow and reflection in the water being very perfect.

A Seal Caught in New York.

A young female seal was caught asleep on Holmes' Reef, East River, June 18, by Captain J. H. Baxter, wreck master at Hell Gate. The little wanderer from the north was taken to the baths at the foot of East 86th street, where she has become a general favorite. She was from the first perfectly fearless and very gentle. She likes to be petted and never offers to bite. She is nearly three feet long, weighs about twenty pounds, and is thought to be about three months old.

indicated horse power per hour, the additional speed has been obtained without any additional cost of coal, seeing that the power developed in the 45 foot pinnaces was about 50. The question now arises whether these quick, light, and handy craft, which have had their fleetness greatly increased without injury to their special qualities as sea-going life pinnaces, could not be applied to purposes quite distinct from the ordinary work connected with a man-of-war, and thus help in freeing the decks and davits of an armor-clad from much of her present impedimenta. With a speed of 13 knots they will probably be found serviceable as patrol boats and for assisting in defeating a torpedo attack. Whether they may be adapted for offensive torpedo purposes, and thus compete with the steel boats, is a matter for consideration, but it is unquestionable that, while they possess the

being built into and forming part of the structure of the boats, give great longitudinal and transverse strength, thereby enabling them to be hoisted up in davits, and rendering them available at all times. But, inasmuch as the speed realized by the largest of these twin-screw lifeboats has never exceeded 9½ knots—a very fair rate in the circumstances—they have been necessarily confined to the performance of what may be termed the

speed of a 60 foot torpedo craft in a straight line, their twin screws give them important advantages in respect of turning and going astern. With the rudder alone and with both engines going full speed ahead they can turn in from eight to ten times their length; but with one engine going ahead and the other astern they can go round in a distance equal to twice their length.

SEA OTTER, OR KALAN.

The kalan, or sea otter, says "Wood's Natural History," is very much larger than its fresh water relations, being rather more than twice the size of the common otter, and weighing as much as seventy or eighty pounds. During the colder months of the year, the kalan dwells by the sea shores, and can be found upon the icy coasts of the Northern Pacific, where it is extremely active in the capture of marine fish. When the warmer months begin to loosen the icy bonds of winter, the sea otter leaves the coasts, and in company with its mate proceeds up the rivers until it reaches the fresh water lakes of the interior. There it remains until the lessening warmth gives warning for it to make its retreat seawards, before the fierce frosts of those northern regions seal up the lakes and deprive it of its means of subsistence.

It is rather a scarce animal, and is not so prolific as many of its relations. The fur of the kalan is extremely beautiful, shining with a glossy velvet-like sheen, and very warm in character. It is in consequence valued at a very high price. The color of the fur is rather variable, but its general hue is a rich black, slightly tinged with brown on the upper portions of the body, while the under portions of the body and the limbs are of a lighter hue. In some specimens the head is nearly white, and in one or two instances the white tinge extends as far as the neck. Indeed, the proportions of dark and white fur differ in almost every individual. All the otters are long of body and short of limb, but in the kalan this peculiarity is more apparent than in the ordinary otters, on account of the curious setting on of the hinder limbs and the comparative shortness of the tail, which is barely more than seven inches long, while the head and body measure three feet in length. The food of the sea otter is not restricted to fish, but is composed of various animal productions, such as crustacea and mollusks. Some writers assert that, in default of its more legitimate food, it varies its diet by sea weeds and other vegetable substances.

NEMERTES, OR STRIPED POLIA.

The nemertes is somewhat like the leech, but it is not furnished with a sucker. It sometimes attains the extraordinary length of thirty to forty feet, and can extend or contract itself in a surprising manner. A specimen of twenty feet long is capable of suddenly contracting itself to the length of four or five feet. The exact length to which the nemertes can extend itself is not known. It is always writhing and coiling its long body into apparently inextricable knots, but never suffering any real entanglement. It will convert its body into a long and slender screw, and it is assumed that it moves from one place to another when coiled in this way. No accurate and reliable observations of the habits of this animal have yet been made.

Effects of Severe Cold on Insects.

A very general impression prevails that severe winters are prejudicial to insect life. It is, however, a quite erroneous impression, for nothing has struck us so forcibly in our experience with injurious insects, as the fact that in most cases they pass more safely through a steady, even if severe winter, than through a mild or changeable one. We have repeatedly called attention to this fact in our own writings, and Miss E. A. Ormerod, in her "Notes of Observations on Injurious Insects," for 1879, has some quite pointed remarks on this subject, in connection with the severity of the past winter in England.

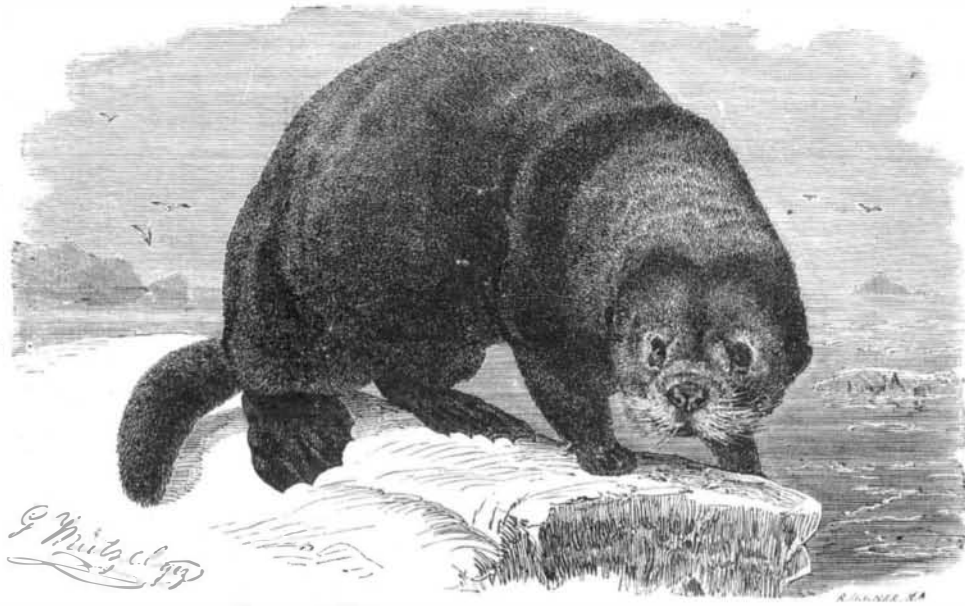
Severe and steady cold is not only favorable to insect hibernation, by causing a continued state of torpor, but indirectly in preserving them from the attacks of birds and other animals, which, during such severe weather, cannot reach them in the frost-bound ground.

Mild winters, on the contrary, generally cause premature activity in insects, often followed by relapses into the torpid state, and such changes are prejudicial to their well being.

Insectivorous animals also fare better during such mild winters.—*American Entomologist.*

The Centrifugal Creamery.

The estimation of the quantity of cream contained in milk can now be made very accurately and rapidly, by means of centrifugal force. Attach the handle of a can, filled with milk, to a cord; hold the other extremity of the latter in the hand, and whirl as if for a sling; the cream, lighter than the rest of the milk, will accumulate on the surface free from all liquid, and more quickly than if in a state of repose; the time will even be lessened in proportion as the revolutions are rapid. When the milk has a temperature of 59° to 60° Fah., the separation of the cream takes place in fifteen minutes, at the rate of six hundred revolutions per minute. At the same time the quantity of water added to the milk for adulterating purposes can be ascertained. M. Gembloux



SEA OTTER, OR KALAN.—(*Enhydra Lutris*)

having tested that pure milk contains ten per cent of cream, added one, then a second tenth of water, and when whisked the cream represented but nine and eight per cent of the volume of milk. Further, when whirled in the cylindrical churn, the contents formed three distinct layers—cream, water, and skim milk. The same centrifugal test was applied to butter, maintained in the liquid state by means of hot water; the water separated into three states toward the circumference of the churn—fatty butter, caseine, and salt water; it was in the latter all the mineral adulterations lodged. It was at the Exhibition of Vienna that an apparatus for separating cream from milk by centrifugal action was first made known. It is to M. Lefeldt that the honor reverts for applying the system on a vast scale by means of a turbine cylinder making eight hundred rotations per minute, when the cream is formed round the axle of the machine, after which comes the skim milk, and then the impu-

NATURAL HISTORY NOTES.

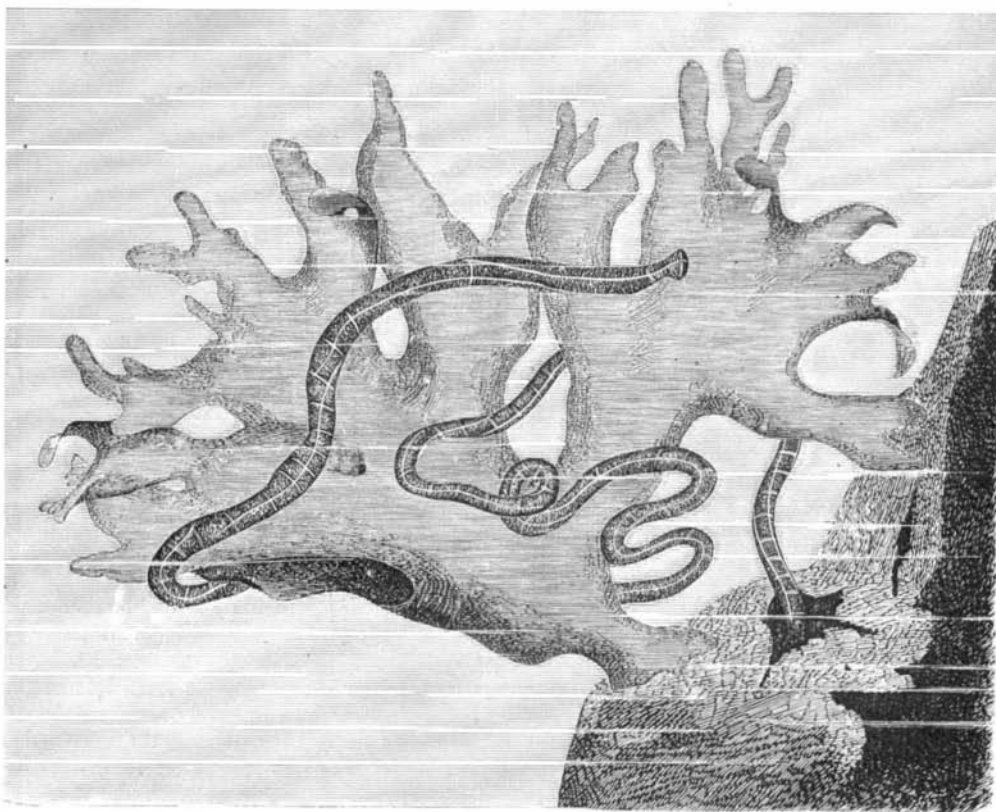
Effect of Thick Sowing on the Sex of Dioecious Plants.—At the meeting of German naturalists and physicians at Baden-Baden last September, Prof. Hoffmann, of Giessen, as reported in the Berlin *Monatsschrift*, sought to show that seeds of unisexual plants, when thickly sown, result in a preponderance of males. Thus he found that one hundred seeds of spinach, sown in a six-inch pot, yielded two males to every female, whereas the same sample of seed produced an equal number of males and females in the open ground where they had plenty of room. This observation would be important if of general application, and especially with hemp, but Haberland disputes it so far as this plant is concerned. According to Hoffmann, sex does not reside in the seed, but depends on the conditions of germination. Unripe seeds of *Lycnis vespertina*, he found, gave a larger proportion of males than fully ripe seed. Seed of *Mercurialis annua*, artificially impregnated in early summer, gave more males than autumn impregnated seed. Prof. Prault, of Aschaffenburg, remarked that crowded prothallia of ferns produce a larger percentage of antheridia, and scattered ones more archegonia. Prof. Pfeffer, of Tübingen, stated that he had observed a similar phenomena in the case of equisetum.

Interdependence of Animals and Plants.

—The *Gardeners' Chronicle* gives an engraving of a very remarkable pitcher plant, new to cultivation, but described by Dr. Hooker, a few years ago, from dried specimens collected in Borneo by Low and others. The large bag-shaped pitchers are, when fully developed, provided with two sharply toothed wings. The neck of the pitcher is thrown into ridges with intervening furrows, and is prolonged at the back into an erect, or slightly incurved process, terminating in two sharp recurved spurs, the whole reminding one of the head of a snake uplifted and ready to strike with its fangs.

At a recent meeting of the Linnæan Society Mr. Burbridge, an observant naturalist, read a paper on the subject, which throws some light on the curious organization in question, and is of considerable interest as illustrating the solidarity of the organic world. It seems that the stalk of the lower bag or ampulla-shaped pitcher is swollen and hollow, and in their native country most of them are perforated by a species of black ant, which forms its colonies in the old and dry pitcher, and continually visits the fresh ones, so far as can be determined, for the purpose of obtaining food and water, since these fresh pitchers contain a miscellaneous collection of dead and decaying insects of many kinds. As these pitchers are perfect traps to creeping insects of ant-like character by reason of the incurved ridges round the throat of the pitcher, these black ants ingeniously perforate the stalk, and so obtain their supplies, and provide a means of exit in case of need. Now as to the

uses of the formidable spurs which lie concealed under the kidney-shaped lid of the pitchers: There is found in the Bornean forests, where this fine pitcher plant grows, a curious little animal called by the natives "Tamperrillie," and by the few Europeans who have ever seen it alive, the "Spectre Tarsier" (*Tarsierspectrum*). It is a most singular and interesting creature, about the size of a rat. An engraving of it is given on page 247 of the SCIENTIFIC AMERICAN for October 18, 1879. Its head is singularly like that of a small kitten; the eyes are large and full, the body is monkey-like, and the tail slender and as long as the body, but bushy at the tip like that of the lion. Its feet have curiously enlarged disk-like tips, reminding one of the enlarged ends of the climbing tendrils of the Virginia creeper. This little animal is an insect-eater, and knowing that the pitchers contain entrapped insects, visits them pretty regularly. In the case of some of the pitcher plants the insects imprisoned in their unarmed urns are readily removed, but not so in the species under consideration, as the sharp spurs are so placed that the tarsier is sure to be pricked by them, and



NEMERTES OR STRIPED POLIA.

quite sharply too, if its head is inserted under the lid for getting at the interior. The main question, and the one yet to be solved, is, of what use are the living ants, and what end is this one species of *Nepenthes* made to serve as the nest of a peculiar species of insects. To suit its requirements not only is its very structure modified, but especial precautions are taken to ward off the insect-eating tarsier. The use of the entrapped insects we already know, for it has