THE USE OF SEA CUCUMBERS IN POISONING FISHES.[1]—Substances of vegetable origin have been and are widely used in the tropics and subtropics of the world by native peoples for poisoning fishes. In the Pacific region the plants most commonly used are various species of *Derris* and the seeds of the tree *Barringtonia* (Merrill, 1943, U.S. War Dept. Tech. Manual, 10–420: v + 149 pp.). To a lesser extent *Tephrosia* and *Croton* are used. In other parts of the world other plants are used, such as *Mundulea* and *Euphorbia* in Africa (Raymond, 1939, Jour. Trop. Med. Hyg., 42: 295–303). The active ingredient in many of these native preparations is rotenone, which in concentrated form is one of our better insecticides and more recently has become used extensively in fisheries management in North America. (For a recent review see Krumholz, 1948, Jour. Wildlife Mgt., 12 (3): 305–17.)

The writer was not aware that animal fluids or products were ever employed in similar fashion to stupefy the fishes within a limited area. It was consequently a matter of great surprise and interest to discover sea cucumbers being used for this purpose on Guam.

During a minus tide early in the morning of November 26, 1945, five Guamanians were using sea cucumbers to poison fishes in several coral reef pools just south of the Ylig River. Prior to treating the pool, all possible exits were blocked with branches of the *Casuarina* tree. The common black sea cucumber of the region had previously been gathered in large numbers, and one of the men now began cutting these animals in two with a big knife. The other men wearing diving goggles squeezed the contents of the sea cucumbers into the various crevices and recesses of the pools. The natives claimed the "blood" was poisonous. Before long the water became noticeably turbid in appearance, and shortly thereafter fish began coming to the surface of the pool, exhibiting much the same type of behavior as in rotenone poisoning. At this time the fish were clubbed with long knives to immobilize them. The material from the sea cucumbers did not kill the fish, but apparently only made them weak and less active. Very few of the specimens did not resist capture, and all of them, even though inactive, still moved their opercula and occasionally made attempts to swim.

The writer and several other members of the NAMRU-2 staff were collecting coral reef fishes nearby at the same time with standard 5 percent rotenone powder. Our efforts were so much more effective than those of the Chamorros, probably because of the greater amount of poison used, that before long the natives deserted their pools and began collecting the surplus fish from ours.

Robert O. Smith, in making a survey of the fisheries of Micronesia in 1946 for the U. S. Commercial Company, observed a similar use of sea cucumbers on Majuro Island in the Marshalls (1947, U. S. Fish and Wildlife Serv., Fish. Leaflet 273: vi + 105 pp.). Here, however, the sea cucumbers were apparently pounded or pulped in the canoes and then dumped into the pools. In this rather extensive survey covering the Marshall, Caroline, and Mariana Islands, Smith did not observe or learn of any other localities where sea cucumbers were employed in this manner, although he called attention to a note in the *Guam Recorder* for May, 1941, reporting the long established use of sea cucumbers on Guam for collecting fish. No other records were found in the literature as to localities where this practice is carried on.

The writer is inclined to believe that the use of sea cucumbers in collecting fishes is relatively recent because of its restricted application and the scarcity of references to it in the literature. Ludwig (1889-1892, Bronn's Thier-Reich, Bd. II, Abt. 3, Buch I) does not record any uses of sea cucumbers other than for food.

Austin H. Clark (*in litt.*) wrote that a number of other persons have also mentioned to him within the past few years the use of sea cucumbers in the Pacific for poisoning fishes. The species involved is most likely *Holothuria atra* Jaeger.

The genus *Holothuria* is the largest genus of holothuroids, with more than 100 known species, approximately three-fourths of which occur in the Indopacific region. It is interesting that *Holothuria atra* is one of the several species that is virtually circumtropical, for it occurs in the Atlantic as well as the Indopacific. Moreover, this same species is one of ten collected and cured for human consumption in the southern

[1] Contribution No. 462 from the Department of Zoology, Indiana University.

Philippines, constituting one of the less desirable grades of trepang, known locally as "Tang Sim" (unpublished report of José S. Domantay).

Many echinoderms are noted for their toxic properties. Echinoids, in particular, may have poisonous pedicellariae as well as spines. The pedicellariae of *Strongylocentrotus dröbachiensis* and of *Toxopneustes pileolus* (Clark, 1950, Bull. Raffles Mus., 22: 53–67) are especially noteworthy in this respect. What the toxic principle might be in the holothurians used to capture fish life has apparently not yet been investigated.—David G. Frey, *Department of Zoology, Indiana University, Bloomington, Indiana.*

MIGRATORY BEHAVIOR OF THE RAINWATER FISH, *LUCANIA PARVA*, IN THE YORK RIVER, VIRGINIA.[1]—On October 15, 1950, the writers observed migratory behavior of schools of the rainwater fish, *Lucania parva* (Baird and Girard), along the northern shore of the York River at Gloucester Point, Virginia. When first observed, at 15 minutes past noon, the fish were moving down-river (eastward) in spindle-shaped schools of about 400 individuals each, in water 8 to 10 inches deep. Throughout the observation period these schools moved at a rate of 40 feet per minute with intervals of 2 to 3 feet between schools. Each school was 6 to 8 feet long, 10 to 15 inches wide and contained 20 to 30 fish per linear foot. These schools continued to pass the Virginia Fisheries Laboratory until 4:00 PM. Estimates based upon the size of the schools, and the rate of their passing our observation point, indicate that more than 270,000 fish were involved in this mass movement. This tends to support the opinion advanced by Hildebrand and Schroeder (1927, Bull. U. S. Bur. Fish. 43 (1): 137) that the species could be an important food item for larger fish. The extent of this migration was not determined, but it was noted to continue over a three-quarter mile zone in front of the laboratory.

Hildebrand and Schroeder (*loc. cit.*) reported that this species travels in schools, often in association with *Gambusia* and *Fundulus*. We noted many variegated killifish, *Cyprinodon variegatus* Lacépède, and a few striped killifish, *Fundulus majalis* (Walbaum), among the schools of *Lucania*.—W. R. Beck, and W. H. Massmann, *Virginia Fisheries Laboratory, Gloucester Point, Virginia.*

[1] Contributions from the Virginia Fisheries Laboratory, No. 32.

Herpetological Notes

THE OCCURRENCE OF THE LOUISIANA NEWT IN IOWA.—The Louisiana newt (*Diemictylus viridescens louisianensis*) has not been reported as occurring in Iowa. In 1939, John Macdonald collected a specimen in a wet meadow south of Fairfield, Jefferson County, Iowa. The specimen is now in the herpetological collection of Parsons College, Fairfield. Mr. I. Lester Firschein has informed me of another specimen (Chicago Natural History Museum No. 37378) which was collected by R. A. Burton, 3 miles north of Olds, Washington County, Iowa, March 23, 1941. Neither specimen was measured but both, which I have examined, were adults with spotting and coloration as described by Bishop (1947, Handbook of Salamanders: 106–109). These two records extend the known range of the Louisiana newt westward into southeastern Iowa, although the subspecies is known to occur equally as far west in Minnesota and farther west in Missouri.—Lowell S. Miller, *Museum of Natural History, University of Illinois, Urbana, Illinois.*