New York, Dec. 27, 1913. No. 1.

Published by the contributors to advance the Science of cold-blooded vertebrates.

AN INTERESTING FORM OF THE SNAPPING TURTLE.

(Chelydra serpentina.)

Recently several large snapping turtles have been received at the Philadelphia Aquarium, which appear to differ from those found commonly about Philadelphia and the Middle Atlantic States generally. I am indebted to Mr. W. E. Meehan, the Director of the Aquarium, for the opportunity of examining them. Altogether three specimens are in his possession, one from Minnesota and the others from Lake Copake in New York. Of the last, one is small. All agree in one striking feature, though most developed in the two large examples, in the presence of three lengthwise keels on the upper surface of the carapace being well elevated and very conspicuous. Other examples with low and evenly convex carapaces, and with the keels but slightly developed, if at all present, are of all ages, the largest measuring 14½ inches over the longest diameter of the carapace. These local specimens are from Pennsylvania and New Jersey. This evidence is interesting, as most writers state that the carapace becomes gradually smoother with age, though my incomplete observations, chiefly from lack of northern material for comparison,

would point to a possible existence of two forms. This involves a question of the correct application of the fortunately few synonyms heretofore grouped under *Testudo serpentina* Linnæus, which may be restricted to the northern or extremely keeled form. *Chelydra lacertina* Schweigger is virtually identical. The remaining *Chelydra emarginata* of Agassiz may then refer to the southern form, or at least to that common in the Delaware Valley and south.

H. W. FOWLER,
Philadelphia, Pa.

COLOR CHANGES IN COLLARED LIZARDS.

Last summer it was my good fortune to be able to study Bailey's Collared Lizard *(Crotaphytes collaris)* in the Painted Desert of northern Arizona. Those which I observed were found only in localities where the volcanic or other rock occurred in piles, or was scattered over the ground. The lizards were generally seen perched upon one of these rocks. During the cooler hours of the day they were nearly always a dark, dirty gray, but when the air was warm and the lizards became more active, the color changed to a bright emerald green. This was in the country of the sandstone rocks. Where the black lava rock occurred the great majority of the lizards were of the same dark color, even when active and during the sunny part of the day. In this latter country they were a perfect example of protective coloration, but the green ones seem quite conspicuous, unless one could imagine a resemblance to the short grass, which occurred irregularly.

I have two specimens in captivity, and notice this same color change during the day. In the

morning, or when the air is cool, they lie sluggishly on the bottom of the cage, or under a rock, and at such times they are of this dark color and show no desire to feed. When the sun strikes their cage, however, they scramble around in a lively manner, their lighter colors begin to show, and they snap up meal worms eagerly.

They are good feeders, quite hardy, and are very gentle, never offering to bite.

DWIGHT FRANKLIN,
New York, N. Y.

FISHES IN THE WATER-SUPPLY OF WILMINGTON, DELAWARE.

On April 15, 1910, we visited Mr. Alfred D. Poole at Wilmington, who offered us every opportunity to examine the fishes in the filter-beds. These are fed from the reservoir, which is supplied from the Brandywine Creek, at a considerable distance. After the water was drawn off, we found the following: *Abramis crysoleucas*, *Notropis hudsonius amarus*, *N. analostanus*, *N. cornutus*, *Cyprinus carpio*, *Catostomus commersonii*, *Ameiurus nebulosus*, *Lepomis auritus*, *Eupomotis gibbosus* and *Boleosoma nigrum olmstedi*. On September 24, 1910, we again inspected other of the filter-beds, finding all of the above except *Ameiurus nebulosus*, besides the following additional species: *Anguilla chrisypa*, *Semotilus bullaris*, *Ameiurus catus* and *Micropterus dolomieu*. On November 20 and 21, 1913, we again visited Wilmington, and examined the reservoir after the water was drawn off. We found it contained the following: *Notropis analostanus*, *Cyprinus carpio*, *Anguilla chrisypa*, *Lepomis auritus*, *Eupomotis gibbosus* and *Micropterus salmoides*. These lists are quite interesting as showing the variety of species which gradually stock artifi-

cial bodies of water after considerable periods of time, as several years had elapsed since their previous drainings.

R. J. PHILLIPS and H. W. FOWLER,
Philadelphia, Pa.

NOTES ON FISHES NEAR NEW YORK.

Since a List of the Fishes Known to have Occurred within Fifty Miles of New York City went to press in the Abstract of the Proceedings of the Linnæan Society of New York, published February 8, 1913, further data, changing the local status of the following species, has come to the writer's attention:

Hippocampus hudsonius. (Feb.[1]) April to Nov.[1]
Lobotes surinamensis.[2] Casual. Sept. and Oct.

One seen in the fishermen's catch at Galilee, N. J., Sept. 20, 1913.

Prionotus carolinus. May to Nov. 21.[3]
Urophycis chuss. Common. Oct. to at least Nov. 21.[3]
Paralichthys dentatus. May to Nov. 21.[3]
Paralichthys oblongus.[3] Common. Nov.
Limanda ferruginea.[3] Common. Nov.
Lophopsetta maculata. August to Nov. 23, at which date in 1912 it was seen taken from rather deep water.

1. N. Y. Zoological Soc. Bull., April 1904.
2. N. Y. Zoological Soc. Bull., Jan. 1907.
3. Seen taken by the writer off New York in twenty-one fathoms, Nov. 21, 1912.

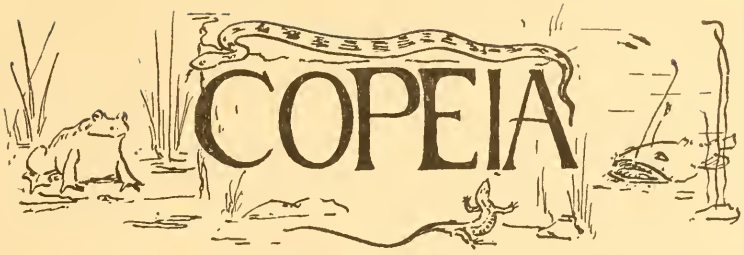
J. T. NICHOLS,
New York, N. Y.

LATE ACTIVITY OF PICKERING'S HYLA.

On December 7, 1913, at Plainfield, N. J., I heard three Pickering's Hylas giving their clear, Spring whistle in different parts of the woods. The day, like the preceding, was unseasonably warm (temperature 54° F. at 11:45 A. M.) and rainy, and the woods very wet.

W. De W. MILLER,
Plainfield, N. J.

New York, Jan. 19, 1914. No. 2



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RIO GRANDE INDIAN FISHERMEN

Most of the Southwestern Indians will not eat fish, but the tribes along the Rio Grande have gotten over this prejudice if they ever had it. An explanation for the former non-use of fish is as follows: When the people came up out of the underworld through a lake in the north they wandered about looking for good places to live. When they came to the Rio Grande the leader made a bridge of Guacamayo feathers. Those persons who refused to cross are now the nomadic Indians, those who crossed safely are the Pueblo Indians, and those who fell in are the fish.

The methods of fishing are various, although snares and traps seem to be the most ancient. The snare is made of a horsehair loop tied to the end of a short stick. Lying on the bank the fisherman maneuvers this snare till it is directly in front of the fish, and then draws it up with a jerk. The fish, startled, shoots straight ahead and is caught. The Indians of Taos Pueblo are very skillful at fishing in this manner. The fish-hook has been acquired from the white man and is called a "pointed fish snare." Bone ones are sometimes made.

H. J. SPINDEN,
New York, N. Y.

AMPHIBIANS AND REPTILES AT JENNINGS, MARYLAND.

During June of 1907, while on a visit to Mr. Herman Behr in this part of Garrett County, I collected or noted a number of interesting species, as follows: *Plethodon erythronotus*, *P. glutinosus*, *Spelerpes bislineatus*, *S. longicauda*, *Desmognathus fusca*, *Diemictylus viridescens* (both forms), *Bufo americanus*, *Pseudacris triseriatus*, *Hyla pickeringii*, *Rana pipiens*, *R. palustris*, *R. clamata*, *R. sylvatica*, *Thamnophis sirtalis*, and *Agkistrodon contortirix*. Mr. Behr also reported *Natrix sipedon*, *Crotalus horridus* and *Chelydra serpentina*.

This list is offered, as no previous account has ever been given of the region, and as several of the species are of interest geographically.

T. D. KEIM.
Skelton, N. J.

NOTES ON THE FISHES AT OCEAN CITY, MARYLAND.

In August, with Mr. A. R. Burton, the offshore pounds were visited to study the fishes of the region. Small collections were also made in Isle of Wight and Sinnepuxent Bays. As no recent account of the fishes has appeared since Uhler and Lugger's in 1876, the following list is offered:

Carcharhinus milberti
Several small ones.

Sphyrna zygæna
A dozen young.

Pristis pectinatus
A mounted example on exhibition was reported to have been taken in 1911. It was about 10 feet long, and had 25 teeth on each side of the rostrum.

Raja eglanteria

Dasyatis say

Pteroplatea maclura
Myliobatis freminvillii
Acipenser sturio
Anguilla chrisypa
Opisthonema oglinum
Brevoortia tyrannus
Stolephorus mitchilli
Fundulus majalis
Fundulus heteroclitus macrolepidotus
Fundulus diaphanus
Fundulus luciæ
A few in ditches.
Cyprinodon variegatus
Tylosurus marinus
Syngnathus fuscus
Menidia beryllina cerca
Menidia menidia notata
Scomberomorus maculatus
Trichiurus lepturus
Caranx crysos
Trachinotus carolinus
Pomatomus saltatrix
Rachycentron canadus
Poronotus triacanthus
Morone americana
Many parasitized with *Livoneca ovalis*, sometimes two within a single gill opening.
Centropristes striatus
Orthopristis chrysopterus
Cynoscion regalis
Cynoscion nebulosus
Bairdiella chrysura
Micropogon undulatus
Leiostomus xanthurus
Menticirrhus saxatilis
Alutera schœpfii
Spheroides maculatus
Chilomycterus schœpfi
Prionotus strigatus
Lophopsetta maculata
Paralichthys dentatus
Lophius piscatorius

H. W. FOWLER,
Philadelphia, Pa.

THALASSOCHELYS CARETTA IN THE SOUTH ATLANTIC.

During November, 1912, the writer observed numbers of loggerhead turtles in the South Atlantic Ocean between the latitudes of 32° 54′ S. and 37° S., and the longitudes of 42° 15′ W. and 46° 29′ W. The area included within these limits lies 400–500 miles east of the coast of Uruguay. The specific dates and notes are as follows:

"Nov. 3.—Two loggerheads, with carapaces fully a meter in length, noted separately.

"Nov. 4.—Three seen, of which one was harpooned and captured. Its carapace was grown over with algae, and its stomach contained Chondrophoridæ *(Velella)*. A Cape Verde sailor who was suffering from rheumatism drank a cup of the blood of this turtle as medicine.

"Nov. 8.—Rough weather. Many loggerheads seen throughout the day (latitude 36° 16′ S., longitude 46° 35′ W.). One was observed swimming or floundering on its back, raising one pectoral flipper above the surface of the water as it paddled.

"Nov. 9.—One seen. This loggerhead lay idly at the surface until it was grazed by the ship. Beneath its plastron was a veritable cloud of small fishes which kept their position when the turtle darted away."

R. C. MURPHY,
Brooklyn, N. Y.

New York, Feb. 14, 1914. No. 3

COPEIA

Published by the contributors to advance the Science of cold-blooded vertebrates.

CONCERNING THE OCCURRENCE OF SUCKERS (ECHENEIDIDÆ) ON BALISTIDÆ.

During a period of prevailingly calm weather, August 8 to 25, 1912, in an area included between the latitudes 26° and 32° N. and the longitudes 49° and 62° W., I had an opportunity to observe from the deck of the American whaling brig "Daisy" considerable numbers of one or more species of pelagic trigger fish (Balistidæ). A photograph of a specimen captured on August 11 furnishes a satisfactory identification of the family.

These fishes were called by the sailors "old wives" and "leather jackets." Schools of them darted round the vessel, swimming mostly on their sides, and the fishes readily bit hooks baited with sperm whale meat. The dorsal fin was high and situated well posteriorly; some of the individuals were spotted or blotched with white. The largest specimen caught measured 28 centimeters in length.

On August 9 (latitude 27° N., longitude 62° W.) I saw one accompanied by three small, slender, dark-colored fishes (remoras) which appeared to be attached to the trigger fish's side,

except that they sometimes wriggled away from it for a few seconds, or changed their positions in the manner of Echeneididæ on sharks. A notebook sketch made at the time shows the parasites about one-quarter the length of the Balistid, or perhaps 8 centimeters long.

R. C. MURPHY,
Brooklyn, N. Y.

NOTES ON FISHES NEAR NEW YORK.

On December 20, 1913, one or two Big Skate, *Raja ocellata*, were taken from the fishing steamer "Taurus" at Cholera Bank, Long Island. This seems the latest definite available record near New York City for the species, which probably winters. The prongs of an egg-case were projecting from the cloaca of a female.

During the fall and ensuing winter of 1913, Dr. Wiegmann has been active studying the occurrence of fishes as captured near New York, and hopes by continuing his observations to get much more definite data on their abundance and migrations than is now available. The following late dates obtained are of interest:

Sheepshead Bay: Goggle-eyed Scad, *Trachurops crumenophthalmus*, Sept. 24: White Mullet, *Mugil curema*, Nov. 9; Northern Barracuda, *Sphyræna borealis*, Nov. 16.

Coney Island: Alewife, *Pomolobus pseudoharengus*, Nov. 26; Menhaden, *Brevoortia tyrannus*, Nov. 26; Silvery Anchovy, *Stolephorus argyrophanus*, Nov. 18. A single large specimen of the Silvery Anchovy was obtained. The identification has been verified at the American Museum of Natural History.

Sandy Hook: Blackfish, *Tautoga onitis*, Dec. 31; Squirrel Hake, *Urophycis chuss*, Dec. 31, abundant.

W. H. WIEGMANN,
J. T. NICHOLS,
New York, N. Y.

LIST OF SALIENTIA FROM NEAR JACKSONVILLE, FLORIDA.

The following were collected ten miles south of Jacksonville by the writer, 1911–1912:

ORDER SALIENTIA.

Family *Ranidæ*.

Rana pipiens Schreber, abundant all over.

Rana sphenocephala Cope, abundant all over.

Rana æsopus Cope, local, not very plentiful.

Rana clamitans Latreille, sparsely, scattered companies.

Rana catesbiana Shaw, permanent bodies of water.

Rana grylis Stejneger, not rare, but very shy.

Family *Engystomatidæ*.

Engystoma carolinense Holbrook, abundant everywhere after heavy rains.

Family *Bufonidæ*.

Bufo lentiginosus Shaw and

Bufo quercicus Holbrook, common, in companies in temporary water, or scattered on cultivated ground.

Family *Hylidæ*.

Hyla pickeringii Storer, rare here.

Hyla squirella Bosc., in gardens and cornfields

Hyla femoralis Latreille, common on pine trees, but not easily caught.

Hyla cinerea Daudin, found in scattered bands, among water hyacinths on creeks.

Hyla gratiosa Le Conte, local, not very plentiful.

Chorophilus nigritus Le Conte, common during the winter months.

Chorophilus occidentalis Bd. and Gd., plentiful, in scattered companies.

Chorophilus ocularis Holbrook, abundant everywhere.

Acris gryllus Le Conte, plentiful on edges of bayous.

R. F. DECKERT,
New York, N. Y.

THE FOOD OF THE LOGGERHEAD TURTLE (*Caretta caretta*).

A large loggerhead turtle was sent to the Philadelphia Aquarium in October last, where it shortly died. It was secured off the New Jersey coast. Upon an examination of the contents of its alimentary canal, the intestinal tract was found completely filled with the remains of hermit crabs (*Pagurus pollicaris*) and borers (*Natica duplicata*). No other food appeared to have been taken. Dr. Henry A. Pilsbry, who also examined the specimen and identified the shells, secured three species of barnacles from its carapace, plastron, and inside its mouth. One of these barnacles he may likely describe as new.

H. W. FOWLER,
Philadelphia, Pa.

BELATED SINGING OF TOADS.

Numbers of Common Toads have been observed every year in the water of Patchogue Lake singing as late as the middle of August. These toads behave exactly as toads do in the breeding season, but no females have been seen among them.

FRANK OVERTON,
Patchogue, N. Y.

BOX TURTLE ACTIVE IN DECEMBER.

In connection with Mr. Miller's December record for Pickering's Hyla ("Copeia," No. 1), a Box Turtle observed by the writer out and active below the Palisades at Englewood, N. J., December 21, 1913, is of interest.

J. T. NICHOLS,
Englewood, N. J.

New York, March 14, 1914. No. 4

COPEIA

Published by the contributors to advance the Science of cold-blooded vertebrates.

PICKERING'S HYLA ACTIVE IN JANUARY.

On January 30, 1914, I heard two Spring Peepers (*Hyla pickeringii*) singing at noon in a swamp at Brookhaven, Long Island, N. Y. There would be a series of half a dozen or more peeps followed by a silence of about five minutes; the frogs responded twice to my whistled imitations of their calls. The temperature of the air was 56° F. in the shade; there was a gentle wind blowing from the southwest, and the sun shone dimly through fog clouds. Much ice was still to be seen on the ponds; the temperature had been warm for several days previously.

FRANK OVERTON,
Patchogue, N. Y.

A NOTE ON THE PURRING GOURAMI.

Although not as highly colored as most of the Labyrinth-fishes from the Far East, *Ctenops vittatus*, commonly called the Purring Gourami, commands more than usual attention because of its being able to produce purring sounds.

It is a small fish, seldom over 2 inches in length, and not often seen in aquaria in this country, as it is very delicate as regards changes in temperature and handling. Only recently has it been my good fortune to have a few pairs of them for any length of time.

The purring sound is heard very frequently during the mating period; it is a short, sharp brrr–brrr, like the sound produced by throwing pebbles in rapid succession against glass. In doing it the fish, with gill-covers, tail and fins extended, shakes himself violently, and the purring, according to its strength, can be heard distinctly for a distance of 25 feet and more.

RICHARD DORN,
Upper Montclair, N. J.

AMPHIBIANS AND REPTILES OBSERVED AT BEVERLY, N. J.

During the past five years I have noted and collected the following amphibians and reptiles in my locality:

Plethodon erythronotus—Under logs in woodland.
Spelerpes bislineatus—Under stones in creek bottoms.
Desmognathus fusca—Under stones in streams.
Bufo americanus—Gardens.
Acris gryllus crepitans—Pond edges.
Hyla pickeringii—Marshes and gardens.
Hyla versicolor—Garden.
Rana pipiens—Grassy pools.
Rana palustris—Meadows and contiguous woodland.
Rana catesbeiana—Creek borders.
Rana sylvatica—Wet woodland.
Natrix sipedon—Creeks and river meadows.
Bascanion constrictor—Low, wet wood growths.
Thamnophis sirtalis—Low meadows. (Both striped and spotted.)
Heterodon platirhinos—Dry fields and woodlands. (Both dark and light phases.)
Sceloporus undulatus—Pine lands.
Chelydra serpentina—Creeks.
Kinosternon pensylvanicum—Muddy streams, takes the brook.
Sternothærus odoratus—Muddy streams, takes the brook.
Chrysemys picta—Creeks.
Clemmys muhlenbergii—Meadow streams.
Clemmys insculpta—Low woods.
Clemmys guttata—Creeks.
Terrapene carolina—Meadows.

J. F. STREET,
Beverly, N. J.

RIO GRANDE INDIAN FISH TRAPS

Fish traps are made according to a widespread fashion. Two converging walls of brush that point downstream are built. At the center is an opening where a log is placed to form a waterfall. Below this waterfall is a willow mat which is carefully screened in from the side. The fish are swept out towards the end of this mat, which is above water, and are unable to go back over the little waterfall.

Large fish-nets are made by communal labor out of the fiber of Indian hemp and the wide-leaved yucca. Each man makes his piece of net and brings it to a meeting. There the different pieces are patched together to form a large seine. The mesh is made even by the use of a flat stick over which the tying is done. Stones are used for sinkers and gourds for floaters.

The throwing of the net is a communal enterprise and the whole village profits by it. The governor of the pueblo has charge, and before the event comes off either he or the war captain goes to the river bank and throws in an offering of cornmeal to placate the river spirit. After the fish have been eaten, many Indians throw the bones back to the river, believing they will again become fish. Others throw the vertebræ on ant hills so the ants will clean them nicely and they can be used as beads.

H. J. SPINDEN,
New York, N. Y.

EGG-LAYING OF THE LOGGERHEAD TURTLE.

At Cape Lookout, in North Carolina, on July 27, 1913, at about midnight, my captain, with one of the other members of my crew, noticed the fresh tracks of a turtle, and upon following them for a short distance, came upon a very large loggerhead

turtle laying her eggs. His description, which I know to be reliable, follows:

He states that the turtle had almost buried herself in the sand; that the laying of each egg, at intervals of ten to fifteen seconds, was accompanied by a convulsive movement; that she appeared not to notice their presence while laying, although he struck her. He received 25 or 30 of the eggs in his hand as they were laid. After she had finished laying she filled the hole, and, with her flippers, smoothed the sand over, then showed a disposition to defend her nest by remaining near it, but they handled her roughly and she started for the sea, more than 100 yards distant. The nest was opened and the balance of the eggs secured. The entire number laid was only 87, which is the smallest number I have ever known to be laid by a loggerhead turtle. In my experience they usually lay about 150.

R. J. COLES,
Danville, Va.

PADDLEFISH FOUND IN MUD.

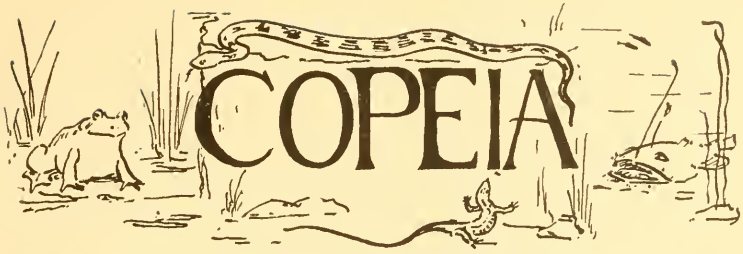
During the construction of a dam across the Nolichucky River near Greeneville, Tenn., an area of the river bottom was exposed to view by means of a cofferdam on November 9th, 1913.

All the water was pumped out, and during the pumping process no fish were observed in the water.

The rock bed of the river was covered by two feet of clean sand, and over this was three or four inches of fine silt. In this silt were found half a dozen living fish called by the natives Shovel-nosed Catfish, identified at the American Museum of Natural History as Paddlefish, *Polyodon spathula*. These fish ranged from 2 to 2½ feet in length, the head and paddle being about half the length of the fish.

WARREN TRAVELL,
New York, N. Y.

New York, April 15, 1914. No. 5



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EFFECT OF THUNDER ON FISHES

On July 9 and 31, 1913, when collecting with seines in the bight of Cape Lookout, North Carolina, immediately following two violent electrical storms, I found fishes unusually scarce. The precipitation had been heavy on both these occasions, but I have in the past noticed scarcity of fish following thunder accompanied by little or no rainfall, and believe that vibration of the ground caused by heavy thunder drives them into deeper water.

R. J. COLES.
Danville, Va.

NOTES ON LEOPARD LIZARDS

Very little has been published on the habits of the Leopard Lizard (*Crotaphytes wislizenii*), although it is common in many parts of the Southwest.

There seems to be considerable variation in the color and pattern, depending on the sort of country in which they are found. Those living in a region of dark volcanic rocks have a darker pattern than those found in the red sandy desert. The Leopard Lizards which I observed last summer were of the latter type, and were chiefly seen

at Tuba, in the Painted Desert, Arizona. The general color of these lizards was light in tone, the ground color was pale buff and the spots of a soft rich brown which blended at the edges. The females were slightly larger than the males and invariably had a series of brilliant orange-red bars along the sides of the body and tail and along the under side of the tail. None of the males which I examined had any red color. The under sides of both sexes are pure white.

These lizards were feeding largely upon cicadas during the month of June. An examination of their stomachs showed this. On one occasion I saw a Leopard Lizard leap over two feet up and catch a cicada which was singing in a low greasewood bush.

Leopard Lizards probably lay their eggs during July, although I was unable to make any observations on their breeding habits. During the month of June I saw many adults but no young, while in August and September I saw no adults but quite a few young lizards, evidently of that year's brood. The young were about five inches in length and were slightly darker than the adults.

Errata.—In Number 1 of "Copeia," page 2. *Crotaphytes collaris* should read *Crotaphytes baileyi.*

DWIGHT FRANKLIN,
New York, N. Y.

FURTHER NOTES ON THE SALIENTIA OF JACKSONVILLE, FLA.

The two species of "Leopard frog," *Rana pipiens*, Schreb., and *R. sphenocephala*, Cope, are the commonest frogs hereabout. Both species can be found everywhere, from February to November. The breeding season is not restricted to a few

weeks or months, as in the North, but frogs may be heard singing in chorus, after heavy rains, during the time mentioned above. I have found their spawn, in shallow bayous, in February, March, April, May, August and October.

Rana æsopus, Cope, the "Gopher frog," is a silent frog, very shy and not often seen. Its call is a loud, deep snore, and can be heard from late February to the end of May. These frogs croak only at night, and are then easily caught by the light of a lantern. Outside of the breeding season this frog frequents the burrows of the "Gopher turtle," *Testudo polyphemus*, sitting at the mouth of these burrows and vanishing into them at the slightest alarm. Two or three frogs will inhabit the same turtle-burrow. The one-year-old frogs of this species I have repeatedly caught, wandering from the high ground and its burrows into the swampy meadows below, where the insect life is more abundant. On being discovered, they will not dash away with long leaps, like other frogs, but squat close to the ground, motionless, like some toads, and are then easily picked up.

Rana clamitans, Latr., the "Pond frog," and *R. catesbiana*, Shaw, the common "Bull-frog," frequent the borders of the larger creeks, also permanent smaller streams. They are not as common here as in the North. Both differ from northern frogs of the same species in having their under sides much darker, some specimens being black with a very few small whitish spots.

Rana grylis, Stgr., is called the "Pig-frog," owing to its loud grunting call, repeated three or four times. This is a beautiful frog, closely related to the common Bull-frog. It is one of the shyest of all frogs, usually floating in water two or three

feet deep, under the branches of a floating dead tree, or among other debris, so that it is almost impossible to get within capturing distance without alarming it. Its size is 4 to 5 inches from snout to vent. The call is heard at any time, day or night, from deeply wooded bayous, oftenest in March, April and May.

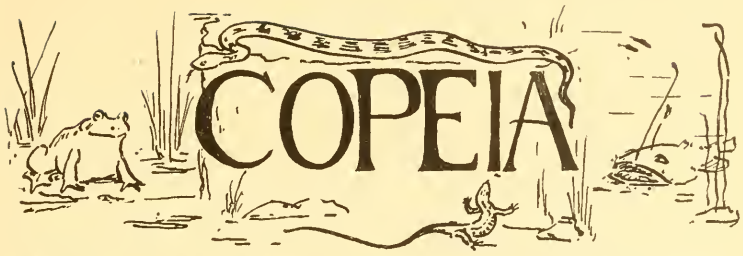
R. F. DECKERT,
New York, N. Y.

FISHES IN POLLUTED WATERS

For many years the tidal reaches of the Schuylkill River to the Fairmount dam in Philadelphia have been greatly polluted, suggesting the impression that they support little or no fish life. I have recently received a number of fishes from this region, through Mr. W. E. Meehan, the Director of the Philadelphia Aquarium, besides notes on others not sent. The most interesting was a gizzard shad (*Dorosoma cepedianum*) captured from a small run during the past October. Those species commonly noted are *Anguilla chrisypa*, *Notropis hudsonias amarus*, *N. amœnus*, *Cyprinus carpio*, *Carassius auratus*, *Catostomus commersonii*, *Ameiurus nebulosus*, *Fundulus heteroclitus macrolepidotus*, *Ambloplites rupestris*, *Eupomotis gibbosus*, *Micropterus salmoides*, *Perca flavescens* and *Boleosoma nigrum olmstedi*. Species of more or less unusual occurrence were *Pomolobus pseudoharengus*, *Salmo fario*, *Ameiurus catus*, *Esox reticulatus*, *Pomoxis sparoides*, *Lepomis auritus*, *L. incisor*, *Micropterus dolomieu* and *Morone americana*.

H. W. FOWLER,
Philadelphia, Pa.

New York, May 15, 1914. No. 6



Published by the contributors to advance the Science of cold-blooded vertebrates.

ON SNARING SUCKERS

Mr. Spinden's article in *Copeia* (Rio Grande Indian Fishermen) recalled one of the earliest episodes of my youth. When I was ten years old (1847), I was a boarding scholar at Greenville, N. Y., and much addicted to angling, especially in a stream immediately back of our house. A New York boy (I forget his name) came with a mother or aunt to spend a week or so with my teacher's family, and had a new wrinkle in the line of fishing. He had a long "catgut leader," which he made into a loop and attached it to the end of a pole, and this he used to take suckers (*Catostomus*); he slowly directed the loop towards the sucker and, leading it over the head, jerked it up when he had led it to the middle of the body and landed the fish. I do not remember that he caught any other fish than suckers in that way, the other fishes being too timid to stand the test.

THEO. N. GILL,

Washington, D. C.

NOTES ON PELAGIC FISHES

The following notes are based on observations made during an Atlantic cruise in the whaling brig "Daisy." The fish parasites mentioned have been

identified by members of the staffs of the U. S. National Museum and the Bureau of Animal Industry.

Sphyræna picuda Bloch and Schneider

A specimen taken by the writer on August 22, 1912, latitude 31° 50′ N., longitude 50° 49′ W., had two large trematodes, *Distomum ampullaceum* Buttel-Reepen, in its intestine.

Coryphæna hippurus Linné

A dolphin caught on August 26, 1912, latitude 32° N., longitude 46° 12′ W., had three whole flying-fish in its stomach, and a trematode, *Hirundinella clavata* (Menzies), in its intestine.

September 2, 1912, latitude 32° 21′ N., longitude 43° W. At noon a large piece of flotsam was harpooned from the deck of the ship and towed astern. Many dolphins and other fishes swam under the shelter of the wreckage, and remained with it while it was being drawn along. Fifteen of the fishes, of which five were *Coryphæna hippurus*, were caught on lines from the ship.

November 1, 1912, latitude 29° 18′ S., longitude 40° 59′ W. In the mouth of a dolphin taken on this date were an amphipod (*Eutyphis faba*) and two isopods (*Idothea metallica*).

October 7, 1912, latitude 5° N., longitude 22° 25′ W. A large albacore was caught on this date. Within its stomach were young dolphins (*Coryphæna*), a decapod crustacean, and a pelagic "violet snail" (*Ianthina*).

Elagatis bipinnulatus (Quoy and Gaimard)

October 3, 1912, latitude 6° 46′ N., longitude 24° 35′ W. A female of this species which measured more than a meter in length was taken.

October 11, 1912, latitude 3° 20′ N., longitude 24° 44′ W. A 7-foot shark which swam round and

round the ship on this date, was accompanied not only by several pilot fish, but also by a troup of fifty or more young runners (*Elagatis*). They were seen with the shark for several hours.

R. C. MURPHY,
Brooklyn, N. Y.

ON THE SYSTEMATIC NAMES OF THE SNAPPING TURTLES

In the first number of "Copeia," Mr. H. W. Fowler has indicated his belief that there exist in the United States two forms of the Snapping Turtle —a northern one, with a well-developed median keel to the carapace in the adult, and a southern one, common in the Delaware Valley and south, with the median keel but slightly developed, if at all. To the former he reserves Linnæus' name, *Chelydra serpentina;* for the latter he employs Agassiz's *Chelydra emarginata*, based upon specimens from Mobile and New Orleans, stating that "*Chelydra lacertina* Schweigger is virtually identical" with *Ch. serpentina.*

Without being able at the present moment to express an opinion as to the existence of two separable forms of the Snapping Turtle in this country, I wish to call attention to the fact that, if they are distinct, the keel-less form must take the name given by Schweigger.

The latter, in 1812, Königsberg. Arch. Naturw. Math., vol. 1, p. 293, distinguished between two forms, of which *Ch. lacertina* is characterized as having "testa oblonga, scutellis vertebralibus planis, lateralibus carinatis," while *Ch. serpentina* is said to have "testa oblonga, trifariam carinato-spinosa," or precisely the same characters as given by Mr. Fowler. From Duméril's Cat. Méth. Coll. Rept. Mus. Paris, 1851, p. 15, we learn that Schweigger's type is still in the Paris Museum of Natural History, viz., "the one of which the vertebral keels are effaced, a character upon which

he [Schweigger] had based the distinction between this species [*Ch. lacertina*], considered new by him, and that which he described under the name of *Ch. serpentina*."

Therefore, if there be two forms of Snapping Turtles, their names would be *Chelydra serpentina serpentina* (Linnæus) and *Chelydra serpentina lacertina* (Schweigger).

LEONHARD STEJNEGER,
Washington, D. C.

NOTE ON HAWAIIAN GECKOS

During April, 1913, Dr. Henry A. Pilsbry secured two interesting geckos while visiting the Hawaiian Islands. As any additional information to Dr. Stejneger's account of the "Hawaiian Land Reptiles" (Proc. U. S. Nat. Mus., XXI, 1899, pp. 783–813) is desirable, I give the following records:

Peropus mutilatus (Wiegmann).

Obtained on the island of Kahoolawe, from which it has not previously been reported.

Hemidactylus garnotii Duméril and Bibron.

One secured at Moomouii, on the island of Molokai.

Lepidodactylus lugubris (Duméril and Bibron).

An old example, collected by J. K. Townsend many years ago, is interesting as likely being the first Hawaiian gecko in any museum, especially American. It is still in good preservation. Though labeled simply "Sandwich Islands," it was probably secured on Oahu. The original label also shows that it was confused with the preceding species.

H. W. FOWLER,
Philadelphia, Pa.

New York, June 20, 1914. No. 7

Published by the contributors to advance the Science of cold-blooded vertebrates.

NOTES ON THE GILA MONSTER.

In May, 1907, the Children's Museum in Brooklyn received a fine specimen, 17 inches in length, of the Gila Monster, *Heloderma suspectum* Cope, captured a few weeks previous near Tucson, Arizona. When it died, February 3, 1914, or almost seven years after captivity, it measured 18 inches.

At first vicious and ever ready with partly open jaws and quick motions of the head to snap at an intruder, the lizard became sluggish after a few weeks, rarely attempting to bite even when handled. It frequently drank water, but refused to take food, such as eggs, whole or beaten, chopped beef, or milk. After two months of such behavior, forcible feeding was resorted to. This was accomplished by means of a glass tube, $\frac{3}{8}$ inch in diameter and 18 inches long. The procedure briefly was as follows: grasping the lizard just behind the head and holding it in a vertical position the jaws were pried open with a strong pair of dental forceps, the tube inserted to a depth of from 2 to $2\frac{1}{2}$ inches and the contents of one beaten egg allowed to run down. Thereafter this operation was repeated once a month. It worked perfectly; there was no

spilling and the reptile apparently thrived. Dissection after death showed blood-clots around the heart; otherwise all organs looked normal. Thick layers of fat lined the sides of the abdomen. A few days before, while feeding, the forceps slipped and the reptile's jaws closed with sufficient force to splinter the glass tube. Injury received through this accident probably caused death.

Shedding of the skin did not occur at regular intervals, but rather continuously, small patches peeling off here and there.

On October 26, 1907, a museum attendant was bitten in the fleshy part of the base of the thumb of the right hand. The reptile's hold was extremely tenacious, and some time, perhaps a minute, elapsed before the hand was released. The wound showed 6 small punctures. Swelling and discoloration of the hand, accompanied by great pain in the hand and arm, followed quickly. Although immediately placed under medical care, when the patient reported for duty two weeks later, he still complained of numbness in the hand and arm and occasional dizziness. Lack of mental reserve and a physical condition below the average in this case no doubt contributed in rendering the effect of the Gila Monster's bite unusually severe.

GEORGE P. ENGELHARDT,
Brooklyn, N. Y.

A HYBRID CENTRARCHID.

On December 12–14, 1911, a small collection of fishes was made in the Chesapeake and Ohio Canal above Violet's Lock, about 25 miles above the city of Washington, D. C.

Among the fishes taken was a Centrarchid which is apparently a cross between *Chænobryttus*

gulosus (Cuvier & Valenciennes) and *Lepomis gibbosus* (Linnæus). At the time of capture it was noted that the form and color were unusual and unlike any of the Centrarchids common to these waters.

Following is a table of comparative measurements of the hybrid and a typical example of each of the other species of nearly the same size:

	Chænobrytus gulosus	*Hybrid*	*Lepomis gibbosus*
Total length in cm.	19.4	16.3	15.4
Head (without flap) in standard length	2.67	2.59	2.91
Depth in standard length	2.28	2.10	2.10
Eye in head	5.28	4.63	4.00
Snout in head	3.86	3.00	3.65
Maxillary	2.15	2.55	3.23
Maxillary reaching	to behind pupil	to front of pupil	to front of eye
Interorbital	4.06	3.64	3.11
Pectoral	1.66	1.42	1.20
Teeth on tongue	present	present	absent
Dorsal formula	X, 10, 1	X, 10, 1	X, 11, 1
Anal formula	III, 9, 1	III, 9, 1	III, 10, 1
Scale formula	7+11–42 (+5)	7+12–42 (+5)	7+12–39 (+4)
Rows of scales on cheeks	6	6	5

The profile of the hybrid is very different from *C. gulosus*, the body being short and deep, ovate; the snout is long, pointed, and the upper profile, from tip of snout to origin of dorsal, is relatively straight.

In *C. gulosus* the pectoral is broad, distal margin evenly rounded; in the hybrid, it is broad, pointed, upper rays longest, and in *L. gibbosus* it is narrow, pointed, median rays longest. Although the color pattern of the hybrid is nearest to that of *C. gulosus*, it is unlike that of any example seen in these waters, the color markings are less distinct

and on lower side and belly blend into those of typical examples of *L. gibbosus*. The coloration of the fins and the form and coloration of the opercular flap agree with *C. gulosus*.

The writer has seen other hybrid Centrarchids from the vicinity of Washington, D. C., one of these being apparently a cross between *C. gulosus* and *L. gibbosus;* another between *C. gulosus* and *L. cyanellus* Rafinesque. In this connection it is interesting to note that *C. gulosus* is not a native species, having been introduced into the Potomac by the Fish Commission about 1895.

LEWIS RADCLIFFE,
U. S. Bureau of Fisheries.

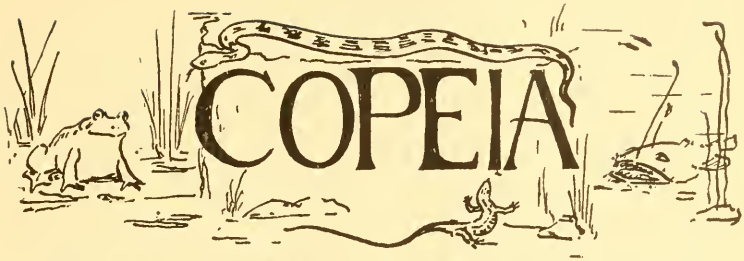
SOME NOTES ON THE CRICKET FROG ON LONG ISLAND.

The country lying between Flushing and Jamaica is an excellent place for frogs. In the woods and between the woods are many small ponds varying from a small pool to a fair-sized pond, big and deep enough to swim in. Here as early as March 23, 1913, I found and collected several Cricket Frogs. Later, as the spring advanced, they became quite common, the small gray frogs being the most plentiful.

This year, 1914, their appearance was later, April 19 being the first. Two weeks later, May 3, I collected several and heard the song; about 11 o'clock one sang as I watched it. Later in the day, at a pond some two miles northeast, I heard some more, while those in my collecting box sang several times.

HOWARTH S. BOYLE,
Elmhurst, N. Y.

New York, July 1, 1914. No. 8.



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FISHES AND REPTILES FROM ASSUAN, EGYPT.

Mr. C. F. Silvester recently submitted the following collection:

FISHES.

Anguilla anguilla (Linnæus). Adult.
Hydrocyon forskalii Cuvier. Adult and half-grown.
Alestes baremose (Joannis). One adult.
Labeo coubie Rüppell. Adult.
Barbus bynni (Forskål). Small example.
Eutropius niloticus (Rüppell). Adult.
Siluranadon auritus (G. St. Hilaire). Two adults.
Porcus bajad (Forskål). Adult.
Synodontis schall (Schneider). One adult.
Clarias lazera Valenciennes. Adult and young.
Lates niloticus (Linnæus). Adult.
Tilapia nilotica (Linnæus). Adult.

REPTILES.

Eryx thebaicus Reuss. Four.
Eryx jaculus (Linnæus). Eight.
Coluber diadema Schlegel. Two adults.
Coluber florulentis (G. St. Hilaire). Eight, all ages.
Psammophis sibilans (Linnæus). Seven, adult and young.
Psammophis shokari (Forskål). Six, adult and young.
Naja haje (Linnæus). Four adults.

Cerastes cerastes (Linnæus). Two adults.
Ptyodactylus hasselquistii (Donndorff). One adult.
Tarentola annularis (G. St. Hilaire). Four adults.
Agama flavimaculata (Rüppell). Adult.
Agama pallida Reuss. Three adults.
Uromastix ornatus Rüppell. One adult. This species apparently not previously recorded definitely from Egypt. Back uniform in color.
Varanus griseus (Daudin). Adult.
Varanus niloticus (Linnæus). Adult.
Acanthodactylus boskianus (Daudin). One.
Scincus scincus (Linnæus). Six, mostly adults.

HENRY W. FOWLER,
Philadelphia, Pa.

AMBLYSTOMA OF LONG ISLAND

Three species of *Amblystoma* (*A. punctatum*, *A. opacum*, *A. tigrinum*) have been listed as being found in the vicinity of New York City.* Of these only *A. tigrinum* is mentioned, without specific data, as occurring on Long Island. Observations by the writer and material in the Museum of the Brooklyn Institute of Arts and Sciences show the following Long Island records:

AMBLYSTOMA PUNCTATUM (Linnæus).

(Spotted Salamander).

2 specimens Cold Spring Harbor, L. I. Aug., 1900.
—G. K. Cherrie and L. Ericson.

3 specimens Forest Park, Brooklyn. May, 1906.
Under stones and logs, damp soil.
—Geo. P. Engelhardt.

1 specimen Huntington, L. I. Aug., 1913.
In potato patch. —Miss Graeve.

*Sherwood, William L. Salamanders found in the vicinity of New York City. Linn. Soc. 1894-95. No. 7.
Ditmars, Raymond L. The Batrachians of the vicinity of New York City. Amer. Mus. Journal, Vol. V, No. 4. Oct., 1905.

This species appears to be common on Long Island. Specimens are frequently brought to the Museum. Its favorite haunts are damp woods, often at some distance from streams and ponds.

AMBLYSTOMA OPACUM (Gravenhorst).

(Marbled Salamander).

1 specimen Mt. Sinai, L. I. Sept. 18, 1909.
—R. C. Murphy.

1 specimen Baldwin, L. I. July 25, 1911.
—Dwight Franklin.

My only experience in finding this species has been in the pine barrens near Lakehurst, N. J., at a place known as "Bone Hill," where, in company with Mr. William T. Davis, three specimens were captured, Aug., 1906, in a barrel sunk at one end of a small pool. This pool, though much reduced in summer, never runs dry, and the barrel formed an excellent trap which the salamanders could readily enter in spring, when the water is high, but from which they could not escape in the summer. For several succeeding seasons *A. opacum* was found in the barrel, but no other species. When visited during June, 1912, the barrel had collapsed, but the pool swarmed with larvæ 1 to 1½ inches long. Except during the breeding season, this species prefers dry or shady places, as already reported by Cope and others.

AMBYSTOMA JEFFERSONIANUM (Green).

1 specimen Montauk, L. I. May 31, 1913.
—Geo. P. Engelhardt.

The capture of this specimen is of unusual interest in furnishing the first record of the species from Long Island and, it appears, also from the vicinity of New York City. In general it can be

said that this salamander is northern in its distribution. Cope records it from West Virginia, Pennsylvania, Ohio, Wisconsin, New York, Vermont and Canada; De Kay from Albany and Peru, Clinton County, New York. The Long Island specimen was discovered under a board in a slightly moist depression near the road about half way between Montauk and Montauk Point, a locality abounding in swamps, ponds and small streams. It measures four inches in length, therefore not fully grown, and in color during life was above glossy black with numerous light-blue blotches and spots; below grayish to lead-colored. During four months of captivity the specimen fed sparingly on meal worms. In alcohol the ground color has changed to olive-brown and the blotches and spots have faded into buff. A wax cast, with natural colors restored, has been prepared.

AMBLYSTOMA TIGRINUM (Green).

(Tiger Salamander.)

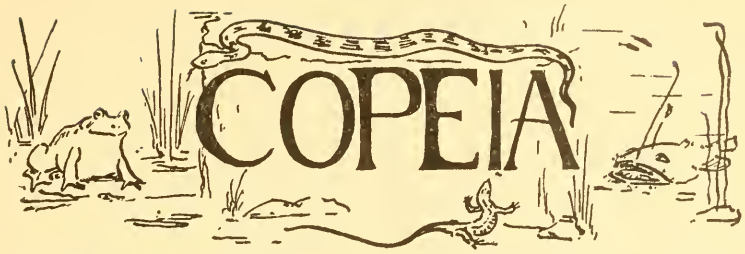
Reported by William L. Sherwood from Rancocas, L. I., but this no doubt should read Rancocas, N. J., as there is no such place on Long Island.

Raymond L. Ditmars refers to this species as "occasionally found on Long Island."

No specimens or specific data are at hand. Information regarding this species, as well as other salamanders from Long Island, would be much appreciated.

GEORGE P. ENGELHARDT,
Brooklyn, N. Y.

New York, August 29, 1914. No. 9.



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FURTHER NOTES ON THE SALIENTIA OF JACKSONVILLE, FLA.

Engystoma carolinense, Holbrook, the "Narrow-mouth Toad," is a common Batrachian here, but owing to its nocturnal habits, it is not often seen. After thunder-showers, however, every pool and ditch resounds with its cry, which sounds like a nasal "baa" or "bee" and has also some resemblance to the noise made by an electric buzzer. I have caught hundreds of these queer little toads, and on August 28, 1911, came across their spawn in a ditch between two potato hills. The eggs are laid in oblong, jelly-like sheets, or flat masses, about 1½ inch long and 1 inch wide. The egg-masses contain about 100 to 150 eggs.

Below is what I believe to be the first record of the growth and metamorphosis of this species:

Eggs laid, night of August 27, 1911.

Aug. 28. One egg-mass put in flat enamelled pan in about 1½ inch of water. Larvæ straightened out, but still in the egg-mass.

Aug. 30. Larvæ released from egg-mass, ⅛ inch long, with small gill tufts.

Sept. 1. Larvæ $\frac{3}{16}$ inch long, gills disappearing.

Sept. 2. Larvæ ¼ inch long, all have lost gills.

Sept. 8. Hind legs budding, length of larvæ ½ inch.

Sept. 12. Legs fully developed, arms appearing, tail getting shorter, length of larvæ $\frac{5}{8}$ inch.

Sept. 14. Larvæ breathing air, tail is but a short stump.

Sept. 16. Tail gone, the young toads measure $\frac{3}{8}$ inch from snout to vent.

Bufo lentiginosus, Shaw, is the southern representative of our common (northern) toad, and seems to prefer the neighborhood of human habitations for its abode. Near our house we found them under boards, logs, tubs, heaps of rubbish, etc. Their habits are in every respect similar to those of *Bufo americanus*, and the call of the male cannot be distinguished from that of the northern species. The toad itself, however, is differently built, the head being wider and higher, and the arms and legs shorter and more delicate. The eyes, also, are larger, and the enormous bony knobs on the large heads of some of the old females give them a sort of resemblance to species of the tropical cystignathoid toads *Ceratophrys*. Unlike the latter, our toads are gentle creatures, living their life of usefulness in our farms and gardens.

Bufo quercicus, Holbrook, is, I believe, the smallest species of the whole genus *Bufo*, called the "Oak-toad," and very common around Jacksonville. Its cry resembles that of a small chick, very loud and shrill, and may be heard at any time of day or night, sometimes from absolutely dry and dusty fields and roadsides, where these tiny toads hop about in the glaring sunshine, living on the smallest of insects. The full chorus, which is earsplitting, is, however, heard only at night, after heavy rains. The throat of the male is black, and when the pouch is distended, forms a small elongate bladder, slanting upward, and about $\frac{3}{4}$ inch long and $\frac{1}{4}$ inch in diameter. The spawn is laid in tiny strings, and the metamorphosis is very rapid. The

young toads, when fully developed, are $\frac{1}{4}$ inch or less in length. The adults measure: Male, 1 inch; female, $1\frac{1}{8}$–$1\frac{1}{4}$ inch.

RICHARD F. DECKERT,
New York, N. Y.

KING FISH AT CORSON'S INLET, N. J.

There has never been a commercial fishery at this point, but it has long been visited by sportsmen. Among the fish sought *Menticirrhus saxatilis* holds a prominent place. The remarkable variation in numbers of this fish in different years is as noticeable here as at other points, the species occurring in great abundance for one or two years and then gradually decreasing from year to year until few are caught. For the last fifteen years, however, which is as far as reliable accounts go, it has never entirely disappeared.

The year 1907 began the latest period of maximum abundance. During the previous August and September large numbers of young fish, less than two inches long, were seen along the sandy marshes of the Inlet, and many hauls of the bait nets contained little else.

The fish usually makes its appearance early in May, the 4th being the earliest date of which I have a note, and remains until October. In 1909 the last seen were October 11th. After the middle of September a northeast storm is usually followed by their disappearance.

Menticirrhus americanus was first noted by me June 27th, 1909, when 8 examples were found in a catch of 95 king fish. July 26th there were 10 examples in a total of 25 of the two species. They

were noted during August and September and until October 11th, when one example was seen. In 1910 they were noted from May 22d to September 11th. In 1911, 1912, and 1913 they were found in July and August, in very small numbers compared with *Menticirrhus saxatilis*, which continued abundant.

Young and half grown examples of *Menticirrhus saxatilis* are common in the Inlet during summer, but I have never identified any but full grown specimens of *Menticirrhus americanus*. It is probable that the latter spawn here, however, as the females frequently contain large and mature ovaries.

R. J. PHILLIPS,
Philadelphia, Pa.

FOUR-TOED SALAMANDER ON LONG ISLAND

Two specimens of the Four-toed Salamander (*Hemidactylium scutatum*) were collected a year apart at the same small pool in a second-growth woods at Jamaica North. They were found by tearing the moss apart that grew at the base of some dead trees that were just at the edge of the pool.

HOWARTH S. BOYLE,
Elmhurst, N. Y.

New York, September 15, 1914. No. 10.

Published to advance the Science of cold-blooded vertebrates.

FISHES FROM POCOTALIGO RIVER, SOUTH CAROLINA

During a recent trip to central South Carolina, May 14–June 1, 1914, I obtained a few fish from the Pocotaligo swamp near Manning in the coastal plain, which have been identified by Mr. Henry W. Fowler, of the Academy of Natural Sciences of Philadelphia, and which are now in the collection of that institution. As a list of them may be of interest in tracing the range of the several species, it is here presented.

An examination of numerous strings of fish caught by negro boys in the various channels of the river in the heart of the swamps showed the following species, which are evidently the most common forms, found in such localities, though doubtless there are others: *Ameiurus natalis*, *Chænobryttus gulosus*, *Acantharchus pomotis*, *Enneacanthus obesus* and *Esox americanus*. I also obtained in a scoop net a number of *Gambusia holbrooki* in one of the channels where a small brook entered from the edge of the swamp. At the head of a small tributary swamp, the water from what was originally a large shallow pool, had almost entirely disappeared, leaving a puddle a few feet in diameter literally swarming with little fish,

tadpoles, water beetles and crayfish. The fishes proved to be young *Acantharchus pomotis* and *Esox americanus*. The whole section of country was suffering from an almost unprecedented drought, and many ponds and small streams which undoubtedly contained fish under normal conditions were absolutely dry, while in the big river swamps the water was entirely restricted to the channels.

WITMER STONE.
Philadelphia, Pa.

POISONOUS SNAKES NEAR NEW YORK CITY

It will be of interest to herpetologists to learn of the occurrence of poisonous snakes in the southerly portion of Westchester County. For some years past the writer has had reports of the occurrence of copperhead snakes and occasional rattlesnakes in the region immediately north of White Plains and south of Mt. Kisco. He has been sceptical of these reports owing to the habits of several species of non-poisonous snakes which vibrate their tails when angry, causing these to be mistaken for rattlesnakes. There is also the common habit among local observers without proper knowledge of mistaking harmless water snakes *(Tropidonotus)* and the flat-headed "adders" *(Heterodon)* for the copperhead snake. Of late, however, there have been persistent rumors of copperhead snakes in the hills near North White Plains. The country is quite wild and few people roam about the hilly portions. On the 25th of June a friend of the writer confirmed these rumors by capturing a large copperhead snake *(Ancistrodon contortrix)* on a hill a short distance from North White Plains. This is the nearest definite record

of a poisonous snake occurring in the vicinity of the boundary of New York City that the writer has ever received—excepting the numerous copperheads captured on the Palisades along the west shore of the Hudson. The specimen described was caught just ten miles from the city line.

It is particularly interesting to note that the reports of rattlesnakes occurring in southerly Westchester County have also been confirmed by a large yellow specimen being captured on a hill near Sherman Park, this being seventeen miles from the city line. The collector informed the writer that there were several other snakes seen on this same hill, which is of a ledgy character.

RAYMOND L. DITMARS,
New York, N. Y.

AN UNUSUAL RED SALAMANDER

A few days ago while chopping cord-wood with my friend Dr. Bremer of the Harvard Medical School, I was surprised to find, under the bark of a hemlock log, a brilliant red salamander. I thought first that I had the red eft form of the common pond salamander (*Notophthalmus viridescens*), though the situation was not one where this creature would be expected. Next I thought of *Spelerpes ruber*, but I knew instinctively that this also was improbable on account of the location. An examination showed that it was an aberrantly colored individual of *Plethodon erythronotus*. This species, if examined closely in a living state, will often be seen to show scattered, minute red dots in the black areas, showing that the red pigment is not really confined to the mid-dorsal region. It probably exists along with the black pigment wherever this occurs, but only shows when

the more dense black pigment is absent. Now supposing this black pigment to be completely wanting, the result would be a salamander similar to that which we obtained at Cohasset, Mass. I have no doubt, judging from similar cases, that a single unit pigment character has been lost with this, at first sight, rather startling result. While the common term albinism and melanism have one a latin and one a greek origin, I presume for the sake of euphony that this predominance of red pigment might well be called erythrism. The specimen is No. 3527 of the Amphibian Collection, Museum of Comparative Zoölogy, Cambridge, Mass.

THOMAS BARBOUR,
Cambridge, Mass.

NOTE ON THE SWAMP TREE TOAD
(PSEUDACRIS TRISERIATUS)

But few definite records have been given for this interesting little amphibian in the Middle States. In New York it does not appear to have been noticed except in the southern part of the state. In New Jersey it has been reported from Signac, Plainfield and in Gloucester County. In Pennsylvania it has been found in the lower part of Chester County, and at Pine Grove in Cumberland County. I am now able to add another record based on two living examples in my possession, received from M. E. S. Mattern, who secured them in late April, along Lizard Creek, near Bowmans Station, in Carbon County. In Maryland it has been obtained at Jennings, as reported in COPEIA, No. 2.

HENRY W. FOWLER,
Philadelphia, Pa.

Edited by J. T. NICHOLS, American Museum of Natural History
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Published to advance the Science of cold-blooded vertebrates.

NOTE ON A NESTING SUNFISH

During the last few days of May, 1914, the writer observed over twenty "nests" of the common sunfish (*E. gibbosus*) along the shore of Umpawaug Pond, Topstone, Conn.

An examination of a few of these did not disclose any eggs, although many of them were guarded by the spunky little males.

These nests could readily be seen through the clear water as saucer-like depressions from which the mud and debris had been cleared, exposing the pebbles and sand.

On one of these nest guardians the writer tried an experiment. Dropping a water-logged piece of heavy fishline into the centre of the nest he awaited results. The sunfish eyed it suspiciously, nibbled at it and then bore it off two feet from the edge of the nest. This experiment was repeated with various objects with the same result. Finally a half a dozen were thrown in at once, to the consternation of the sunfish, who retreated. Two days later the writer observed the same nest with the objects in place, but along side of it a brand new nest with the little sunfish on guard.

DWIGHT FRANKLIN,
New York, N. Y.

FISHES SWALLOWED BY GAR PIKE

As is well known, gar pikes are highly predacious fish. They devour vast numbers of food and game fishes; and in localities where they are abundant they are treated as pests and destroyed by the thousand.

But although their voracious habits are well-known, there do not appear to be any definite records as to the size of the fish they swallow. This is due to the fact that only a very few out of the thousands of gars taken annually are opened, and among these it is rare to find one containing a fish newly ingested and still recognizable. The following two records accordingly seem worth preserving.

During a stay of seven weeks at Moon Lake, Miss., a few years ago, I saw over a dozen large alligator gars (*Lepisosteus tristœchus*), some of them over 9 feet long, cut up by negroes to smoke for use as food in the winter. In one instance I saw a fish taken from the stomach of a gar. It was a crappie, or calico bass (*Pomoxis sparoides*), 6 inches long.

The second record is the following: The New York Aquarium recently received an alligator gar which had been shipped alive from the lower Mississippi at Memphis, Tenn. It died on the way north, and on reaching the Aquarium was turned over to the Museum, where it was skeletonized. It measured 6 feet 6 inches in length, and on being opened it was found to contain a flat-nosed gar (*Lepisosteus platostomus*) 2 feet 2 inches in length, or exactly one-third its own length. The ingested fish had apparently been but recently swallowed; it was still intact, only the scales and head bones having begun to disintegrate in a few places. It lay in the alimentary canal with the head pointed toward the tail of its captor, indicating that it had been engulfed head first and not from behind.

L. HUSSAKOF,
New York, N. Y.

THE LONG-NOSED DACE IN THE HACKENSACK, NEW YORK

The widely-distributed fish (*Rhinichthys cataractæ*) has only been noted occasionally in New York. Originally described from Niagara Falls it has since been found in the St. Lawrence River, near Ithaca, and at Plattsburg. Mr. Nichols says it is a rare local resident within the fifty-mile limit of New York City. It was, therefore, with interest that I secured a fully adult male in nuptial dress, while on a visit with Mr. George Herbert Lings to his father's estate near Blauvelt, in Rockland County. This example was taken May 19, 1914, in rocky rapids, in a tributary of the Hackensack. Several other fishes, seen at the same time, were believed also to be this species. In quiet water, in the near vicinity, we noted *Abramis crysoleucas*, *Notropis bifrenatus*, *Catostomus commersonnii*, *Erimyzon sucetta oblongus*, *Lepomis auritus* (nesting) *Eupomotis gibbosus*, *Rana clamata*, *R. palustris*, *R. catesbeiana*, *R. sylvatica* and *Chrysemys picta*.

HENRY W. FOWLER,
Philadelphia, Pa.

CHUB MACKEREL IN GRAVESEND BAY

Limited numbers of this species (*Scomber colias*) were taken in Gravesend and Sheepshead Bays, during the late summer of 1913. The average length of specimens taken on September 27, 1913, was 142 mm. During the past summer large numbers of compact schools appeared in early June. On June 27, 1914, they averaged 97 mm. in length. Immense numbers were taken for bait and as food for the local colony of Italians. In three hauls of a 100-foot dragnet, 62 pounds were taken. In late August the species was taken by hook at Sheepshead Bay and then averaged 131 mm. in length. The stomachs contained several species of *Arthrostraca* (*Elasmopus* and *Ampithoë*) and small Silversides (*Menidia notata*). Locally they were used as live bait in the capture of Weakfish and Fluke.

WM. H. WIEGMANN,
New York, N. Y.

A LIST OF THE AMPHIBIANS AND REPTILES OBSERVED IN RICHLAND COUNTY, ILLINOIS, IN MAY, 1913

The writer and Miss Crystal Thompson were sent by the Museum of Zoology, University of Michigan, to Richland County, Illinois, in May, 1913, to obtain specimens and study the habits of *Rana areolata* Baird. During the field work the following species of amphibians and reptiles were collected:

1. *Ambystoma microstomum* (Cope).—Frequently plowed out of mouse and crayfish burrows.
2. *Bufo americanus* LeConte.—Common.
3. *Chorophilus nigritis* (LeConte).—apparently not common; but one specimen observed.
4. *Acris gryllus* LeConte.—Abundant on the shores of ponds.
5. *Rana pipiens* Schreber.—Common.
6. *Rana areolata* Baird.—Not common; found in crayfish burrows.
7. *Rana catesbiana* Shaw.—Abundant.
8. *Ophiosaurus ventralis* (Linn.).—Rare.
9. *Heterodon platyrhinus* Latreille.—Three specimens secured.
10. *Natrix fasciatus* (Linn.).—Abundant; frequently headlighted in the ponds at night.
11. *Cyclophis aestivus* (Linn.).—One specimen observed.
12. *Bascanion constrictor* (Linn.).—Reported as formerly abundant, but now nearly exterminated. Often plowed out of burrows.
13. *Pituophis catenifer sayi* (Schlegel).—Common; frequently plowed out of burrows.
14. *Thamnophis sirtalis* (Linn.).—few observed.
15. *Chelydra serpentina* (Linn.).—Common in creeks and ponds.
16. *Terrapene carolina* (Linn.).—Very abundant; a series of 23 specimens collected and many more observed.

HELEN THOMPSON GAIGE,
Ann Arbor, Mich.

Edited by J. T. Nichols, American Museum of Natural History

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New York, November 20, 1914. No. 12

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A NEW RECORD FOR THE PROWFISH.

Zaprora silenus Jordan

In the Proceedings of the California Academy of Sciences of 1896, (page 203, pl. 20), Jordan described as new to Science a species of Scombroid fish which constituted a new genus and family related to the *Icosteidae* but differing from it in having pharyngeal teeth.

In the addendum of the Fishes of North and Middle America, Jordan and Evermann (Bull. 47, U. S. Nat. Mus. Vol. 3, 1898, p. 2850, Vol. 4, plate CLII, fig. 1) it is again described, and it is stated that "only the type, 29 inches long, known."

In Fishes of Alaska, Evermann and Goldsborough, it is mentioned and figured, and the statement is made that it is "known only from 2 specimens, the type and one other now in the Provincial Museum at Victoria, both taken in Nanaimo Harbor, British Columbia."

In "Check List of the Fishes of Canada and Newfoundland," by Andrew Halkett, Naturalist, Department Marine and Fisheries, 1913, p. 77, it states that "only two specimens are known, one from Nanaimo, (the type) which is in the Provincial Museum, Victoria, and the other from the Straits near Victoria, Vancouver Island."

In April, 1914, Captain Andrew Weiding

caught on a halibut trawl in 65 fathoms of water in Lat. 58° 5′ N., Long. 149° W., a specimen of this fish which was sent to the Bureau of Fisheries by Edwin Ripley, fish dealer of Seattle, Washington. As the present specimen, which was 33⅓ inches in total length differed somewhat from the typical description, the following notes upon it are given: Standard length 74cm. Depth, 18.5 cm. Length of caudal peduncle, 4 cm. Depth of caudal peduncle, 7.2 cm. Pectoral rounded, its longest ray 11 cm. Caudal truncate, its longest ray, 11 cm. Pectoral with small scales on base on rays, extending (on middle ray) to 6. 5 cm. Dorsal, anal and caudal scaled at base. Dorsal formula, LIV. Anal, 24. Head, 13.7 cm. Eye, 2.4 cm. Snout, 3cm. Max., 4.5 cm. Interorbital, 5.3 cm. Ground color, gray, lighter beneath, punctulated with black dots. Scales with bluish margins. Dorsal and anal without punctulations. Pectoral dark at base, with dote, distal portion light gray, margin blackish. Caudal whitish at edges and towards end, after margin blackish. Pores of head, white. Forehead grayish. Yellow spot in upper axil of pectoral. B. F. tag no. 9547.

William C. Kendall,
U. S. Bureau of Fisheries.

COMPARATIVE NUMBERS OF LIZARDS AND SNAKES ON DESERT.

Lizards are the most abundant form of desert reptile life. They greatly outnumber the snakes both in point of individuals and species. In the summer of 1913, the writer saw only three species of snakes on the Painted Desert, Arizona. These were the prairie rattlesnake (*Crotalus confluentus*), bull snake (*Pituophis sayi*), Arizona ribbon snake(?) (*Eutaenia megalops*).

Among the lizards which are abundant may be mentioned: Bailey's Collared Lizard, Leopard Lizard, Racerunners, Swifts and Horned Lizards.

Dwight Franklin,
New York, N. Y.

MUD TURTLE ATTACKED BY CRAB.

Canoeing in the muddy shallows of a creek at Mastic, Long Island, with Mr. Alan S. Nicolay on August 29, 1914, a large Blue Crab was observed firmly holding a Mud Turtle (*Kinosternon pennsylvanicum*) of perhaps more than half its size, one of whose feet waved helplessly above the surface. The crab probably had it by the neck, and the encounter might well have ended disastrously if not interrupted.

The waters at Mastic are rather unusual. The creek where the encounter took place, though directly tributary to brackish Moriches Bay, is, judging from the water plants, almost, if not quite, fresh. The writer has taken the Painted Turtle in it. The Snapping Turtle is common in the Mastic Region; Spotted Turtles are abundant in narrow, more or less fresh creeks in the brackish meadow; the Mud Turtle is frequently seen and the writer has found it on the beach side of the bay. A fisherman at Brookhaven, whose numerous stock of Diamond-backed Terrapin were examined says that this part of the bay is excellent for that species. The Box Turtle is common in the woods, but the writer has never found the Wood or Musk Turtles in the vicinity.

Mr. Waldron De W. Miller considers the latter species definitely less coast-wise than the Mud Turtle in the vicinity of New York. He finds it at Plainfield, N. J., where he has not taken the Mud Turtle, which he has, however, found in the Cheesequake Marshes, lower Raritan River Marshes, and at Sandy Hook, N. J.

J. T. Nichols,
New York, N. Y.

AMBYSTOMA TIGRINUM IN SOUTH DAKOTA.

Last summer, during the month of August, the writer lived among a number of Wahpeton Sioux, residing about Drywood Lake about ten or twelve miles from Sisseton, S. Dakota. The abundance of the tiger salamander *Ambystoma tigrinum* in Drywood Lake, and indeed in all the ponds thereabouts, was

notable. Both forms occurred, the axolotl phase dwelling in the water, and the salamander phase on the land.

After a rain, or in the morning while the ground was still heavily bedewed, numbers of these salamanders could be found crawling over the prairie, especially along the roads. I have seen as many as seven in the course of a couple of miles, and their mangled bodies were often seen where they had been run over, sometimes as much as half a mile from the lakes.

These salamanders delighted in burrowing in the mounds of loose black earth cast up by the pocket gophers on the prairie. They often covered themselves, leaving only the tip of the nose exposed. If irritated, they would slowly lash their tails, which would exude abundant drops of a thick white milky fluid. The Indians believed this to be poisonous. Great variation in the coloring of these salamanders was observed, some being almost uniformly dull olive, others plainly and strikingly barred with yellow. No specimens under five or six inches in length were observed, and most may have been eight or even nine inches long.

ALANSON SKINNER,
New York, N. Y.

Edited by J. T. NICHOLS, American Museum of Natural History
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A NEW RECORD FOR THE LUMPFISH IN CHESAPEAKE BAY.

This seems to be the second specimen to be recorded from Chesapeake Bay. It was caught in a trap off Wolf Trap Light, April 29, 1914, by E. L. Wilson, and later taken to the Bureau of Fisheries for identification. The specimen was a large one about 14¾ inches long, and full of ripe or nearly ripe eggs. B. F. tag 9548.

In *Forest and Stream,* August 3, 1907, page 178, Barton A. Bean records the capture of an adult female Lumpfish (*Cyclopterus lumpus*), at Buckroe Beach, Chesapeake Bay, about two miles north of Old Point Comfort. It was included in a shipment of fish to Messrs. Sheaffer & Stuart, of Washington, D. C., by Thomas V. Weber, April 14. After describing the specimen Bean says:

"The specimen here recorded is a female, apparently having spawned; seventy eggs passed freely from the fish while being measured."

William C. Kendall,
U. S. Bureau of Fisheries.

NOTES ON NEW JERSEY FISHES.

During the past season a number of New Jersey fishes have fallen under my notice. Though most of the species are common, several interesting associations and records are here given:

On May 19th, while at Sea Isle City, *Carcharias littoralis, Raja erinacea, R. ocellata, R. laevis, Pomolobus aestivalis, Brevoortia tyrannus, Scomber scombrus, Sarda sarda, Pomatomus saltatrix, Porontus triacanthus, Centropristis striatus, Stenotomus chrysops, Cynoscion regalis, Micropogon undulatus, Spheroides maculatus, Prionotus carolinus, P. strigatus, Paralichthys dentatus, Lophopsetta maculata, Merluccius bilinearis, Gadus callarias, Urophycis regius* and *U. chuss* were found; July 20th, *Carcharhinus milberti* and *Echeneis naucrates* were obtained; July 24th, *Sphyrna zygaena, Fundulus majalis, Menidia menidia notata, Trachinotus carolinus, Syngnathus fuscus* and *Menticirrhus saxatilis;* August 29th, *Trachinotus falcatus, Orthopristis chrysopterus* and *Bairdiella chrysura.*

Mr. W. J. Fox, who also secured some of the above, obtained *Caranx crysos, Stephanolepis hispidus* and *Anguilla chrisypa* at Carson's Inlet on August 11th. The last was an adult, and remarkable for its deformed body, being twisted in rather even undulations. I examined a small *Cyclopterus lumpus,* taken in the pound at Ocean City in late April, and was informed several others were also obtained. *Aleutera schoepfii* and *Urophycis regius* were also secured there June 21st; and *Synodus foetens* at Beesley's Point on September 10th.

Among fresh-water fishes, those of the Alexsocken Creek, above Lambertville, obtained July 22nd, contained three adults of *Rhinichthys cataractae.* These were the first I ever collected in New Jersey, and were taken in the rapids, associated with the very common *R. atronasus. Semotilus atromaculatus, Notropis cornutus, Fundulus diaphanus,* and *Boleosoma nigrum olmstedi* were also found. *R. atronasus* were very abundant in Jacobs Creek, near Harborville. A small collection from the Pompton River, near Mountain View, in Passaic County, contains *Semotilus bullaris, Notropis photogenis amoenus, Ambloplites rupestris, Lepomis auritus, Eupomotis gibbosus* and *Micropterus dolomieu.*

HENRY W. FOWLER,
Philadelphia, Pa.

SALAMANDERS COLLECTED IN WESTCHESTER COUNTY, N. Y.

1. *Amblystoma opacum* Gravenh.
2. *Amblystoma punctatum* Linn.
3. *Amblystoma jeffersonianum* Green.
4. *Hemidactylium scutatum* Tschudi.
5. *Plethodon cinereus* Green.
6. *Plethodon cin. erythronotus* Green.
7. *Plethodon glutinosus* Green.
8. *Spelerpes bilineatus* Green.
9. *Spelerpes ruber* Daudin.
10. *Desmognathus fusca* Raf.
11. *Diemyctylus viridescens* Raf.
12. *Diemyctylus vir. miniatus* Raf.

All these salamanders have been found by the writer to be fairly abundant, except the three species given below:

Amblystoma jeffersonianum Green, is my latest find. One specimen, only, was taken at Silver Lake Park, near White Plains, N. Y., about 1,000 feet from the lake, on a hill in the woods, at an altitude of about 100 feet from the level of the lake. The salamander was under a large flat rock, exposed to full sunshine, in soft, perfectly dry, almost dusty soil. It was covered with dust, but upon being handled, this rubbed off, and showed the salamander in its typical coloring. The color is dark brown above, with small, light blue spots on the sides, limbs, and sides of the tail; undersides bluish-black to gray. Length 4¾ inches from tip of snout to tip of tail. Following is a condensed description taken from Bulletin No. 34, U. S. Nat. Mus., pp. 89-92:

"Body cylindrically more slender . . . . than A. Punctatum. . . . The head is elongated, with muzzle obtuse . . . . The eyes are large . . . . the gular fold is distinct . . . . that behind the angle of the jaws is inconspicuous, as is the lateral parotoid furrow. There are twelve costal furrows. The tail is a little shorter than the body and head. It is oval in cross-section in the middle . . . . without any ridge or crest . . . . it becomes more and more compressed towards the tip. The limbs are largely developed and the toes very long. The digits are cylindrical and

without any basal web."

These external identification characters correspond exactly with the specimen.

Hemidactylium scutatum Tschudi has been taken repeatedly at Silver Lake Park, in the hills near the lake, usually in or under decaying logs. At first glance it resembles a pale specimen of Plethodon cinereus erythronotus, but the color is more nearly yellowish-brown. The undersides decide the question, being pure milky-white with small dark dots in *Hemidactylium* but lead colored, or pinkish-gray in *Plethodon.* The costal grooves are also very much more pronounced than in the other genus.

Spelerpes ruber Daud., one specimen (young), found in a brook near Silver Lake, is too well known to require description here. I only mention it on account of its apparent rarity in the district.

Richard F. Deckert,
New York, N. Y.

ON ALFARO CULTRATUM.

Alfaro cultratum is one of the most interesting of the killifishes, and is abundant in the swift streams of certain portions of the lower Caribbean slopes of Costa Rica. Its most curious feature is a double row of scales that extend below the ventral body line, forming a thin edge, which is continuous with the keel formed by the flattened anterior portion of the body,

This is an evident adaptation for life in the very fast water which the fish inhabits, although the species does very well in an ordinary aquarium. It is one of the live bearing forms, and on one occasion a captive female approximately 70 mm. in length gave birth to 65 young, and, about three months later, to 75. The young average about 7 mm. in length, and the scales of the keel are plainly visible when the fish is held in a proper light. Most live-bearing Poecilliidae breed the year round in aquaria, and it seems probable that, where conditions are favorable, they do so also in the wild state.

Lee S. Crandall,
New York, N. Y.

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New York, December 31, 1914.

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DO SNAKES SWALLOW SMALL MAMMALS HEADS OR TAILS FIRST?

While in the Yosemite valley, July 11-15, 1914, I saw three individuals of the rattlesnake (*Crotalus oregonus*) of that region. Two of these were seen July 13, just above Nevada Falls at an elevation of about 6,000 feet, on the trail to Clouds Rest. The third was seen July 15, in the entrance to the valley near Cascade Falls, elevation about 3,445 feet. The first of the two seen on the way to Clouds Rest was lying on some rocks at the side of the trail. It was, of course, soon killed by members of our party.

The snake was about two feet long and had seven rattles and a button. A very noticeable swelling or enlargement just amidships, as well as its sluggish condition, suggested that it had recently swallowed an animal of some kind.

Like Kipling's Elephant's child, we were all filled with "insatiable curiosity", and not being afraid of being spanked, at once asked a new fine question: "What did the rattler have for breakfast?"

The obvious way to find out was to cut the rattler open, which we proceeded to do. I held the snake with my left hand near its head and the other abaft the swelling, while Mr. C. E. Crunsky performed the surgical operation, and the new fine question was answered—the rattler had a fine adult Merriam Chipmunk (*Eutamias merriami*) for its breakfast. And the *rattler had swallowed it tail first!* The head of

the chipmunk was towards the snake's head, and its legs, tail and fur all lay back toward the snake's tail, smooth and in perfect order. This surprised us very much. We could hardly see how the chipmunk could go down tail first without turning the tail, or some of the legs, or the fur, the other way. We could scarcely believe our own eyes; some of the party were even disposed to grant there had been an error in observation. But as all members of the party (there were six or seven of them) were agreed as to the fact, it is evident that this chipmunk had been swallowed tail first.

A few days later Dr. J. Grinnell sent me a photograph taken August 1, 1914, by Mr. Edward R. Warren of Colorado Springs, which showed a gopher snake in the act of swallowing a chipmunk tail first—only the head of the chipmunk remained exposed.

Barton Warren Evermann,
San Francisco, Cal.

SOME AMPHIBIANS NEW TO WHITEFISH POINT, MICHIGAN

During the summer of 1914, the biological survey of the Whitefish Point region, Chippewa County, Michigan, which is being made by the University of Michigan Museum of Zoology, was continued, and additional data on the reptile-amphibian fauna were secured. The three amphibians listed below were obtained for the first time, and increased to sixteen the total number of species known to occur in the region. (See Ann. Rept. Mich. Acad. Sci., 1912, pp. 215-217.)

Ambystoma jeffersonianum (Green).—Found under old logs at the edge of black ash and cedar swamps.

Diemictylus viridescens Rafinesque.—But one specimen was obtained. This was found in a decayed log at the edge of a marsh.

Hyla pickeringii Holbrook.—Common in the hardwood forests and tamarack swamps.

Helen Thompson Gaige,
Ann Arbor, Michigan.

THE GENUS CRYPTOTOMUS COPE

A recent examination of the type species (*C. roscus Cope*), compared with other members of this genus, convinces me that at least two well-marked groups occur, which may be admitted to sub-generic rank. They may be set forth as follows:

Sub-genus *Cryptotomus* Cope.

Type *Cryptotomus roscus* Cope.

Body elongate, labroid in appearance. Front profiles attenuate. Cutting-edge of jaw teeth formed of several overlapping series, each tooth distinct, and posterior flaring out behind. Scales on breast greatly enlarged. One row of large scales on cheek. Dorsal spines very flexible.

One species, brightly colored.

Sub-genus *Nicholsina* sub-gen. nov.

Type *Cryptotomus beryllinus* Jordan and Swain.

Body moderately long, scaroid in appearance. Front profiles gently convex. Cutting-edge of jaw teeth formed of nearly continuous or single series, with only few anterior distinct. Free posterior canines frequent. Scales mostly uniform in size, not enlarged on breast. Cheek with one or two rows of large scales. Dorsal spines flexible.

Several species, small, and usually of dull or olive coloration. Besides the type, they are *C. deutiens* (Poey), *C. retractus* (Poey), *C. ustus* (Valenciennes) and *C. auropunctatus* (Valenciennes), in America.

Dedicated to Mr. John T. Nichols, of the American Museum of Natural History.

HENRY W. FOWLER,
Philadelphia, Pa.

A NOTE ON A DRAWING OF CARANX BARTHOLOMAEI CUVIER & VALENCIENNES.

In the Fishes of North and Middle America, Jordan & Evermann (Bull. 47, U. S. Nat. Mus. vol. iv., 1900), plate CXLII, fig. 389 is erroneously labelled *Caranx latus*. This drawing was made by H. L. Todd from a specimen collected by Vinal N. Ed-

wards at Woods Hole, Mass., U. S. National Museum No. 20247. Upon examining the fish in the container to which this number is given (labeled *C. fallax*), the writer found seven specimens, six of these were *C. bartholomaei* and one was *C. latus*. From the form of the fish, the lack of elevation of anterior rays of soft dorsal and anal; the greater number of soft rays (26 dorsal rays in drawing, 21 or 22 in *latus;* 22 anal rays in drawing, 16 to 18 in *latus*); the absence of a black blotch on opercle; the short maxillary, its tip not reaching anterior margin of pupil, and curved and straight portions of lateral line subequal, it is evident that the drawing was made from one of the specimens of *C. bartholomaei*.

LEWIS RADCLIFFE,
U. S. Bureau of Fisheries.

DEKAY'S SNAKE IN THE LATE FALL

Previous to November 26, 1914, there were several drops of temperature to below the freezing point, 18 degrees above zero being reached on one occasion. On the above date, the weather was milder, the thermometer registering as high as 50 degrees. While the writer was walking near the corner of Kingsbridge Road and University Avenue, he found a young DeKay's snake (*Storeria dekayi*), about 8cm. in length. It was quite active and when released, quickly disappeared under the dried grass.

LEE S. CRANDALL,
New York, N. Y.

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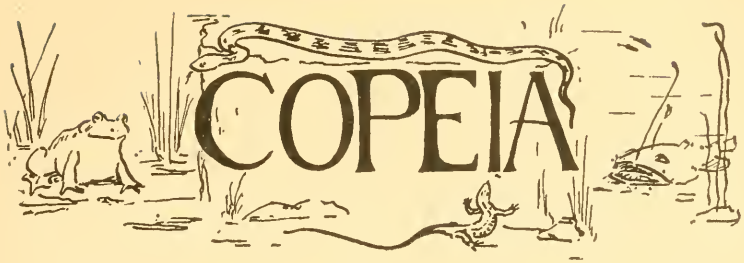
New York, February 20, 1915. No. 15



Published to advance the Science of cold-blooded vertebrates

NOTE ON SOME GYMNOTID FISHES.

The following species of this family (Gymnotidæ) were noticed in the collection of the Academy of Natural Sciences of Philadelphia. As they have not been studied for many years, and several are new records, they are offered as a slight contribution to science.

Electrophorus electricus (Linnæus). Demarara, Pebas in Ecuador, and South America.

Gymnotus carapo Linnæus. Surinam; Rio Jacuby, Sao Joao to Rio Negro and Chapada, in Brazil; Peruvian Amazon; Upper Amazons; Pebas and Ambyiacu River, Ecuador.

Sternopygus macrurus (Schneider). Surinam; Rio Jacuby, Peruvian Amazon, Ambyiacu River.

Eigenmannia virescens (Valenciennes). Rio Jacuby and Sao Joao to Rio Negro and Chapada, Peruvian Amazon, Pebas, Ambyiacu River.

Eigenmannia troscheli (Kaup). Peruvian Amazon, Sao Joao.

Steatogenes elegans (Steindachner). Upper Amazon (Hauxwell). Apparently not recorded from this region previously.

Hypopomus brevirostris (Steindachner). One from Colombia, likely Rio Magdalena, as it was received from R. W. Mitchill.

Rhamphichthys rostratus (Linnæus). Peruvian Amazon.

Sternarchorhamphus macrostoma (Gunther). Peruvian Amazon.

Sternachus albifrons (Linnæus). Peruvian Amazon. A young one from the Ambyiacu River also likely this species.

Sternarchus bonapartii Castelnau. Peruvian Amazon.

Sternarchella balaenops (Cope). This is only known from the type (*Sternarchus balaenops* Cope, Proc. Amer. Philos. Soc., 1878, p. 682) from the Peruvian Amazon. It is closely related to *Sternarchella schotti* (Steindachner), but differs chiefly in its shorter head and the more swollen protruding mandible.

HENRY W. FOWLER,
Philadelphia, Pa.

EUROPEAN AND AMERICAN HADDOCK.

In the effort to determine any racial differences, if such exist, between European and American Haddock (*Melanogrammus aeglifinis*), a vertebral count of 25 examples of the latter was recently made at the U. S. Bureau of Fisheries. The comparisons were made with published records of the vertebral count of haddock from Scotland and Iceland (Williamson, 26th Annual Report of the Fishery Board for Scotland). The results as indicated below, show that there is no appreciable difference in the number of vertebræ between fish from the several localities.

Locality	Number of Specimens	Average No. of Vertebræ	Range
Massachusetts	25	54.1	53-55
Scotland	33	53.7	52-56
Iceland	8	53.9	53-55

Locality	Number of Specimens	Number of Vertebræ				
		52	53	54	55	56
Massachusetts	25	—	4	15	6	—
Scotland	33	1	12	17	2	1
Iceland	8	—	2	3	3	—

W. W. WELSH,
U. S. Bureau of Fisheries.

THE GESTATION PERIOD IN THAMNOPHIS BUTLERII (COPE).

In 1912 the writer (Biol. Bul., XXIV, pp. 18-20) published the results of observations on the breeding habits of *Thamnophis butlerii* (Cope), some of which concerned the length of the period of gestation in southern Michigan. Since the snakes have been observed to breed at various times between April 9 and April 24, and the time of breeding is probably determined largely by the prevailing temperatures during April, and because the young appear in August or early in September (August 7-September 6), it was concluded that "it is very probable that the length of the gestation period is rather exact for the species," the differences in the time of parturition being largely due to differences in the time of breeding. It is to be expected that the period is subject to some variation, since presumably the body temperature of the embryo, like that of the mother, fluctuates with the temperature of the air, and this influences the rate of development.

The records which have been obtained show that the length of the period may vary as much as 40 days. The female which was under observation in 1912, gave birth to young in 144 days, but a female which was fertilized on April 18, 1913, had her young on July 31, or in 104 days, and in the case of one which became pregnant on April 18, 1914, parturition occurred on August 9, or in 113 days.

The factors which cause this variation have not been determined, but that temperature is one is suggested by the fact that the snakes kept in relatively cool places during gestation, had the longest periods. The female which gave birth in 144 days was kept in a cool place in the laboratory and was not exposed to sunlight, while the female with the next shorter period was kept in a warm place and exposed to the sunlight for a short time each day, and the female which had young in 104 days was kept in a glass-covered cage in a warm room where the sunlight fell upon it for several hours each day. Unfortunately, the females which had copulated and were kept as controls, proved to be sterile, and the observations are

very few in number, so that no conclusions as to the cause of the variations in the gestation period have been reached. It is certain, however, that there are variations, and it is planned to investigate the influence of temperature by keeping the pregnant females in constant temperature rooms.

ALEXANDER G. RUTHVEN,
Ann Arbor, Mich.

LOS ANGELES SNAKES.

The following snakes were observed within one-half day's walk of the city of Los Angeles during the years 1913 and 1914:

1.—Rosy Boa, *Lachinura roscofusca.* (Cope)
2.—Pacific Bull Snake, *Pituophis catenifer.* (Blainville)
3.—Boyle's King Snake, *Ophibolus getulus boylii.* (Baird & Girard)
4.—Coral King Snake, *Ophibolus zonatus.* (Blainville)
5.—Red Racer, *Zamenis flagelliformis frenatus.* (Stejneger)
6.—Blue Racer, *Zamenis constrictor flaviventris.* (Say)
7.—Striped Racer, *Zamenis laterale.* (Hallowell)
8.—Western Garter Snake, *Thamnophis parietalis.* (Say)
9.—Pacific Garter Snake, or "Water-snake," *Thamnophis hammondi.* (Kennicott)
10.—Patch-nosed Snake, *Salvadora grahamiae.* (Baird & Girard)
11.—Western Ring-neck Snake, *Diadophis amabilis.* (Baird & Girard)
12.—*Rock Snake, *Hypsiglena ochroryncha.* (Cope)
13.—*Tantilla, *Tantilla eiseni.* (Stejneger)
14.—Pacific Rattlesnake, *Crotalus oregonus.* (Golbrook)

*Hitherto unrecorded from this locality.

PAUL RUTHLING,
Los Angeles, Cal.

Edited by J. T. NICHOLS, American Museum of Natural History
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THE DISTRIBUTION OF THE NORTHERN FROG, RANA SEPTENTRIONALIS, BAIRD, IN MAINE

The Northern Frog is not included in S. Henshaw's list of the Batrachia of New England (1904), but the following recent records show that it is widely distributed in northern Maine:

Dr. W. C. Kendall collected it July 10, 1903, at Cross Lake Thoroughfare, Eagle Lake, Aroostook Co., and presented one specimen to the Portland Society of Natural History and another to Bowdoin College.

September 8, 1912, A. S. Pope collected one from a wood road, which passed through a sphagnum bog near Grassy Pond, Piscataquis Co., not far from the foot of Mt. Katahdin, and saw several others in the same place. The specimen is in the Lee Museum of Biology at Bowdoin College.

September 6, 1913, Dr. Manton Copeland found *Rana septentrionalis* common along the banks of Ciss Stream, which flows from Round Pond into Caucnogomoc Lake, Piscataquis Co. He identified seven specimens, and secured three for the Lee Museum of Biology. They were found on the marshy banks of the stream where bull frogs (*Rana catesbiana*) were abundant. Subsequently I had the opportunity to examine and photograph these frogs. They lived well in captivity, eating flies freely.

Through the kindness of Mr. Arthur H. Norton, I am permitted to publish the following data collected by him:

"*Rana septentrionalis.*—It was observed in Van Buren and Caswell, Aug. 15-16, 1914. It was found to be numerous in two small dead water ponds in Caswell, locally called Mud and Girard Ponds. They were more conspicuous than *Rana clamata,* inhabiting similar places, i.e., tussocks of sedge on the edges and the beds of lily pads near shore.

"At Van Buren they were found in ditches by the railroad track and were common.

"At Mud Pond, Caswell, they were heard calling, and the same is true of *R. clamata.*

"The call of *R. septentrionalis* was found to be similar in nature to that of *R. clamata,* but differed strikingly in tone, being higher and slightly metallic, resembling closely the sound produced by striking a long nail on the head with a hammer in driving it into heavy timber. I did not observe the pungent odor which has given it the name of Mink Frog."

From these facts I conclude that *Rana septentrionalis* is rather generally distributed in the northern part of Maine, and that it is found in the same localities as *R. catesbiana* and *R. clamata,* not tending to replace either of these species.

PHILIP H. POPE,
Manchester, Maine.

SOME AMPHIBIANS AND REPTILES OF DELAWARE COUNTY, PENNSYLVANIA

The following list includes species I have seen or collected within the county limits since the fall of 1912. Where the number of specimens is given, the error is on the side of understatement, as in many cases I have not recorded in my notes specimens seen which were not caught.

Plethodon erythronotus (Green).—Both forms common in Cobb's creek near Haverford and at Darby creek near Coopertown Road.

Spelerpes bislineatus (Green).—Common in Cobb's creek near Haverford, and in a small creek

rising near Coopertown and entering Darby creek at Coopertown Road—more aquatic than the preceding.

Spelerpes ruber (Daudin).—Fairly common in the same localities as the preceding.

Desmognathus fusca (Rafinesque).—Fairly common in the same localities as the two Spelerpes.

Bufo americanus Holbrook.—Common everywhere.

Hyla pickeringii (Holbrook).—Several caught near Haverford and Cobb's creek.

Rana catesbeiana Shaw.—Not rare but seldom seen except at night. Cobb's creek, near Haverford.

Rana clamata Daudin.—Common; Cobb's creek and Darby creek.

Rana palustris Le Conte.—This and the preceding the most common frogs seen. Same localities as preceding.

Rana sylvatica Le Conte.—Not secured, though some frogs seen in thickets near Coopertown Road were believed to be this species.

Regina leberis (Linnæus).—Fairly common. I have about 18 records for the county, mostly for Cobb's creek near Haverford, though a few for Darby creek above Fox Croft, and one for Naylor Run, near Grassland.

Natrix sipedon (Linnæus).—Common in Cobb's creek from Bryn Mawr to Ardmore, in Darby from below Adele to above the Hunt, and in Naylor Run near Grassland. I have about 40 records.

Storeria dekayi (Holbrook).—I have three records for the county. One near Coopertown, one in Cobb's creek at Ardmore Ave., and one at Haverford College.

Coluber constrictor Linnæus.—Fourteen records and all but one on the railway embankment along Darby creek from below Coopertown Road to Fox Croft. The other was on the opposite side of the creek, near Coopertown Road.

Thamnophis sauritus (Linnæus).—Cobb's creek, near Haverford. Three records.

Thamnophis sirtalis (Linnæus).—About 60 seen

around Cobb's creek from Bryn Mawr to Ardmore Junction. Also in Darby and smaller creeks.

Lampropeltis doliatus triangulus (Boie).—One specimen from near Coopertown, a typical triangulus, with blotches reaching only the fifth row of scales.

Ancistrodon contortrix (Linnæus).—H. E. Knowlton, of Haverford, tells me he was bitten by a copperhead about two years ago, over in the rocks along the railroad near Coopertown Road. I think this is a good record, as he knows the common snakes of this region.

Sceloporus undulatus (Latreille).—Not seen by me, but reported by H. E. Knowlton from near Coopertown Road. He had previously seen some specimens I had in captivity, so I think this is a good record.

Chelydra serpentina (Linnæus).—I caught two in a pond near Haverford and saw one taken in Darby creek above Coopertown Road.

Sternothoerus odoratus (Latreille).—I have seen one taken in Darby creek, probably near Coopertown Road.

Chrysemys picta (Schneider).—Caught in Cobb's creek near Haverford and Darby creek above and below Coopertown Road.

Clemmys muhlenbergii (Schœpff).—I have seen some said to have been taken in Darby creek above Coopertown Road.

Clemmys insculpta (Le Conte).—Caught two along the railroad embankment near Fox Croft.

Clemmys guttata (Schneider).—One taken in a small creek between Coopertown and Darby, and one taken in Cobb's creek, near Haverford.

Terrapene carolina (Linnæus).—Fairly common near Coopertown.

E. R. Dunn,
Haverford, Pa.

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LONG ISLAND SNAKES

The only published list is that of Mr. George P. Engelhardt which appeared without signature in *The Museum News,* Brooklyn, Vol. 8, May, 1913, p. 129, and recorded twelve species. One of these, the King Snake (*Ophibolus getulus*), mentioned by DeKay (1842) as occurring rarely on the "brush plains," has never been rediscovered, and the record is very doubtful.

To Mr. Engelhardt's list we can add one species, the Grass Snake (*Liopeltis vernalis*), and additional data regarding several of the others.

1. *Eutaenia saurita* (Linn.), Ribbon Snake. General in distribution and always near streams, ponds or swamps. At Mastic this species is more common than the Garter Snake (*E. sirtalis*).

2. *Eutaenia sirtalis* (Linn.), Garter Snake. The most common snake on Long Island, still found in the parks, vacant lots and gardens of Brooklyn. At Orient the earliest spring record is March 15. It is generally common early in April. An unusually late autumn record is Orient, Dec. 10, 1913.

3. *Tropidonotus fasciatus sipedon* (Linn.), Water Snake. Common in or near streams, ponds and marshes.

4. *Storeria dekayi* (Holbrook), Brown Snake. Abundant within the city limits of Brooklyn and generally distributed over Long Island. Not common in the Orient Point district.

5. *Storeria occipitomaculata* (Storer), Red-bellied Snake. Two records:—pine woods at Yaphank, July, 1911, and Mt. Sinai, September 11, 1914.

6. *Zamenis constrictor* (Linn.), Black Snake. Common, especially in sandy regions near the south shore. Not known from the Orient Point district, but found sparingly on Gardiner's Island. Dates, April 15, 1913, East Marion; Oct. 8, Gardiner's Island. A specimen taken at East Marion on May 15, 1912, measured 70 inches in length.

7. *Liopeltis vernalis* (DeKay), Grass Snake. One taken at Easthampton in July (G. W. Hollister). Observed at Mt. Sinai in July.

8. *Diadophis punctatus* (Linn.), Ring-neck Snake. One taken at Port Jefferson in June, 1906. Yaphank, May-July.

The Yaphank colony of Ring-neck Snakes, so far as captures during several years indicate, is restricted in range to the woods bordering a cranberry bog on the Weeks' estate.

Long Island examples of this snake seem to differ considerably from typical mountain specimens. The cervical ring is very narrow on Long Island specimens in the Brooklyn Museum collection, being only one scale, or one scale and a half, in width, and sometimes broken by the dark line of the dorsal ridge. Specimens from Stowe, Vermont, have strongly marked rings often three scales in width.

9. *Ophibolus doliatus triangulus* (Daudin), Milk Snake. General in distribution, but not common. Coldspring Harbor, several records; Yaphank, July, 1910; Orient, June, 1908; Greenport, May, 1909; Southold, October, 1911.

10. *Carphophis amoenus* (Say), Worm Snake. Eastern Parkway, Brooklyn, May, 1913; Jamaica South, May, 1906; Bay Shore, 1913. This species still persists within the city limits of Brooklyn, but it is commonly overlooked because of its burrowing habits. It may often be found hiding under logs or boards.

11. *Heterodon platyrhinus* (Latreille), Hog-nose Snake. General and common throughout most of Long Island; rare on the north prong (Southold township). Spring date, May 15, Gardiner's Island.

The favorite habitat of the Hog-nose appears to be the sand dunes, where toads (*Bufo fowleri*), upon which this snake almost exclusively feeds, also occur in great abundance. On several occasions during July and August, 1908, the young were encountered in amazing numbers among the dunes at Rockaway Beach, and their tracks made a hieroglyphic network among the hollows of smooth sand. A party of campers on the beach had captured a hundred or more young Hog-noses and had placed them in a barrel of water, from the notion that they belonged to an aquatic species. Most of the young snakes were drowned.

Only the spotted form of this species has been observed on the beaches, but the black form is not uncommon in the wooded regions about Jamaica. Mr. W. T. Davis has a specimen which was "of uniform slate color," collected at Yaphank, July 14, 1907.

The Hog-nose Snake seems to be abundant along the south coast of Long Island all the way to Montauk Point. Several were seen in a well at Promised Land.

12. *Crotalus horridus* Linn, Banded Rattlesnake. Formerly not uncommon in swamps and pine barrens of Long Island, but now doubtless very rare. A fine specimen, collected about thirty years ago, is in the collection of the Long Island Historical Society. Another specimen upon authentic information, was killed at Centre Islip in 1903. A set of rattles from a specimen killed about 1870 is in the possession of Miss Clara Weeks of Yaphank.

The practical extirpation of the Rattlesnake on Long Island probably followed closely on the eastward extension of the Long Island Railroad in 1895. The snakes acquired the fatal habit of sunning themselves on the railroad embankments, and of lying across the heated rails. According to Mr. A. H. Helme, one of the last strongholds of the rattlers was

in the neighborhood of Freeport. There are no recent records.

G. P. Engelhardt,
J. T. Nichols,
Roy Latham,
R. C. Murphy,
Brooklyn, N. Y.

ALLIGATORS IN WINTER

On December 24, 1914, on Bogue Banks, near Morehead City, N. C., I killed a four-foot alligator which had crawled about 30 feet from its "cave," or hole. It was sluggish and did not appear to notice me as I came up to it. This is the first one I have ever killed here in the winter, and its being out at this season near the northern limit of its range, is interesting. I have reliable evidence from the natives that they not infrequently come out in this vicinity in winter, and are even heard bellowing.

Russell J. Coles,
Danville, Va.

THE YELLOW-TAIL (*Ocyurus chrysurus*) IN NEW JERSEY

In 1905 I wrongly described an example of this species as the gray snapper (Rep. N. J. State Mus., 1905, p. 316). This specimen has since been examined and compared with examples of the yellow-tail, and agrees in most all details. It was obtained by Mr. Philip Laurent on September 21, 1890, according to the label, at Anglesea. As no other record for the yellow-tail north of Florida appears to have ever been given, the above may prove of interest.

Henry W. Fowler,
Philadelphia, Pa.

Edited by J. T. Nichols, American Museum of Natural History

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THE BROOK LAMPREY IN NEW JERSEY

In the spring of 1909 Mr. Charles E. Sleight of Ramsey, New Jersey, collected a considerable number of Brook Lampreys in Gœtschius' Brook near the culvert of the Erie railroad, about one-quarter of a mile from the Ramsey railroad station. The brook here flows through an open meadow, and Mr. Sleight says that the lampreys were observed there in the spring of several years, but that none have been seen since 1909. He kindly presented the writer with three of these odd fish, the largest one of which is 5 11/16 inches in length, and has the anal papilla well developed.

As the Brook Lamprey is an addition to Dr. Henry W. Fowler's Fishes of New Jersey, the specimens have been submitted to him. He confirms the identification and says that the species should be known as *Lampetra aepyptera* (Abbott), as pointed out in "Notes on Lancelets and Lampreys," Proceedings Acad. Nat. Sci. Phil., Dec., 1907, p. 466. The type of this species is in the Academy's collection and came from the Ohio River. *Lampetra wilderi* Gage, Dr. Fowler considers a synonym. Under this latter name there is an interesting account, in the Transactions, N. Y. Acad. Sciences, May 10, 1897, by Bash-

ford Dean and Francis B. Sumner, of the spawning habits of the Brook Lamprey as observed about one mile north of Van Cortlandt Park, New York City. These two records are, as far as known, the only ones for the species in this vicinity.

Wm. T. Davis,
New Brighton, N. Y.

NOTE ON THE HABITS OF THE YOUNG OF THE SQUIRREL HAKE AND SEA SNAIL

During the oceanographic cruise of the U. S. Fisheries schooner *Grampus* in the summer of 1913, large quantities of the Giant Scallop were dredged at many points on the continental shelf between Nantucket Lightship and the Virginia capes. In a number of instances these scallops were found to contain young examples of the squirrel hake, *Urophycis chuss* (Walbaum), ranging in length from 27 to 70 mm. With one exception all were taken in the region between Montauk Point and Cape May, and within the 20 fathom curve. The only occurrence at a greater depth was in 42 fathoms, 52 miles S.S.E. from Montauk Point.

Whether these young hake habitually live within the mantle cavity of the scallop, or whether they merely use it as a refuge on the approach of an enemy, is not known. The latter hypothesis appears to be the more plausible one. In the six dredge hauls in which young hake were thus taken, 27 examples were obtained from 59 scallops. In one instance, 11 hake were obtained from 9 scallops.

During the same cruise a number of young examples of the sea snail, *Liparis liparis* (Linnæus) were obtained from the mantle cavities of scallops at two stations, as follows:

Forty-five miles E.S.E. from Assateague, Va., in 30 fathoms, and 45 miles E. by S. from Cape Charles,

in 25 fathoms. These ranged in length from 20 to 29 mm. So far as known, this species has not been reported from so far south. A single example was also found in a scallop taken in 37 fathoms, 16 miles S. from Nantucket Lightship.

W. W. Welsh,
U. S. Bureau of Fisheries.

FURTHER NOTES ON THE SALIENTIA OF JACKSONVILLE, FLA.

Hyla pickeringii Storer, the "Spring peeper," is rather rare here, only two small "bayous" containing very few specimens having been found by the writer. These places were about six miles apart. I have heard this species sing only in December.

Hyla squirella Bosc., the commonest of the southern tree-toads, is found everywhere, in cornfields, sugar cane, about wells and under the eaves of stable roofs, barns, outhouses, etc. After a heavy thunder shower in September, 1911, hundreds of these little tree toads could be seen hopping along the country roads outside of Jacksonville. That same night the writer took 32 specimens from a velvet bean vine on the blank side of his cottage. The cry is rather coarse, sounding like: "Cra, cra, cra," etc., with a second's interval between each note. This species is noted for its rapid color changes.

Hyla femoralis Latreille is called the Pine tree toad, from its habit of frequenting the tops of pine trees almost exclusively, during the summer months. It resembles our own gray tree toad, with its rough skin and star-shaped dark patch on the back, but is smaller and more slender. Its usual color is dark reddish-brown or chestnut, but it can readily change from fleshy pink or pale gray to any shade of brown, gray or green. It is one of the shyest of tree toads, rarely caught except during the breeding season, when it frequents certain "bayous" in thousands. The

noise resulting from the calls of the males on these occasions, is deafening. This call cannot be reproduced on paper, being a rapid succession of harsh, rattling notes, higher in pitch than the call of *H. squirella,* and kept up all night. During the dry season this tree toad occasionally calls from the tops of the pine trees, one answering the other.

Hyla cinerea, Daud., is an aristocratic looking tree toad, with its long, slender figure of the brightest green, edged on each side with a band of pale gold or silvery white. Its size is larger than any of the preceding species, often reaching 2½ inches from snout to vent. Occasionally met with on corn fields, its chief haunts, however, seem to be the shores of the creeks, where it occurs in scattered companies on the water hyacinths and bulrushes. Its call sounds like: "Grab, grab, grabit, grabit," etc., uttered in a shrill, loud voice, and has a startling resemblance to the human voice. One would never think the call came from a frog. Although a powerful leaper, it is easily caught when once located, as it is not at all shy. This species seems to have no special breeding season, and is never heard in the early spring, when the majority of the other frogs and toads congregate at the shallow "bayous."

Hyla gratiosa, Le Conte, the Florida tree toad, is a handsome species, and the largest of the North American tree toads, reaching a length of 3¼ inches from snout to vent. It is heavily built, with large adhesive disks on fingers and toes. It differs from all other species in its evenly granulated skin, and regular pattern of roundish spots. The color is ashen gray, purplish or green of some shade. The spots are darker than the ground color, evenly distributed over the upper surfaces, and may be absent when the frog changes to pale golden green. The arms and legs are banded. The throat of the male is rich chrome yellow or green. It is not very plentiful anywhere, and rarely met with outside the breeding season. Dur-

ing the latter time it comes down out of the trees, and small companies of from four to ten specimens, in widely scattered pools or "bayous," attend to their breeding duties amid the loud calls of the males. The call can be heard for over a mile, and sounds like a large gong, or church bell, being of unusual depth, and very clear, with a second's interval between each dual note. The male, while singing, floats in the water, the large vocal sac throwing the frog into a vertical position with every utterance. The eggs are laid singly and sink to the bottom of the pool. I have never heard this species call except during the breeding season, which lasts from March to June, beginning with the first warm rains.

Richard F. Deckert,
New York, N. Y.

LIST OF AMPHIBIANS AND REPTILES OBSERVED IN THE SUMMERS OF 1912, 1913 AND 1914, IN NELSON COUNTY, VIRGINIA

Nelson county is partly in the Piedmont section of Virginia and partly in the Blue Ridge. The collecting was mostly on the James River, in the Piedmont section, about 40 miles below Lynchburg, at an altitude of 400 to 600 feet. The figures refer to actual records in my notebook. Where the common names are given they are those in use for the species in Nelson County.

Desmognathus fusca (Rafinesque).

Diemictylus viridescens (Rafinesque). Both land and water forms. Land form "ground puppy," water from "spring lizard."

Bufo americanus Holbrook. "Toad." Very common.

Acris gryllus crepitans (Baird). Common locally.

Hyla versicolor Le Conte. "Tree toad."

Rana catesbeiana Shaw. "Bull frog."

Rana clamata Daudin.

Rana palustris Le Conte.

Carphophiops amoenus (Say).

Regina leberis (Linnæus) 25+. Common.

Natrix sipedon (Linnæus). "Water snake, or water moccasin." 98. Very common.

Elaphe guttatus (Linnæus). "Corn snake." "Brown sedge snake." "Mole catcher"? 6.

Elaphe obsoletus (Say). "Scaly, or rusty black snake." "Pilot." 8.

Storeria occipitomaculata (Storer). 2.

Storeria dekayi (Holbrook). 1.

Opheodrys aestivus (Linnæus). "Green snake." 13.

Virginia valeriae Baird and Girard. 2.

Diadophis punctatus (Linnæus). "Fodder snake." 3.

Coluber constrictor Linnæus. "Slick black snake." "Hoop snake"? "Cow sucker"? "Horse racer"? 22+. common.

Thamnophis sirtalis (Linnæus). 6. Not rare.

Lampropeltis rhombomaculatus (Holbrook). "House snake"? "Ground snake." "Molecatcher." 10.

Lampropeltis getulus (Linnæus). "King snake." "Master snake." "Black moccasin." "Cowsucker"? 9.

Heterodon platirhinos Latreille. "Spread-head moccasin." 4 and a nest of 34 eggs.

Agkistrodon contortrix (Linnæus). "Copperhead." "Highland moccasin." 12.

Crotalus horridus Linnæus. "Rattlesnake." Locally common. 1.

Eumeces fasciatus (Linnæus). "Scorpion" or "scarapin." 13.

Cnemidophorus sexlineatus (Linnæus). 26+. Locally common.

Sceloporus undulatus (Latreille). "Fence lizard." 92+. Very common.

Chelydra serpentina (Linnæus). "Turtle." "Snapping turtle."

Kinosternon pensylvanicum (Gmelin).

Pseudemys rubriventris (Le Conte).

Chrysemys picta (Schneider). "Skilpot." Common.

Terrapene carolina (Linnæus). "Dry land terrapin." Common.

E. R. Dunn,
Philadelphia, Pa.

NEW COLOR VARIATION OF STORERIA OCCIPITOMACULATA

During the first week in August, 1914, I collected a small black-colored snake near Cammal, Pa. It attracted my attention, as I was not familiar with the coloration that was presented. Examination revealed a peculiar phase of the red-bellied snake, of which I was unable to find a description in any of the standard works upon reptiles. Through the courtesy of the Academy of Natural Sciences of Philadelphia, I was permitted to examine the varieties of red-bellied snakes in their collection. In looking over the specimens I found one that simulated mine. This reptile was collected at Johnsonburg, Elk County, Pa., by Cope. He described it as being a very dark brown, with the dorsal band obscure, and the under surfaces black. The throat and chin were whitish, and the black darkest in a row of spots on each side of a dozen anterior gastrosteges. The reptile I found measured 24 cm., was distinctly black on the dorsal and ventral surfaces, the throat and chin white, sprinkled with small black spots; the stripes on the sides could only be detected by having the light strike the reptile in a certain manner. When the two reptiles were placed side by side, Cope's specimen was lighter in color, both on the dorsal and ventral surfaces; the stripes on Cope's specimen could readily be seen as compared with the reptile under discussion.

R. D. Spencer,
Philadelphia, Pa.

NUMBER OF YOUNG PRODUCED BY THE COMMON GARTER SNAKE

Definite records of the number of young produced by any species of reptiles are always interesting and valuable to those interested in the life history of animals. The following observations concerning the number of young produced by the common Garter Snake (*Thomnophis sirtalis*), may therefore be worth recording.

This snake is well known to be viviparous. It is the most abundant snake in the vicinity of Lake Maxinkuckee, Indiana. On July 26, 1900, a female three feet long, was killed by me just west of the lake. Upon cutting it open 40 young snakes, each six to seven inches long, were taken from the mother's body.

This number we thought very large, but Dr. J. Schenck, of Mt. Carmel, Illinois, records 78 young each three to seven inches long, taken from a female of this species 35 inches long.

Does any reader of Copeia know of a record of a larger number?

Barton Warren Evermann,
San Francisco, Cal.

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NOTES ON THE HABITS OF SCELOPORUS UNDULATUS (LATREILLE).

This exceedingly common lizard is chiefly found on trees and fences, or very rarely on the ground. They are rather agile and difficult to capture save with a noose. They do not, as a rule, go into holes when hard pressed, though I have seen one hide under the loose bark of a stump. They show a certain amount of color change from lighter to darker and vice-versa.

Breeding-habits. A ♀ caught on May 10, 1914, at Marlton, N. J., was killed and dissected on June 7th. She had 10 large eggs in her oviducts. My earliest record for young is July 29th (Nelson County, Va.), but I have no other records before Aug. 14. I have never seen any half-grown ones except in the very early summer, so that I think this lizard reaches adult size in one year.

Food. One of my earliest remembrances of this lizard is seeing a large one run up a pine tree carrying in its mouth a cricket as large as its own body. In captivity I have watched them eat butterflies of the genera Pieris and Colias, houseflies and Mayflies. Specimens were hardy in captivity, and excellent feeders, chasing and snapping up the small butterflies with great agility, and swallowing them with a chewing motion.

E. R. Dunn,
Philadelphia, Pa.

HIBERNATION OF REPTILES IN SOUTHERN CALIFORNIA.

Of the snakes in the immediate vicinity of Los Angeles, very few are to be found at large during the winter, for they behave much as do their eastern cousins. This was contrary to my expectations when I first arrived here, for like many another easterner, I thought Southern California would yield a bountiful harvest of snakes at any time of the year. Now and then a Pacific Bull Snake (*Pituophis catenifer*), a Western Garter Snake (*Thamnophis parietalis*), or a "Water" Snake (*Thamnophis hammondi*) will wander in search of food and may be found abroad even in winter. Only exceptionally warm days will cause this, however, and few, if any, other snakes ever come out in the winter. Most captives in my collection of local snakes refuse food from about the middle of October to the beginning of March.

Lizards, on the contrary, are to be found on any sunny day during the winter when they come forth to warm themselves after a freezing night. At such times they snap up occasional flies and other insects. *Gerrhonotus scincicauda, Uta stansburiana* and *Sceloporus bi-seriatus* are the most intrepid of the lizards that dare the rigors of a none-too-gentle climate and warm themselves in the rays of the winter sun. Up in the mountains where snow falls during the winter, one may see the hardy little swifts (*Uta*) scamper about rocks in the sun a few feet away from shady nooks where large patches of snow lie evaporating, while down at a lower altitude may be found other lizards, and even snakes at times. In captivity the lizards feed readily through the winter.

The hiding places of lizards may easily be found in the winter by overturning heaps of boards, stones, logs, etc. At that time of the year, especially after a heavy frost, they are easily captured, for they are quite sluggish. The Horned Lizards usually bury themselves in the ground, where they are sometimes

dug out accidentally. Snakes in this part of the country hibernate under haystacks, piles of boards, etc., but usually they seem to pass the winter in gopher and ground squirrel holes in the ground.

Between last Christmas and New Years I caught one "Water" Snake and one Western Garter Snake on a particularly warm day in a valley between the city of Los Angeles and the ocean. Near Dulzura I caught one more "Water" Snake and this winter received two small unidentified snakes from Calexico, where there is an arid tropical climate. Even in the desert around Calexico, snakes are more scarce in winter than they are in summer; though, if the truth must be told, they are not plentiful there at any time.

I have not known of any case of *Clemmys marmorata*—Southern California's only turtle—being found in the winter.

PAUL D. R. RÜTHLING,
Los Angeles, Calif.

COLUMBUS ON THE REMORA.

In the Journals of the first and second voyages of Columbus are found respectively descriptions of a species of Trunk and Sucking-fish observed near Cuba. The account of the latter mentions that the "Reversus," or Remora, was employed by the Indians in a singular manner of fishing which consisted in holding the "huntsman-fish" fast by a cord, and allowing it to attach itself to the bodies of other fish or large marine turtles. Humboldt conjectured the "Reversus" to be identical with *Echeneis naucrates*, Poey with the species named by him *E. guaicano*. Pre-Linnean writers on ichthyology continued to apply the term "Reversus" to the species of Sucking-fish described by Columbus, and also included under the same term a spinous variety, or "species," which is easily recognizable from the descriptions and figures as *Diodon histrix*. The use of the Remora as a "huntsman-fish" in the manner first related by Colum-

bus seems to have continued until modern times in various quarters of the globe; so at least the writer is informed by Dr. E. W. Gudger, who has collected a number of reports to that effect.

CHARLES R. EASTMAN,
New York, N. Y.

CERTAIN FAMILIAR STRUCTURAL ADAPTATIONS IN FISHES.

That habit and structure are correlated will be questioned by no student of evolution. That habit determines structure would probably be less widely conceded. If it does so, specialized structures would be expected to arise among fishes already possessing habits to take advantage of them; we would expect to find the habit served by a fish's peculiar structure, shared also, to some degree, by its relatives which lack the structure; and notable cases where this expectation is realized are evidence that structure is determined by habit.

Some such cases come to mind. The sailfish, remarkable for its great expanse of dorsal fin, is said to come to the surface of the sea with the fin out of water, functioning as a sail in the wind. The sword-fish and mackerel, its allies, are surface fishes, the sword-fish at least often swims with its back-fin out of water.

The prehensile tail of the sea-horse with which it coils around and holds fast to sea-weed is a structure unique among fishes. The pipe-fishes, its nearest allies, live among sea-weed twisting their lithe bodies among and bracing their tails against the strands of weed.

The highly developed breast-fins of the flying fish which enable it to travel considerable distances through the air and elude predaceous fishes of which it is the prey, is one of the most remarkable structural adaptations to be found in the world's ichthyfauna,

and perhaps responsible for the success, measured by the abundance, of flying fishes off shore over warm seas everywhere, where they seem to outnumber the sum of all other species. Their allies, the slender, elongate needle-fishes, though lacking any wing development are noted for the habit of leaping and skipping over the surface of the water. One elongate species with a much flattened body turns on its side and skims over the surface like a skipping stone.

J. T. Nichols,
New York, N. Y.

RANA PALUSTRIS IN WISCONSIN.

During the early fall of 1914, three specimens of *Rana palustris* Le Conte were found in a small stream entering the south side of Lake Wingra, Dane County. These specimens were identified for the writer by Dr. A. G. Ruthven, and a specimen was deposited in the Museum of Zoology, University of Michigan. The stream in which these frogs were found is the small sluggish outlet of a large swamp situated about a half mile from the lake. The bottom of the stream is of soft mud, without stones of any sort, and at all seasons of the year is more or less obstructed by a heavy growth of water cress. *Rana pipiens, Acris gryllus* and *Rana clamitans* are very commonly found here, but frequent and diligent search throughout the year previous had failed to disclose any pickerel frogs.

The distribution of this species is given by Dickerson (The Frog Book) as "over the eastern part of North America, west to the Great Plains, and north to Hudson Bay." Higley (Wisconsin Academy of Sciences, Arts and Letters, VII, 169) states that it is quite common in Michigan, and may possibly be found in Wisconsin, and in "The Herpetology of Michigan" (Mich. Geol. and Biol. Surv., Pub. 10, Biol. Ser. 3) Thompson and Thompson say that they

have examined specimens from six counties in Michigan and have records of the occurrence of the species in three others. No records are given for any part of the state above the southern end of Saginaw Bay. Cope (Batrachia of North America, 1889) gives two records for Wisconsin, one from the Root River, 1853, and the other from the Upper Wisconsin River, the date of which is not given. Notes on the occurrence of the species at Green Lake, Wisconsin, in 1906 and 1909, have been given to me by Mr. John M. Lowe. The results of ecological work in the region of the Madison lakes will doubtless show that *Rana palustris* although rare, has a fairly continuous distribution in the state.

THURLOW C. NELSON,
University of Wisconsin.

SOME NEW RECORDS FOR GYRINOPHILUS PORPHYRITICUS (GREEN).

In rearranging the collection of Amphibia in the Lee Museum of Biology at Bowdoin College, I came across a badly shrivelled and faded specimen of this species. It was easily identified by the teeth and the general appearance, but the only data with it was a card marked Brunswick, Me.

There are two more recent records from Manchester, Maine.

August 16, 1913, George E. Gilbert brought me two specimens, an adult, and a larva about three inches long, with external gills.

April 12, 1915, the same collector got three adults, two of them 7¼ inches in length. A week later I visited the place where they were found, a cold spring rising in a barrel in an open field and emptying into a stone drain. One had been found in the mud under the board cover of the spring, while the others were in the water. They seem to be good

swimmers, but in captivity I noticed that they rested with the nose held out of water.

At the mouth of the stone drain, about 100 yards from the spring, I found a larva three inches long, and in the spring itself five more only on inch in length, The large larva was probably a year old, while the small ones appeared to be newly hatched. In color they were a pale red with small yellowish dots scattered along the back, but there is little pigment in the skin and the whole animal is quite translucent.

In the shape of the head, thread-like external gills and general form these larvæ resemble those of *Spelerpes bilineatus,* but the color and markings are quite different.

Although this species seems to be quite abundant about this one spring, I have found it nowhere else in the vicinity.

PHILIP H. POPE,
Manchester, Maine.

NUMBER OF YOUNG PRODUCED BY COMMON SNAKES.

Mr. J. F. Street informs me he dissected an adult garter snake (*Thamnophis sirtalis*) in the fall of 1909, obtained at Indiana, Pa. It contained 65 well-developed embryos. I saw an example of this species in the Carnegie Museum, at Pittsburgh, some years ago, from Ohio Pyle, Pa. It had a great number of young which were given as 65. The largest water snake (*Natrix sipedon*) I have examined, was obtained by Evan Rhoads on Newton Creek, near Mount Ephraim, Camden County, N. J., August 22, 1912. When fresh it was little short of five feet, and contained over 70 young, (76 according to my notes). I may add that a red-eared terrapin (*Pseudemys elegans*) was captured in Oldmans Creek, N.

J., during June, 1914, and brought to my notice through Dr. Ida A. Keller. It is doubtless an introduction or escaped individual, as the species is a native of the Gulf States.

HENRY W. FOWLER,
Philadelphia, Pa.

Edited by J. T. NICHOLS, American Museum of Natural History

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ANNUAL OCCURRENCE OF SPADE-FOOT TOADS.

Spade-foot toads (Scaphiopus holbrooki) appeared in Patchogue on the evening of May 22, 1915, for at least the fourth successive year. The first hard rain of spring occurred on the night of May 21, and on the evening of May 22, great numbers of toads were present in the same pool in which they have been seen in previous years. On the morning of the 23d nearly every blade of grass in the pool was covered with their eggs, and by night not a toad remained in sight. The sudden emergence of the toads from their underground retreats and their extremely short stay in the breeding pools, probably accounts for the former belief that years usually elapse between their appearances.

Frank Overton,
Patchogue, N. Y.

NOTE ON AN UNUSUALLY LARGE OCEAN SUNFISH.

On May 14, 1915, I examined a very large Ocean Sunfish or Mola (*Mola mola*) at the fish house of the Borzone Fish Company in San Francisco. The fish had been caught the day before in a parancella net about 40 miles off the Golden Gate and south of the Farallons.

The following measurements and notes were taken: Total length 9 feet; width 7 ft. 9 in.; eye to snout 14 in.; diameter of orbit 5 in; eye to base of pectoral 17 in.; length of pectoral 15 in.; width 12½ in.; gill opening 4¼ x 6½ in.; length of dorsal (mutilated) 2 ft. 5 in.; width 23 in.; length of anal 21 in.

Color silvery; body, especially anteriorly, covered with hard, bony, silvery, stellate or granular plates.

After the fish had been caught in the net it was attacked by sharks and badly mutilated, especially on the fins and about the nose.

It was said that this fish weighed 2,500 pounds, but I cannot vouch for the truth of this statement. My own estimate was not to exceed 1,800 pounds.

This was said to be the largest fish of this species ever taken by San Francisco fishermen. Smaller examples weighing 300 to 400 pounds are occasionally taken. One was brought in in April of this year that weighed about 300 pounds. One was taken in June, 1893, off Redondo Beach, California, that measured 8 ft. 2 in., and weighed 1,800 pounds.

Barton Warren Evermann,
San Francisco, Cal.

[The mounted skin of a *Mola* 10 ft 2 in. in total length from Long Beach, California, May, 1911, is exhibited in the American Museum of Natural History, New York.—*Ed.*]

HIBERNATION OF REPTILES.

A friend in Bridgeport, Connecticut, is my authority for the statement that there seems to be a great difference in animals, as to their tendency to hibernate in winter, and the effect of temperature upon the physical phases of their life. He had had for three years, in 1910, a brace of rattle-snakes,

(*Crotalus horridus*) from the neighborhood which he kept in a glass case, and maintained a summer temperature the year round, with the result that during that period of three years the snakes did not hibernate, but maintained an active existence during the entire time. He has observed that they have shed their epidermis at shorter periods than has been generally supposed; to wit, about once in three months, and that this is not a constant factor, but will vary. It has popularly been held as an indisputable fact that the rattle-snake adds one joint to the rattle each year, but Mr. Ford has discovered that a new joint is added to the rattle with each shedding of the eperdermis, and the snakes in his collection have added from three to four buttons each year, proving that the old time hypothesis is erroneous. The snakes have fine rattles with perhaps ten or twelve buttons and have attained a length of maybe less than twenty inches. In this collection, under the scrutiny of Mr. Ford, is a small mud turtle (species unknown) that is kept at about the same temperature as the snakes but with different results. As winter approaches and the proper season arrives it declines to eat, draws in its head and becomes lethargic and finally falls into a stupor, which lasts till spring when it awakes again to its wonted life and activity. From these facts, it would be interesting to determine what degree of cold a dormant animal may be subjected to without destroying its latent vitality, and what degree of temperature is necessary to induce hibernation in any given animal.

Herman Haupt, Jr.,
South Haven, Michigan.

ON ONE OR TWO COMMON STRUCTURAL ADAPTATIONS IN FISHES.

The caudal fin of fishes is the chief propelling organ. As such its form is a good criterion of a fish's

habit of locomotion. The forked form is used almost without exception by those species which swim continually through extensive stretches of open water. The water slipping along the fishes flanks must escape backward in the middle line of its tail. Side to side motion of a square caudal would interfere with the backward flow of the water and impede the fish. Obviously the forked fin is better adapted for this work as the central impeding portion is eliminated and the lobes brace against comparatively stationary water. A narrow peduncle is also an advantage and we find the peduncle tending to be more and more narrow particularly in its vertical diameter, and it is often strengthened by keels in its horizontal diameter, that is the plane of its motion. It is interesting that the same type is approached by the mackerels, a free swimming more or less pelagic off-shoot of the Percoid stem, by the mackerel-sharks, most active swimmers of the sharks, which have a very different heterocercal caudal as a basis of variation, and the Cetacea, among mammals. The Cetacea are, interestingly enough, adapted to motion in a different plane, moving their forked caudal up and down instead of from side to side, and with the peduncles narrowed horizontally instead of vertically.

Certain fishes, except when alarmed, propel themselves not by the caudal, but by the breast-fins. Such are the wrasse-parrotfish group, which slip in and out among rocks and the crevices of coral-reefs. These have usually squarish or rounded caudals, quite different from the firm forked ones of more actively free-swimming fishes. Indeed the relative forking is a fair criterion of the amount of swimming that a fish does, the minnows with forked caudals, being more active swimmers than the killifish group with rounded, the sea running salmon having a more forked caudal than the brook inhabiting trout, the old trout a squarer tail than the young, to whom the

same brook furnishes, compared to its size, a wider swimming range.

The evolution in habit and structure which from a group of predaceous free-swimming mammals like the Delphinidae has evolved the large whale-bone whales which feed on small animals sifted from the water with their baleen, is more or less paralleled in several independent groups of fishes. Our common menhaden, representative of the herrings, is a good example. Though a small fish the size and density of the schools in which it swims are in a way analagous with the cetacean's bulk. Continually it swims forward, its mouth wide open, gulping sea-water from which its very fine lengthened gill-rakers are sifting food enough to make it very fat and sought after for its oil. A better example are the gigantic basking shark and whale shark, off-shoots from the active predaceous mackerel sharks. The large gill openings and very small teeth of these largest of fishes, show them to be sifters of small food. In the almost universally predaceous mackerel genus *Scomber* an East Indian species has very long fine gill-rakers, doubtless associated with herring-like feeding habits.

J. T. Nichols,
New York, N. Y.

CONCLUDING NOTES ON THE SALIENTIA OF JACKSONVILLE, FLA.

Acris gryllus, Le Conte, the "Cricket frog," is one of the commonest frogs, great swarms of this species having been seen by the writer during the spring months about the edges of bayous, creeks and ponds. Its rattling notes can be heard during the entire warm season, day and night. Owing to the small size of its adhesive disks, this tree-"frog" cannot climb into trees, but lives on the ground, wandering into fields, meadows and gardens. It attains a length of 1¼ inches from snout to vent, but the

greater number of specimens are 1 inch or less in length. This species looks and acts more like a water frog than a tree-toad, although belonging to the latter family.

Chorophilus occidentalis, B. & G., is a beautiful species, rarely seen except in early spring. At this time, however, it occurs in great numbers in the large, shallow bayous, where it stands almost straight upright, on some twigs or weeds, with its large throat pouch distended, giving vent to its piercing call. This call is very loud, similar in pitch to that of *Hyla pickeringi,* but much shorter, and at a distance sounds like the ring of a steel chisel, when struck by a hammer.

This is the largest species of the genus *Chorophilus,* attaining a length of 1½ inches, from snout to vent. It is stout of body, the head is pointed, the arms and legs rather short and stout. The toes are very slightly webbed, the disks on fingers and toes scarcely noticeable. The subarticular tubercles are very prominent.

The structure of this species indicates terrestrial, possibly subterraneous habits. I have dug specimens out of the sweet-potato hills in my garden.

The smooth, shiny upper surfaces are rich reddish brown or fawn colored, like specimens of our northern Wood frog. There is a black band on each side, beginning at the nostril, running through the eye, over the tympanum to the shoulder. The edge of the upper jaw is silvery white. The groin is rich yellow or orange, with large elongate or round black spots. The undersides are white, faintly spotted with brown on the throat, flesh colored posteriorly. On the back there may be two broad, dark brown parallel bands. The arms and legs are banded more or less distinctly with brown.

Chorophilus nigritus, Le Conte, or "Swamp Tree-toad," is found during the Winter and early Spring, in great numbers about ditches and bayous.

Its call is similar to that of the Cricket "frog," but much louder, and the crepitations are slower. It is a shy species, extremely difficult to catch. The color is gray or greenish-black, with usually three longitudinal rows of black, light-edged, roundish spots. Occasionally these spots fuse into bands. The limbs are also spotted. On the upper jaw there is a pale yellowish line, extending to the arm insertion. A narrow black band starts at the tip of the snout, runs through the eye, covers the tympanum and ends at the shoulder or beyond. The undersurfaces are greenish yellow. The back and outer parts of the limbs are covered with large round warts, giving the creature a very rough appearance. The belly is coarsely granulated. The tips of the fingers and toes have small disks. The foot is slightly webbed. The head is even more pointed, and much narrower, than in the preceding species.

Chorophilus ocularis, Holbrook. This is the smallest of the North American frogs, rarely exceeding ⅝ inch from snout to vent. The head is pointed, the eyes large, the limbs and body slender. The disks on the fingers and toes are small but distinct. The skin of the back is covered with very fine warts, that of the belly finely granulated. The color is yellow, reddish brown or chestnut. The upper jaw is margined with white. There are three longitudinal dark brown dorsal bands, one from the tip of the snout to above the vent, usually bifurcate posteriorly, and one on each side of this, starting behind the eye. Underneath, it is pale yellow. The male's throat is dark brown, and can be distended to the size of a large pea. The arms and legs are indistinctly cross-banded.

These small "frogs" are very numerous near Jacksonville, but owing to their small size, are seldom seen. During the Spring months, they abound on the marginal vegetation of the "bayous," the males giving

vent to their faint calls, which sound more like the chirping of insects than the calls of frogs.

RICHARD F. DECKERT,
New York, N. Y.

ON A YOUNG BLACK ANGEL FISH.

A *Pomacanthus arcuatus,* 3 or 4 inches long, taken near San Antonio Bridge, Porto Rico, last July, in a biological survey of that island which is being forwarded by the N. Y. Academy of Sciences and the Insular Government, had bright yellow, instead of whitish, cross bands. Yellow bands are then, not diagnostic of *paru,* perhaps they are ordinarily yellow in sufficiently small *arcuatus.*

J. T. NICHOLS,
New York, N. Y.

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THE CAPTURE OF A BASKING SHARK ON LONG ISLAND.

A fourteen-foot Basking shark, *Cetorhinus maximus*, was captured on June 29, 1915, at Westhampton Beach, on the south shore of Long Island. It had become entangled in a bluefish net operated by a local fisherman, and was hauled ashore still alive. I had the good fortune to examine it two days later as it was being cut up for removal from the beach, and obtained the head, jaws and several other parts for the American Museum for further study.

Records of *Cetorhinus* as far south as Long Island are extremely few, so that it seems desirable to call attention to the present specimen.

The shark was a male, fourteen feet in length. The caudal had been cut off before I reached the scene, so that I could not verify the exact length; but, from the measurements I made, the length was apparently as stated. The specimen was therefore small for this species, not even half grown.

The color of the shark was gravish black, a little darker above than on the sides and belly. The under side was not white, as it is stated to be in textbooks; the only white about the specimen was a triangular patch on the under side of the rostrum, extending from the mouth as a base, to a point half-way to the

tip of the snout. There were also two pale bands in the mid-ventral region, one on either side of the median line; they were about two inches in width, and had broken or jagged margins. They were confined to a portion of the ventral region, in front of the mixopterygia.

The most striking feature about the shark, to one who had never seen the species in the flesh, was the extraordinary shape of the rostrum. This was the exact form of the lead end of a bullet, and so unlike that of any other shark that it could serve as a diagnostic character equally with the enormous gill-clefts, to distinguish this species from all other sharks. It should be noted, too, that the rostrum was not short, as it is represented in textbook figures, but projected considerably in front of the mouth.

The whole surface was covered with minute tubercles, which were rough to the touch when the shark was stroked from behind forward. The tubercles were especially large at the tip of the rostrum. On the snout, both above and below, were sensory pores distributed in groups. They were transversely elongated and very large, some of them ¼ inch in width. The long, slender gill-rakers, which are so distinctive of this species, were black in color, and looked like long, finely toothed combs attached to the gill bars. The longest rays were 2⅞ inches in length. The teeth were set in the jaws in three rows, except in a few spots, where there were a few extra teeth giving the appearance of four rows.

The alimentary canal contained a large quantity of bright red material. On examination under the microscope, this resolved itself into a vast multitude of minute Crustacea (species not yet determined), whose reddish bodies lent color to the entire mass.

A few measurements, especially of the head region, may here be given: Rostrum, from front of

eye, 10¼ in. Diameter of eye, 1½ in. Front of eye to nostril, 3 in. Width of nostril, 1¼ in. Distance between inner margins of nostrils, 4¾ in. Mixopterygia, 7¼ in.

A fuller account of this specimen with photographs of the freshly-captured fish and figures of anatomical details will shortly be published.

L. Hussakof,
New York, N. Y.

ON FISH-BONES IN A KINGFISHER'S NEST.

Through the kindness of Mr. S. H. Chubb of the American Museum the writer has had for examination a mass of fish-bones, scales, etc., from the recently occupied nest of a kingfisher, and has looked it through to determine the species of fish eaten in this case. The results have both an ichthyological and ornithological interest.

The nest referred to was placed in a bank about one-quarter of a mile from Van Cortlandt Lake, New York City. It was occupied by young kingfishers 29 days between the times of hatching and departure. Immediately after they had gone Mr. Chubb removed about two quarts of soil from the bottom of the nest, and from this about 220 cubic centimeters of clean bones, scales, etc., was obtained, representing probably three-quarters of all the fish remains in the nest.

The most striking single objects among the bones were the beautifully preserved tooth-bearing pharyngeals of small cyprinids, of which there were 113. The mass was carefully gone over for readily recognizable bones of other fishes and surprisingly few encountered. Lower jaw bones of 2 or 3 small pickerel (*Esox*), 3 to 5 inches in length, were noted; also the opercle of a yellow perch (*Perca flavescens*), about

four inches, and anal spines of a sunfish, about three inches long. There were also pieces of the shell of a crawfish. The absence of suckers (catostomids) was unexpected. Their pharyngeals would have been as easily picked out as those of the cyprinids, and supposing that their bottom habits protected them, then how about the crawfish?

Of the 113 minnow pharyngeals, 90 were identified as from the golden shiner (*Abramis crysoleucas*), 21, not satisfactorily determinable, were perhaps also this species, and two were from different individuals of the goldfish (*Carassius auratus*). That particular nest of kingfishers was then concerned with cyprinids, of which at a minimum estimate it accounted for 76 individuals, and of these the golden shiner made the greater part, probably almost the entire number.

The golden shiner is probably the most abundant fish in still and slow-moving fresh-waters near New York City, yet it would scarcely figure as largely in the kingfisher's bill of fare were there no discrimination in its favor. There is no obvious reason why the goldfish, which is also abundant, should not be as readily obtained. The writer suspects that the kingfisher selects that fish which in a given region furnishes it the best food supply, and specializes in the capture of the same disregarding other species. It would be interesting to learn if the many kingfishers which hunt over the salt and brackish waters near New York specialize on *Menidia* or *Fundulus*.

J. T. Nichols,
New York, N. Y.

THE TRANSFORMATION OF SPELERPES RUBER (DAUDIN).

Various allusions in literature to the life history of *Spelerpes ruber* as being well known, (though I have been unable to find any published account of

it), have made me hesitate in publishing these notes, but I will give them for what they are worth.

Practically all the specimens studied came from a spring near Haverford, Pa., in which spring both adults and larvae were very abundant, and ten or fifteen could be caught at any time. Some of the larvae were much larger than small adults, my smallest adults being 80-90 mm. long and my largest larvae about 110 mm. long. These larvae were distinguishable from those of *S. bislineatus*, by much larger size and uniform coloration. The smallest seen were as long (50-60 mm.) as the largest larvae of *S. bislineatus* seen and much more robust.

In January of this year I started keeping the larvae alive with a view to watching the transformation. I continued this into the spring with no success, the larvae all dying in a few days, or living on with no signs of transformation.

However, in a series of ten larvae collected on May 20, the largest (110 mm.) showed tinges of red in the ground color and smaller gills. On May 22 this specimen had lost all the filaments of the gills and had taken to lying entirely out of water.

May 23—The gill stumps were shrivelling, the tail fin had gone, and the color was more like that of the adult. A smaller one of the same lot of May 20 (90 mm.) had also lost the tail fin and showed a reddish tinge. The gill filaments also were smaller.

May 24—A (the large one) gills were stubs—eyelid developed—mouth nearly developed—B (the smaller one) eyelids developing—mouth developing—gill filaments ragged.

May 27—A, mouth developed fully—tongue free, gills mere stubs.

May 28—I collected an adult which showed unmistakable signs of having just completed the transformation.

May 29—Not much change in larvae from May 27.

May 31—I killed and preserved the large larva A, and the recently transformed adult of May 28. The gill stubs on A were very small and no longer than their width.

June 1—B has lain out of water for two days. The gill filaments are going.

June 4—B lying out of water all the time. Practicing bucco-pharyngeal respiration. Gill filaments about gone. This specimen was then killed and preserved.

It is thus apparent that *Spelerpes ruber* begins to transform in May. The time of breeding is not known to me and I can find no record of it. The animals remain active all winter in springs. At the time of transformation they are probably well over a year old, as two lots can be distinguished, 80-110 mm. long, and 50-60 mm. long. This would seem to make the duration of the larval period about two years, and would also point to a definite breeding period, probably in the spring and summer. Of course these last statements are simply conjectures.

The question of *Siren operculata* Beauvois arises here. I am of the opinion that before so well established a name as *Spelerpes ruber* be changed, it should be shown beyond the shadow of a doubt that the larva on which Beauvois founded his *operculata* is identical with the larva of *ruber*.

E. R. Dunn,
Haverford, Pa.

NOTES ON AMBLYSTOMA TIGRINUM AT FLAGSTAFF, ARIZONA.

During the month of May, 1913, the writer had good opportunities to study this salamander at an altitude of a little under 7,000 feet.

This species was the only salamander observed in the vicinity and was found in a small stream near a lumber mill. The rocks about Flagstaff are red volcanic larva.

Both the gilled and air breathing forms were found together in the water, some of the specimens reaching a length of about six inches. The color of the gilled forms was olive brown with dark irregular spots on the back, sides, belly and tail fin. The air breathing forms were darker and less spotted. This color varied somewhat with individuals and with the surrounding temperature, the specimens becoming lighter as the air or water became warmer. The gills were not as fully developed as in many specimens which the writer has seen in captivity, and the caudal fin was not as broad. Neither did it extend up the back as far.

Several boys in the vicinity reported finding their eggs during the month of June, while the writer was absent, and secured several immature gilled specimens about two inches in length.

No land forms were found out of the water, although they may have occurred there. But as the ground is exceedingly dry in this vicinity the writer doubts whether this species is found far from water at this locality.

These salamanders were quite abundant in certain pools of the stream, as many as nine being counted in a pool about seven feet in diameter and one foot deep. They were very active and difficult to capture by hand, and generally darted to cover under some submerged plank or stone.

Several specimens of the land form, which the writer collected, are now thriving in shallow water at the Bronx Zoological Park. They feed greedily and will even snap harmlessly at one's finger.

DWIGHT FRANKLIN,
New York, N. Y.

RHINOCHILUS LECONTEI IN LOS ANGELES.

In the Copeia of February 20, 1915, (No. 15) appeared a list of fourteen snakes found in the vicinity of the city of Los Angeles. To those must now be added one more recently discovered at Belvidere, California, by Mr. Viggo Tarp. This is *Rhinochilus leconteï* (Baird & Girard) and was found on May 13, 1915, about two miles from the beach on a bare hill near some gopher holes. This specimen is now thriving in captivity on a diet of lizards. It is 38½ inches long.

The only other traces I have found of LeConte's Snake have been in La Canada Valley, where an old bee-man named Charlie Metcalf had skins of two other specimens found in the valley where he lives. Near Los Angeles, LeConte's Snake is considered rare.

Paul D. R. Rüthling,
Los Angeles, California.

Edited by J. T. Nichols, American Museum of Natural History

PRICE FIVE CENTS

New York, September 22, 1915. No. 22

Published to advance the Science of cold-blooded vertebrates

A PECULIAR COLOR DISPLAY IN THE YELLOW GRUNT.

While at the Marine Biological Station of the Carnegie Institution at the Tortugas Islands in the Gulf of Mexico, I had many opportunities to observe the brilliant colors of the coral-reef fishes. These are seen at their best only when the fish are at liberty in their natural waters.

The yellow grunt, *Haemulon sciurus,* has the head and body broadly striped with chrome-yellow and lavendar-blue. The anals and ventrals are yellow, the belly and throat white. The outside of the fish would seem to afford a sufficient display; but, as in other grunts, the interior of the mouth is bright-colored. In this species it is vermilion everywhere from the caudal margin of the breathing valves as far back as the first gill slit. The mouth is large and can be opened very wide. When so opened it appears as a conspicuous red patch.

One morning in July, 1905, I crushed a large black sea-urchin (*Diadema*) and threw it into the water. Two yellow grunts soon appeared and began to feed on it. When I first saw them they were about a foot apart and directly facing each other. Presently one of them opened its mouth very wide so as to display fully its red lining. He then swam toward the other. The second fish opened its mouth in the same way but did not move. The first kept on until the

jaws of the two touched. His mouth was a bit larger or wider open so that his jaws overlapped for an instant those of the other fish. They then separated.

During the whole of this manœuvre the two fish faced each other. To each the vivid red mouth lining of the other must be visible. To the human observer it is startlingly conspicuous. He cannot escape the impression that the fish are making a display; he might be pardoned for saying that they are bluffing. This impression is strengthened by the wide gaping of the mouth, by the facing position and by the rather deliberate approach. It is as if each were expecting the other to flee at any moment.

Such displays of conspicuous color patches are not rare among inconspicuous insects. They are thought to have been developed through natural selection and to serve the purpose of startling an enemy (Schreckfarben). In conspicuously colored insects they are probably quite as common, but are overlooked because superimposed on an already conspicuous coloration. In the grunt, the red mouth patch displayed suddenly on a background of yellow and blue stripes is to man conspicuous and startling. If seen in an insect it would undoubtedly be classified as a "Schreckfarbe." How it affects the fish's natural enemies we can hardly know.

The color patch is revealed to its fullest extent when the mouth is opened wide in the presence of an enemy. It seems to be little exposed in the usual taking of food. I have never seen it then. But the food of the species consists of crustaceans and annelids, whose visual organs, so far as we know, are unaffected by any color display. Selection need then hardly deprive the *Haemulons* of their mouth patches in order to assure their food supply. Considered as a contrivance for bluffing enemies the mouth patch seems of doubtful advantage. It is to be expected that enemies, if affected by it, would soon become accustomed to it and be no longer startled.

In any case it helps them to see better the oral weapon with which they are threatened. It should be easier for them to meet the attack.

On the whole it seems wisest to regard the display as merely incidental to the opening of the mouth in attack and as quite devoid of biological meaning. In its effect on food it is neutral; in its effect on enemies the advantages and disadvantages seem to be pretty well balanced. The disadvantages may have rather the best of it. The analysis of the case may help to an understanding of similar displays in other forms. It suggests caution in interpreting them.

JACOB REIGHARD,
Ann Arbor, Michigan.

PIKE-FISHING INCIDENTS.

The following incidents occurred during my vacation this summer in the Adirondack Mountains:

On August 14th Dr. H—— and myself went out pike fishing on Stony Creek Pond No. 1, in Coreys. At the time the incident happened I was rowing the boat and the Doctor trolling, using a shiner for bait. A pike was struck and after some play the line came away minus bait, hook and an inch of the gut to which the hook had been attached. Another baited hook was put on and we continued around the pond. On coming a second time to the spot where the fish was lost there was another strike, and a pike a little under two pounds was safely landed in the boat.

At the first cut I made in dressing this fish out dropped a shiner with the Doctor's lost hook and inch of gut snood fastened to it. The gut had been sawed off by the pike's teeth.

A few days later while fishing in the same place the following occurred:

I was still fishing, using a live perch as bait. My first catch was a pike weighing in the vicinity of one and a half pounds. He had swallowed the perch, and,

finding it impossible to reach the hook or even to see it, I opened his belly, and finding the perch still alive, threw it into the water. While it could not right itself and swim away, it continued for some time to paddle around in a circle.

CHAS. W. MEAD,
New York, N. Y.

NOTES ON A FISH CAUGHT THREE TIMES.

The writer has on several occasions seen fishes bite on a hook when they have already been caught once.

In one instance on Upper Saranac Lake in the Adirondacks a yellow perch (*P. flavescens*) was caught, a worm being used as bait. The lower half of its tail was slightly deformed and this served as a mark of identification. As the writer was not after perch, the fish was tossed back uninjured.

Within about ten minutes it had been caught three times.

DWIGHT FRANKLIN,
New York, N. Y.

BOX TORTOISE (*Terrapene carolina*) SWIMMING A CREEK.

On May 9th, about eight o'clock in the morning, I noticed an object moving about in Darby Creek, about a mile above Addingham. It was a few feet out from the shore, and through a pair of field-glasses was seen to be a box tortoise. At this point the creek is about fifteen to twenty yards wide, and the tortoise was headed directly for the opposite shore. It swam very slowly and laboriously, only the highest part of the carapace and the head, from just below the eyes, projecting above the surface of the water. As it moved along, it bobbed up and down. After much effort, when within a few feet of landing on the oppo-

site shore, it stopped to rest a second or so, floating a short distance down stream, when it resumed its movements towards the bank. Close to the bank it stopped paddling, floated gently up on the mud, and after a few moments' rest, crawled slowly out on the muddy shore, stopping again for a rest. Five or ten minutes later it was still resting in the sun. Never having seen the box tortoise swim before, this note is offered as possibly of interest.

DELOS E. CULVER,
Addingham, Pa.

NUMBER OF YOUNG PRODUCED BY CERTAIN SNAKES.

I quote the following records from my notes, trusting that they may be of some interest. All the specimens referred to were taken in Nelson County, Va.:

Natrix septemvittata. August 31st, 1914. Five young.

Natrix sipedon. I have never observed over 40 young, but have three records of this number, one each of 36, 33, and 25. Dates of birth, August 12th-October 12th.

Heterodon platyrhinos. August 16th, 1913. A nest of 34 eggs ploughed up in a field. They hatched August 23-27.

Agkistrodon contortrix. September 1, 1913, 7 young. These young snakes, though born alive, had well developed egg-teeth, which were not present in the young of either *Natrix*. They were quite evident in the young of *Heterodon*.

E. R. DUNN,
Haverford, Pa.

SOME AMPHIBIANS AND REPTILES OF CECIL COUNTRY, MARYLAND.

This list represents material I have examined or collected, unless otherwise stated. Sometimes, as

at Bacon Hill, Northeast, Stony Run, etc., several collections have been made, at different seasons of the year. Though incomplete, the list includes the greater number of species found in the county, especially the commoner forms:

Cryptobranchus alleganiensis (Daudin). Seen at Conowingo and reported from Octoraro and Bald Friar. Occasional in the Susquehanna.

Ambystoma maculatum (Shaw). Reported at Conowingo, though not obtained by me.

Plethodon erythronotus (Green). Singerly, Bacon Hill, Northeast and Bohemia Manor. Usually locally abundant.

Spelerpes bislineatus (Green). Bacon Hill. Few taken.

Spelerpes ruber (Daudin). Bacon Hill, Northeast, Bohemia Manor and Piney Creek. Abundant in springs.

Desmognathus fusca (Rafinesque) Conowingo, Bacon Hill, Singerly and Piney Creek. Common.

Bufo americanus Holbrook. Conowingo and Porter's Bridge. Bohemia Manor at Bohemia Bridge, near Warwick and Cecilton, Bohemia Mills and Little Bohemia Creek. Northeast, Bacon Hill, Elkton and Singerly. Abundant.

Acris gryllus crepitans (Baird). Northeast, Bacon Hill, Stony Run, Charlestown, Elkton. Abundant. Bohemia Manor along Big and Little Bohemia Creeks. Devil's Elbow, etc. Also common at Elk Neck and Piney Creek.

Hyla pickeringii (Holbrook). Stony Run, Charlestown, Northeast, Bacon Hill, Singerly, Elkton, Conowingo. Common, and heard usually in the spring.

Hyla cvittata. G. S. Miller. An adult example was obtained by Mr. Paul Lorrilliere at Georgetown on the Sassafras River, July 20, 1915. It is interest-

ing as the most northern locality in the distribution of the species. Mr. Lorrilliere writes, "Last night about seven o'clock, while casting for bass, I heard a single clear note, soon followed by several more. The man rowing me about said it was produced by a little green frog, which hung on the leaves of docks, etc., and that it had a little bag under its throat which appeared to collapse when it made its call. The only sound that appears like this call is a twang on a stretched rubber, which is quieted before it has vibrated more than a second. It can be heard a quarter of a mile or more on a still night."

Hyla versicolor. Le Conte. Elkton, Singerly, Northeast, Bacon Hill, Elk Neck, Little Bohemia Creek.

Rana pipiens Schreber. Bohemia Manor.

Rana catesbeiana Shaw. Elkton, Northeast, Stony Run, Conowingo, Octoraro and Elk Neck. Abundant in Bohemia Manor, along Big and Little Bohemia Creeks, Devil's Elbow, Bohemia Bridge and Bohemia Mills.

Rana clamata Daudin. Porter's Bridge, Conowingo, Stony Run, Charlestown, Bacon Hill, Octoraro, Piney Creek, Elk Neck, and Bohemia Manor, along Little and Big Bohemia Creeks, Devil's Elbow, Scotchman's Creek, Dike Creek, Bohemia Bridge and Bohemia Mills. Common.

Rana palustris, Le Conte. Porter's Bridge, Conowingo, Octoraro, Charlestown, Stony Run, Bohemia Manor and Big Bohemia Creek. Common.

Rana sylvatica, Le Conte. Abundant about Bacon Hill and Singerly.

Natrix sipedon (Linn). Octoraro, Stony Run and Elk Neck. Very abundant in Bohemia Manor, along Big and Little Bohemia Creeks, Devil's Elbow, Bohemia Mills, Bohemia Bridge and Warwick.

Elaphe obsoletus (Say). A large example obtained in Bohemia Manor near Bohemia Mills. Also seen near Bohemia Bridge.

Coluber constrictor (Linn). Little Bohemia Creek, Bacon Hill, Singerly, Stony Run and Devil's Elbow.

Thamnophis sauritus (Linn). Bacon Hill and reported from near Devil's Elbow in Bohemia Manor.

Thamnophis sirtalis (Linn). Elkton, Singerly, Bacon Hill, Warwick and Stony Run.

Lampropeltis doliatus (Linn). Stony Run.

Heterodon platirhinos (Latreille). Bohemia Mills, Bacon Hill, Singerly. Bohemia Bridge and near Warwick.

Sceloporus undulatus (Latreille). Elk Neck, Bacon Hill, Singerly, Warwick.

Chelydra serpentina (Linn). Big and Little Bohemia Creeks, Bohemia Bridge, Conowingo, Elkton, Bacon Hill, Northeast, Singerly, Conowingo.

Kinosternon pensylvanicum (Gmelin). Big and Little Bohemia Creeks, Bohemia Bridge and Elk Neck. Common.

Pseudemys rubriventris (Le Conte). Seen along the Little Bohemia Creek, though not collected.

Chrysemys picta (Schneider). Little and Big Bohemia Creeks, Bohemia Mills, Elk Neck, Conowingo and Octoraro.

Clemmys guttata (Schneider). Bacon Hill and Northeast.

Terrapene carolina (Linn). Warwick, Devil's Elbow, Bohemia Bridge, Little Bohemia Creek, Bohemia Mills, Bohemia Bridge, Piney Creek, Elk Neck, Elkton, Northeast, Bacon Hill, Singerly, Conowingo and Octoraro.

HENRY W. FOWLER,
Philadelphia, Pa.

Edited by J. T. NICHOLS, American Museum of Natural History

PRICE FIVE CENTS

New York, October 15, 1915. No. 23

COPEIA

Published to advance the Science of cold-blooded vertebrates

ICHTHYOLOGICAL NOTES FROM MONTAUK, LONG ISLAND.

The following notes were secured during the course of field work undertaken for the Brooklyn Museum in the early part of August, 1915. Some local names are included in quotation marks:

Sphyrna zygaena (Linn.). A Hammerhead, about five feet in length, was seen several miles off Montauk Point on August 8th.

Clupea harengus Linn. A specimen about seven inches long was picked up in fairly fresh condition on the ocean beach on August 7. The species seems to be unusual in Long Island waters at this season.

Brevoortia tyrannus (Latrobe). The local Menhaden fishery has practically failed this season.

Scomber scombrus Linn. "Boston Mackerel." The pound-net fishermen were securing a few of these fish. A number of young mackerel were found in the stomachs of Roseate Terns (*Sterna dougalli*).

Xiphias gladius Linn. Single Swordfish were taken by harpoon off Montauk Point on July 10, 14 and 15, 1915, by William D. Parsons, Jr., of Montauk.

Caranx crysos (Mitchill). "Jack." A seven-inch specimen was taken in a pound-net on August 11.

Poronotus triacanthus (Peck). "Butterfish"; "Shiner." This fish was entering the pound-nets in large numbers in early August.

Micropterus salmoides (Lacepede). Abundant in Fort Pond, where it was introduced about 1887. On July 20, 1915, an example having two complete and distinct heads was caught, taken to the Montauk Inn, and eaten. It was an adult in good condition.

Morone americana (Gmelin). Exceedingly abundant in Fort Pond, Great Pond, and Reed Pond. These waters are now landlocked, but were stocked about thirty years ago. On August 11 no less than 75 White Perch were caught in Fort Pond by two girls and a boy. This body of water, unlike Great Pond, is quite fresh. The largest of the fish weighed just under a pound. Some of the local seafarers have a curious notion that these perch have become "transformed" from some distant salt-water species. Unfortunately, those caught are seldom eaten, and we saw one large lot fed to hogs.

Centropristes striatus (Linn.). Many Sea Bass were being taken on hand-lines off Montauk Point, and we saw hundreds enclosed in pounds in Fort Pond Bay, where they are kept for a better market later in the season. Meanwhile they are fed on chopped squid, fish entrails, etc. This year the species is affected by an eye disease, which Capt. E. B. Tuthill says he observed also ten or twelve years ago. Some fish, when caught, are seen to have their eyes covered with a whitish film. Subsequently the eye begins to bulge out, and the outer surface to disintegrate, hanging in white shreds. At this stage the unfortunate victims are pursued by their fellows, which bite at the protruding eyes, causing death after a number of hours.

Spheroides maculatus (Bloch & Schneider). A specimen 9½ inches in total length was taken on August 11.

Chilomycterus schoepfii (Walbaum). "Porcupine-fish." A specimen was taken in a pound-net at Fort Pond Bay on August 11, but was thrown away

before we saw it. A few are said to have been caught at the same place earlier in the summer.

Mola mola (Linn.). "Sunfish." One was taken by William D. Parsons, Jr., on July 15 at sea south of Montauk Point. It was captured with Swordfish tackle, and cut up for use as lobster bait.

Merluccius bilinearis (Mitchill) "Whiting." A few of these fish were taken by a pound-net fisherman on August 11.

Urophycis chuss (Walbaum) "Ling." A small specimen was picked out of a boatload of pound-net fish on August 11.

R. C. Murphy,
Francis Harper,
Brooklyn, N. Y.

NOTES ON FISHES NEAR NEW YORK.

In Copeia No. 2, February, 1914, occur dates of local occurrence of marine fishes in autumn and early winter. Examination of Dr. Wiegmann's notes shows a number of records which are late or otherwise of interest, not published at that time. With these we here include one or two records of specimens received at the American Museum of Natural History.

Mustelus canis. December 13, 1913 (Coney Island).

Galeocerdo tigrinus. A large tiger shark was captured off Islip, Long Island, Sept. 11, 1915. The head was sent to the American Museum by Captain John C. Doxsee.

Raja ocellata. December 30, 1911 (Seventeen-fathom Banks).

Leptocephalus conger. "Silver Eel." December 30, 1911 (Seventeen-fathom Banks).

Pomolobus pseudoharengus. December 18, 1913 (Coney Island).

Brevoortia tyrannus. December 5, 1913 (Coney Island).

Stolephorus mitchilli. October 30, 1913 (Coney Island).

Synodus foetens. October 30, 1913 (Coney Island).

Hyporhamphus roberti. October 16, 1913 (Coney Island).

Fistularia tabacaria. October 16, 1913 (Coney Island).

Siphostoma fuscum. December 13, 1913 (Coney Island).

Sphyraena borealis. The record for Nov. 16, in COPEIA, No. 2, was of a specimen 176 mm. in total length, taken in 1912 not 1913.

Vomer setipinnis. October 30, 1913 (Coney Island).

Trachinotus carolinus. October 30, 1913 (Coney Island).

Pomatomus saltatrix. October 16, 1913 (Coney Island).

Pseudopriacanthus altus. A specimen of this rare fish, 38 mm. in total length. October 30, 1913 (Coney Island).

Orthopristis chrysopterus. November 17, 1913 (Coney Island).

Bairdiella chrysura. December 18, 1913 (Coney Island).

Leiostomus xanthurus. December 29, 1913 (Coney Island).

Menticirrhus saxatilis. November 4, 1913 (Coney Island). One young.

Pogonias cromis. December 18, 1913 (Coney Island).

Chaetodon ocellatus. October 30, 1913 (Coney Island).

Chilomycterus schoepfii. November 5, 1912 (Long Beach).

Myoxocephalus octodecimspinosus. A few were taken Dec. 29, 1913, at Coney Island, also large masses of their green eggs.

Prionotus strigatus. November 4, 1913 (Coney Island). One young.

Rissola marginata. October 30, 1913 (Coney Island).

Merluccius bilincaris. December 18, 1913 (Coney Island).

Pollachius virens. A young specimen about six inches long, City Island, July 15, 1915, brought to the Museum by Messrs. C. & O. Falkenbach.

Urophycis regius. December 18, 1913 (Coney Island).

Lophopsetta maculata. December 18, 1913 (Coney Island).

W. H. Wiegmann,
J. T. Nichols,
New York City.

AN ENCOUNTER BETWEEN A BLUE RACER SNAKE, *BASCANION FLAGELLIFORMIS* AND A "GOPHER."

A gopher of a species unidentified was running through the grass near my garden gate, and a Blue racer snake was loosely coiled up in the road, apparently on the watch, but not seeing me. As soon as the gopher became aware of the presence of the snake it darted forward, and commenced circling about the snake and from time to time running in and nipping at the body of the snake, and jumping back. The snake turned its head about constantly, watching the gopher, and twice it made ineffectual strikes at the running animal, with its open mouth. After some minutes of this kind of thing the gopher ran for its burrow and the snake thrust out its tongue and started towards the house, and being headed off, climbed up a small juniper tree, from which it was dislodged, and allowed to escape, which it did with incredible speed. I witnessed no evidence whatever of the power which it is popularly believed snakes

have of charming their prey, as all the wiles of this snake had no effect upon the gopher.

HERMAN HAUPT, JR.,
South Haven, Michigan.

THE MINK FROG, RANA SEPTENTRIONALIS BAIRD, IN ONTARIO.

Mr. P. H. Pope's note on the distribution of the mink frog in Maine,* recalls some of my experiences with this species while stationed at Prof. C. V. P. Young's boys' camp on Otter Lake, Dorset, Ontario, in the summer of 1913.

On July 7, in a peaty lake with clear sphagnaceous border we found several *Rana septentrionalis*. From July 7-14, we heard at night along the shore of Otter Lake the peculiar note which later proved the croak of the mink frog. On the 15th of July at 10 P. M. we heard several frogs and started with flashlight for the Peat Lake where the species was in chorus. The air temperature ranged from 52° to 55° F., but the water of Otter Lake at its surface registered 69° F.

On July 16th and 17th, we examined the place closely. All along the north edge of the lake were white water lilies, yellow spatterdocks and water shields. These three made a perfect carpet on the water's surface. On these plants during the day the mink frogs rested. Whenever the sun went under a cloud or it became overcast they would croak. The water was about two feet deep. By pushing our canoe through the water plants toward the frogs, one person could place a landing net in front of the quarry while the other with the paddle could gently cause the frog to leap into the net. In this way we caught 15 specimens. Often the frogs would jump along on the lily pads, sometimes for considerable distance; seldom, if ever, did they give a cry like frightened young bullfrogs. Another favorite position was resting be-

*COPEIA, Mar. 15, 1915, No. 16.

tween the overlapping lily pads with just the head protruding, while in the center of the pond where there were only isolated plants, the frogs disappeared before we saw them, the "wake" near a lily pad indicating their former presence.

In the outlet to Otter Lake (Ten Mile Creek between Lake of Bays and Otter Lake) we found them common, July 24, on muddy bottoms where water lilies were abundant. In the same kind of situation they occurred on Porridge Lake, July 28. Another habitat we discovered August 31 was a beaver lake where Cassandra and all the associated heath-like plants grew. Finally, on Fletcher Lake, September 1, we found them in the shallow, sandy shores amongst pipeworts (*Ericaulon articulatum*).

After July 15th and 16th we heard no more choruses. On the latter date we captured one or two frogs with the stump of the tail remaining. These were about 38 mm. (1½ inches) from snout to vent, or little below the two largest individuals taken (49 mm. or 2 inches). The other specimens which were not lost measured 47, 42, 42, 43, 40, 40 mm. respectively. None of these eight specimens had fully developed eggs, though one female surely would have bred the following year. The middle of July, when the chorus was recorded, accords well with Garnier's observed season of breeding for this species, but we had small opportunity to determine if it obtained at Otter Lake.

This species cannot be called solely a river species; it has a "chant amour" which at chorus season can be heard one-third to one-half of a mile away; the name "mink frog" seems very apropos for this species, at least for Ontario specimens; the tadpoles remain at least one winter in this stage and transform at a size approaching that of the adult. The season of breeding, the length of larval period, the size of transformed frog place it with the green frog and bull frog. Neither of these species seemed to be asso-

ciated with it particularly although each was in the Lake of Bays region in numbers.

A. H. Wright,
Ithaca, N. Y.

RATTLESNAKES ON CATALINA ISLAND.

Van Denburgh and Slevin (Proc. Calif. Acad. of Sci., 4th Ser., Vol. IV, pp. 138-139) state that the presence of rattlesnakes on Catalina Island off the coast of southern California was first recorded by Yarrow from a specimen taken there by Mr. Schumacher in 1876. One additional specimen only is recorded. In that so little is known of *Crotalus oregonus* on the island, the following notes may be of interest:

During July, 1906, while camped at Whites Landing, I killed a rattlesnake about two feet long. The specimen was not saved. I believe that several other specimens were killed during the summer. At that time rattlesnakes were considered fairly common over the greater part of the eastern slope of the island.

Mr. Murray L. Royar, who has just returned from a summer spent at Avalon, has donated to the Museum of Vertebrate Zoology a small specimen of *Crotalus oregonus* taken at Avalon on August 2, 1915. Mr. Royar reports that old-timers on Catalina Island say that there were no rattlesnakes on the island in early days. Later, when hay and other crops were introduced, rattlesnakes appeared. The reptiles were first seen around barns and near civilization and later took to the hills. He also states that even at the present time few are found far inland.

Harold C. Bryant,
Berkeley, Calif.

Edited by J. T. Nichols, American Museum of Natural History

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New York, November 19, 1915. No. 24

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A CANNIBALISTIC PTEROPHRYNE.

In Fishes of North Carolina p. 400, speaking of the Mouse Fish, Smith says: "The habits of the species are known chiefly from its behavior in aquaria. The fish are cannibalistic, denuding their fellows of their fleshy appendages and fins and sometimes swallowing their smaller companions whole."

On July 2, 1915, I caught a *Pterophryne histrio* 85 mm. total length in the bight of Cape Lookout, N. C., and placed it in an aquarium aboard my yacht. It was very lively and continually moving about. After it had been in captivity about eighteen hours it was seen to disgorge a small *Pterophryne* 38 mm. in total length. I at once transferred both specimens to formalin solution.

This conclusively proves that the species does not confine its cannibalistic habit to life in captivity, as the small fish had positively been swallowed before capture.

Russell J. Coles,
Danville, Va.

A LIST OF SANTO DOMINGO FISHES.

Many years ago a collection was received at the Academy of Natural Sciences of Philadelphia, made by Prof. W. M. Gabb, at Santo Domingo, in the eastern part of the island. As this collection was

never reported, and a number of the species are additions to that little known fish-fauna, this note is offered. The additions to the fauna are indicated by the prefixed star.

Elops saurus Linn.
Albula vulpes (Linn.).
Dixonina nemoptera Fowler.
Sardinella humeralis (Valenciennes).
Opisthonema oglinum (Le Sueur)
Anchoria brownii (Gmelin).
A. clupeoides (Swainson).
Synodus dominicensis Fowler.
Angnilla rostrata Le Sueur.
Muraenesox saurana (Cuvier).
Gymnothorax funebris (Ranzani).
G. ocellatus (Agassiz).
Parexocoetus mesogaster (Bloch).
Tylosurus timucu (Walbaum).
Dorythamphus lineatus (Valenciennes).
Mugil curema Valenciennes.
Agonostomus monticola (Griffith).
Joturus pichardi Poey.
Sphyraena barracuda (Walbaum),
S. guachancho Valenciennes.
S. picudilla Poey.
Scomberomorus regalis (Bloch).
S. cavalla (Cuvier).
Gempylus serpens Cuvier.
Trichiurus lepturus Linn.
Trachurops crumenopthalmus (Bloch).
Caranx hippos (Linn.).
C. pisquetus Cuvier.
C. latus Agassiz.
Blepharis crinitus (Bloch).
Vomer setipinnis (Mitchill).
Selene vomer (Linn).
Trachinotus glaucus (Bloch).
T. falcatus (Linn.).
Centropomus ensiferus Cuvier.
C. cuvieri Vaillant and Bocourt.
C. parallelus Poey.
Cephalopholis fulvus (Linn.).
C. fulvus onatalibi Valenciennes.
Epinephelus flavolimbatus Poey.
E. maculosus (Valenciennes).
Alphestes lightfooti (Fowler).
Priacanthus arenatus Cuvier.
Lutianus jocu (Schneider)
L. apodus (Walbaum).
L. buccanella (Cuvier).
L. vivanus (Cuvier).
L. synagris (Linn.).
L. mahogani (Cuvier).
Haemulon plumieri (Lacepede).
Anisotremus surinamensis (Bloch).
Brachydeuterus corvinaeformis (Steindachner).
Pomadasis ramosus (Poey).
Calamus calamus (Valenciennes).
Eucinostomus gula (Valenciennes).
E. harengulus Goode and Bean.
Gerres rhombeus Valenciennes.
G. olisthostomus Goode and Bean.
G. plumieri Valenciennes.
Odontoscion dentex (Cuvier).
Bairdiella ronchus (Cuvier).
Micropogon furnieri (Desmarest).
Umbrina coroides Valenciennes.
Corvula subaequalis (Poey).
Polydactylus virginicus (Linn.).
Eupomacentrus fuscus (Valenciennes).
E. otophorus (Poey).
Iridio poeyi (Steindachner).
Chaetodipterus faber (Broussonet).
Hepatus bahianus (Castelnau).
Lactophrys tricornis (Linn.).
L. triqueter (Linn.).
Spheroides testudineus (Linn.).
Scorpaena plumieri Bloch.
Philypnus dormitor (Lacepede).
Eleotris pisonis (Gmelin).
Awaous taiasica (Lichtenstein).
Leptecheneis naucrates (Linn.).
Caulolatilus chrysops (Valenciennes).
Labrisomus nuchipinnis (Quoy and Gaimard).
Citharichthys spilopterus Gunther.
Achirus lineatus (Linn.).

Henry W. Fowler,
Philadelphia, Pa.

NOTES ON THE FAUNA ABOUT THE HEADWATERS OF THE ALLEGHENY, GENESEE AND SUSQUEHANNA RIVERS IN PENNSYLVANIA.

During early June of 1906, the following fishes were found in a tributary of the Allegheny near Port Allegheny, in McKean County:

Campostoma anomalum, Pimephales notatus, Semotilus atromaculatus, Rhinichthys atronasus, Hybopsis kentuckiensis, Catostomus commersonnii, Boleosoma nigrun and *Ethcostoma flabellare.*

The broad valley of this section offers more varied conditions than the upper headwaters, which are but small mountain brooks. *Plethodon erythronotus, P. glutinosus, Desmognathus fusca,* both forms of *Diemictylus viridescens, Bufo americanus, Hyla pickeringii, Rana palustris, R. clamata, R. catesbeiana, R. sylvatica* and *Thamnophis sirtalis* were also found. *Cryptobranchus alleganiensis* was reported to occur abundantly sometimes, though not met with on this trip.

In the summer of 1904, *Gyrinophilus porphyriticus, Spelerpes bislineatus, Plethodon erythronotus, Desmognathus fusca, Diemictylus viridescens, Bufo americanus, Rana palustris, R. clamata, R. catesbeiana* and *R. sylvatica* were found. All of these amphibians are typical of the hemlock forests.

In the headwaters of the Genesee in Potter Co. the following were found in June of 1906: *Salvelinus fontinalis, Semotilus atromaculatus, Rhinichthys atronasus, Catostomus commersonnii, Erimyzon succetta oblongus, Ameiurus nebulosus Schilbeodes gyrinus* and *Cottus gracilis.* Only *Salvelinus* and *Rhinichthys* were found in the very small brooks or rills, and this was also true of those in the Allegheny and Susquehanna drainages. The Genesee *Rhinichthys* was very dark, inclining largely to a dusky or black-

ish color. Though some examples had a pale area in place of the usual dark lateral band, that of the breeding male varied from a dull dark red to a deep wine color on the trunk. Many had the lower sides of their bodies variegated with dusky and the tops of their heads finely granular. *Desmognathus fusca* occurs very abundantly and some few examples of *Plethodon erythronotus* were found, though the latter did not appear to be so abundant as in the hemlock forests near Port Allegheny. Though *P. glutinosus* was not found at Gold Potter County it was met with in the Allegheny Valley at Seven Bridges. Other species about Gold were *Diemictylus viridescens, Bufo americanus, Hyla pickeringii, Acris gryllus crepitans, Rana palustris, R. clamata, R. sylvatica* and *Lampropeltis doliatus triangulus, Liopeltis vernalis* and *Sternothaerus odoratus* were reported though not met with.

The smaller headwaters in the Allegheny and Susquehanna valleys offered the same meagre fish-fauna as the Genesee and about the only fish were *Salvelinus fontinalis* and *Rhinichthys atronasus.* Near Brooklyn in Potter Co. *Spelerpes bislineatus* was found and near Kilburne *Natrix sipedon.*

The writer, in company with H. W. Fowler, spent their vacations for three years in the places mentioned. Thinking the Geographical distribution of the species listed proving of possible interest, they are herewith presented.

Thomas D. Keim,
Stelton, N. J.

LATE-BREEDING SPADE-FOOT TOADS, ETC.

On the evening of August 4, 1915, enormous numbers of Spadefoot Toads, (*Scaphiopus holbrooki*) appeared in Patchogue, Yaphank, Middle Island and Coram. I made a twenty-five mile circuit through the villages named, and found the toads in

practically every pool. There had been an extremely hard rain during the two previous days. Fowler's toads, (*Bufo fowleri*) common tree toads. (*Hyla versicolor*) and green frogs, (*Rana clamitans*) were also abundant. All the various kinds were in full song. On the next day enormous numbers of eggs of the spade foot and Fowler's toads were readily identified in the pools. On the 7th, the eggs were hatched, and on the fourteenth the young were almost half grown. Fully formed spade foot toads were found in Coram on September 4.

On the afternoon of September 12, Leopard Frogs, (*Rana pipiens*) were singing on the salt marshes near the Forge Life Saving Station.

FRANK OVERTON,
Patchogue, N. Y.

AN ALBINO POND FROG.

In the Reptile House at the N. Y. Zoological Park there is on exhibition an albino specimen of the common Pond Frog, *Rana clamitans*. The creature was caught by Henry, the young son of Chas. E. Snyder, head keeper at the park, in a pond near his home in Scarsdale, N. Y.

The color is rich lemon yellow above, white below, and on the hind limbs can be seen faint traces of cross bands. The pupil and iris of the eye are pink, as in albino rats and rabbits. There is, however, a fine golden line bordering the pupil.

The frog feeds well, but seems to see insects which move above it, much quicker than those on a level with itself.

It is a female, about two-thirds grown, the length from snout to vent being 2½ inches. The only other record of albino specimens of the order Salientia in the United States, that the writer has knowledge of, is that of some tadpoles of the common toad, *Bufo americanus,* reared from colorless spawn by

Prof. Morgan, of Columbia University. The tadpoles gradually acquired the normal coloration of the species. Another albino amphibian record is that of a specimen of the two-lined Salamander, *Spelerpes bilineatus* described by A. M. Banta and R. A. Gortner in Proc. U. S. Nat. Mus. vol. 49, p. 377, pl. 54-55.

Other amphibians showing albinism are:

Edible Frog *Rana esculenta* of Europe, larvae.

Grass Frog *R. temporaria* of Europe, larvae and adults.

Yellow Bell toad *Bombinator pachypus* of Europe, one adult.

Green Toad *Bufo viridis* of Europe, one larva.

Midwife Toad *Alytes obstetricans* of Europe, larvae and adults.

Richard F. Deckert,
New York, N. Y.

ON A SMALL COLLECTION OF FROGS AND TOADS OF THE DISTRICT OF COLUMBIA.

For the purpose of making a closer study of the *Anura* of Washington, D. C., and vicinity, I have started a small collection of these interesting "varmints," which are temporarily being kept in the office of Mr. R. G. Paine, of the Division of Reptiles, U. S. National Museum. My sincere thanks are due to Mr. Paine, one of the best known herpetologists of Washington, for his kindness in permitting a "neophite" like myself to impose on his time and good nature. But then you know he is a "crank" on the subject, himself.

In collecting I have also had the assistance of Mr. H. A. O'Dwyer, whose sharpness of vision and quickness of limb have been, and, I trust, will be in the future of great benefit to our undertaking.

Experience so far seems to prove that *Bufo fowleri* is the more common toad in this vicinity, sev-

eral specimens having been found on the farm of my friend, Mr. William Palmer, in Alexandria County, near Arlington Cemetery, Virginia. Mr. Palmer's farm, like the entire district, seems to abound in this species, whereas but one very small and young *B. americanus,* from North Chesapeake Beach, (and this rather doubtful), has thus far been added to the collection.

Two pickerel frogs, (*Rana palustris*), were caught by Mr. O'Dwyer and myself along the Chesapeake and Ohio Canal, above the Aqueduct Bridge, between the Chain-bridge and Georgetown, on the evening of August 30, 1915. Abundant rains had soaked the entire region and made the finding of frogs a "regular picnic." Several young specimens of *R. clamitans,* which, by the way, appears to be very abundant in this neighborhood, were also caught, as well as a young specimen of *R. pipiens,* easily recognizable by its round, brownish, dorsal spots and its sharp snout.

A specimen of *Hyla versicolor* was picked up by Mr. Palmer from the bottom of his well, whither the tree-toad had jumped or fallen after the superstructure had been removed in order to make way for a pump of more modern type. Efforts will shortly be made to secure specimens of *Hyla evittata* Miller, which are said to be very numerous in the ponds between Mr. Palmer's farm and the Potomac River, and also to establish whether *Hyla cinerea* co-exists with, or is not, as some claim, specifically identical with *H. evittata.*

Some doubt seems to exist as to the exact species of a small frog resembling *clamitans,* but with the back of a rich brown or chocolate color, and with a beautiful streak of lazuli blue on the edge of the upper jaw from the tympanum to the tip of the snout. Can any reader of COPEIA help us out?

S. M. GRONBERGER,
Washington, D. C.

ADDITIONAL RECORDS OF THE TIGER SALAMANDER IN CALIFORNIA.

Records of the Tiger Salamander (*Ambystoma tigrinum*) in California are so few that it seems desirable to make brief mention of some specimens in the collections of the University of California. A specimen from Mount Hamilton, Santa Clara County, (no date), taken by A. W. Crawford, and one from Ripon, San Joaquin County, taken April 6, 1912, by Louis Vistica, are in the collection of the Department of Zoology. A specimen from Galt, Sacramento County, was taken December 31, 1914, by W. H. Noble, and is now No. 5562 in the reptile and amphibian collection of the California Museum of Vertebrate Zoology. All three seem referable to the western sub-species namely *Ambystoma tigrinum californiense* Gray.

Tracy I. Storer,
Berkeley, California.

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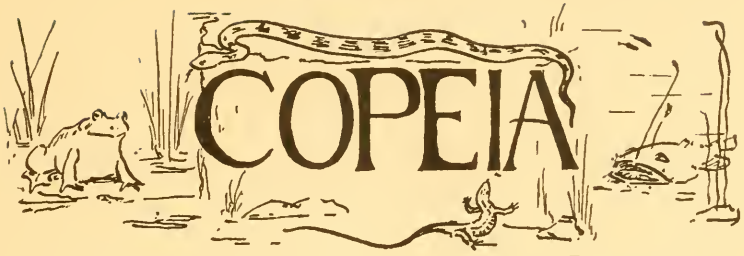

Published to advance the Science of cold-blooded vertebrates

FISHING WITH POISON IN AFRICA

During the American Museum Expedition to the Belgian Congo, 1909-1915, we had opportunity to gather a large collection of fish from the Congo River and its northeastern affluents.

It may be interesting to give a short account of one of the most successful methods of fishing used by the natives of the Logo and Bakango tribes of Faradje (Uele District) on the Dungu River, an affluent of the Uele-Ubangi system. At the appointed day in the early morning a crowd of women and children set out with baskets full of leaves of a large bush with white pea-like flowers (*Tephrosia*), which they cultivate in their villages. At a particular rocky place where the river was about 500 yards wide, they selected one of the largest rocks forming a low island. They threw these leaves into the circular erosions, which thus served as mortars. Two or three women over one hole would busily handle the pestles crushing the leaves, keeping time to the songs of the merry crowd. In the meantime a few of the men and boys had, downstream, constructed a slight barrier of branches and green twigs across the shallow riverbed. Now these slowly came up stream with their dugouts, and, with good wishes for success, received the green mush from the holes in large, wide-meshed baskets. Again paddling upward for a few hundred yards,

they made fast their canoes. At this place the stream was partially obstructed by the emerging rocks, and to the passages between, with much stronger current, they carried their nearly full baskets. All at once, they dipped them into the water and stirred the mush rapidly with one hand. Soon the brownish water showed a distinct greenish hue and within less than five minutes fish after fish came to the surface acting as if it had completely lost its power of equilibrium.

Men, women and children armed with spears and arrows, knives and hatchets all had rushed into the water or taken positions on the different rocks, on the lookout for the doomed fish. For about an hour the whole section downstream became the happy and noisy hunting-ground of the natives who either would throw the fish as they were killed, out upon the larger rocks, or carry them along in baskets. When the catch was complete all fish were distributed by the chief among the party, he retaining a few of the larger ones that weighed easily from 10 to 20 lbs. each.

It seemed to us that fish killed with this poison decomposed more rapidly, yet it is certain that they may be consumed without the slightest danger. The fish taken belonged chiefly to the families, Siluridae, Mormyridae, Cyprinidae, Characinidae.

While we were standing on a rock, a boy had thrown out with a painful yell, a small specimen of an electric catfish (*Malapterurus electricus*). To prevent its struggling back into the water, I stepped on it and was greatly surprised to receive through a one-third inch heavy leather sole, a shock that made me withdraw my foot quickly. I pushed the fish into a hole and Mr. Chapin and myself marveled that such a small specimen could store enough electricity to repeat this performance at least ten times through wet soles.

Many tribes do not eat this fish, which has a thick, rather loose, blubber-like skin, but I have heard

from white men that it is excellent eating, after the removal of its electric hide.

HERBERT LANG,
New York, N. Y.

LONG ISLAND FISHES NOTED BY MR. J. G. RAYNOR

Elops saurus. The Big-eyed Herring or Ten-Pounder, is of particular interest to students of evolution and of the past life of the earth, because it is what is often called "a living fossil," that is, a type which has come down from remote ages with very little change in structure. This fish is in fact a little modified representative of a group which flourished far back in the Cretaceous Period of the earth's history. It is also one of the most primitive of all the teeming hosts of Teleost fishes. Its nearest relatives among existing fishes are the Tarpon (*Megalops*) and the Ladyfish (*Albula*).

The American Museum of Natural History has recently received from Mr. John G. Raynor a specimen of this fish taken at Westhampton Beach, Long Island, about October 20, 1914. Others were taken at about the same time. The occurrence of this southern form on Long Island is sufficiently infrequent to be worthy of record; it is said to be common at Woods Hole, Mass., in October.*

Tetrapterus imperator. Mr. Raynor reports a Spearfish taken at Westhampton in the last of June or first part of July, 1890. He verified its identification by examining a figure of the species as well as a mounted Sailfish and a Swordfish model at the museum; and later submitted a very fair photograph of the fish, taken at the time of capture. To judge from the photograph it was eleven or twelve feet in total length. This fish apparently belongs with the Spearfish incursion reported from Woods Hole 1885

* Bull. U. S. Bur. Fish. Vol. 31, pt. 2.

to 1890.* It is the only definite Long Island record for the species that we know of.

Lophius piscatorius. From Mr. Raynor we have "Carpet-bag" and "Glutton" as local names for the Angler. Many Long Island fishermen loosely call it "Toadfish," although probably realizing that it is different from the smaller *Opsanus tau*, for which the name is also used and to which it properly belongs. At Easthampton, according to Mr. J. L. Helmuth, some of the fishermen call *Lophius*, "Angler," and he has heard it called "Dogfish" by one resident. In 1912 it was sometimes called "Muttonleg" by the crew of an off-shore beam-trawler who were bringing it head-less to the New York market. These notes may be of interest to anyone compiling a vernacular synonymy of the species.

W. K. Gregory,
J. T. Nichols,
New York, N. Y.

GARTER SNAKE SWALLOWED BY PIGMY "RATTLER"

It is not generally known that the Pigmy or Florida Ground Rattlesnake (*Sistrurus miliarius*) is on some occasions inclined toward cannibalism. A fine specimen eighteen inches long, lately disclosed this inclination and clearly demonstrated that the snake can swallow another considerably longer than itself.

On September 19, 1915, a captive Garter Snake (*Eutaenia sirtalis*) twenty-one inches long, which had been in my collection but a short while, gave birth to a litter of fifteen young. Not having a spare cage in which to put the mother and her offspring, I decided to place them in a cage with two Pigmy Rattlesnakes. On the following morning my attention was drawn to what more resembled a distorted sausage than it did a snake. It happened that one of the Pigmies had killed and swallowed the Garter Snake. The

* Bull. U. S. Bur. Fish. Vol. 31, pt. 2.

victim, which was over three inches longer than the "rattler," had been swallowed head foremost, and, because of its greater length lay in lateral folds in the stomach of the *Sistrurus*. As a result the latter snake was much distorted in outline. Due to handling and a consequent nervous reaction the Rattlesnake later disgorged its lengthy meal.

CLARENCE R. HALTER,
New York, N. Y.

RING-NECK SNAKE AT ORIENT, LONG ISLAND

In COPEIA, April, 1915, issue, a list of Long Island snakes is given with two stations for the Ring-neck Snake: Port Jefferson and Yaphank.

On September 12, 1915, while plowing in a weedy corner between two plots of woodlands, I turned out a young Ring-neck (*Diadophis punctatus*). It was five inches in length, of an uniform dark-gray above, the light band very prominent.

A small boy following in the furrow, who first called my attention to the specimen, reported that there were two of the same species; one quickly escaping into the thick bramble at the wood-margin, that one being much larger, as much as ten inches in length.

These were evidently hiding underneath loose turfts of sod. Much rubbish, boards, logs, stones and odds and ends are piled in the edge of the woods there. Although many searches have been made, no signs of others have appeared.

It is interesting to record a third station on Long Island for this secretive little reptile.

ROY LATHAM,
Orient, N. Y.

LOS ANGELES SALAMANDERS

In a branch canyon of Topango Canyon, near Santa Monica, California, is a small pool from which

water is piped for a ranch house below. This pool is not more than two feet in depth, four feet long and three feet wide. It is covered with boards and is surrounded by much damp disintegrated granite, rich loam and leaves from shady oak-trees above.

Between the boards and underneath, within three feet of one another, I found—on May 31st, 1915—the four different salamanders known to exist in the vicinity of Los Angeles. They were: *Diemyctylus torosus,* commonly known as the "Water-dog." *Autodax lugubris, Plethodon oregonensis,* and *Batrachoseps attenuatus.*

The "Water-dogs" were plentiful and included young without gills and adults of full size. Altogether there were about twenty of them which lived in and about the pool.

One *Autodax lugubris* lay coiled between the damp boards, beneath which a pretty specimen of *Plethodon oregonensis* lay on a wet rock near the water's edge. At one side, on damp earth beneath a rock, hid a *Batrachoseps attenuatus.* The three salamanders last mentioned were all adult.

This is the second specimen of *Plethodon oregonensis* that has come under my observation during the last three years. This is the first time I have known of the four Los Angeles Salamanders having been found in one place or even in one day.

A few weeks later, a visit in hotter and dryer weather showed only "Water-dogs," to be in evidence at the same place, although I had left the salamanders, boards and rocks as I had found them.

Paul Ruthling,
Los Angeles, California.

LIST OF REPTILES AND AMPHIBIANS FROM CLARK COUNTY, VA.

I spent August 2-14, 1915, on the Shenandoah River at White Horse, two miles above Berry's Fer-

ry in Clark County, Virginia, at an altitude of 500-900 feet. The following species were observed.

Plethodon glutinosus (Green). One specimen under a log. *Spelerpes bislineatus* (Green). A few adults, many transforming larvae, and a few young larvae. *Spelerpes longicaudus* (Green). 4 adults and 3 larvae. *Spelerpes ruber* (Daudin). 2 one-year-old larvae. *Desmognathus fusca* (Rafinesque). *Bufo americanus* Holbrook. *Hyla versicolor* LeConte. None were seen but they could be heard each night in the trees. *Acris gryllus crepitans* (Baird). *Rana catesbeiana* Shaw. *Rana clamata* Daudin. *Rana palustris* LeConte. *Sceloporus undulatus* (Latreille). Not common, only one seen. *Thamnophis sauritus* (Linnaeus). 1. *Natrix septemvittata* (Say). 1. *Natrix sipedon* (Linnaeus). 6. *Lampropeltis triangulus* (Boie). 1, about a yard long. The blotches were dark red and reached the second scale row. *Diadophis punctatus* (Linnaeus). 2. *Virginia valeriae* Baird and Girard. 1. *Bascanion constrictor* (Linnaeus). 3. *Elaphe obsoletus* (Say). 2. *Ancistrodon contortrix* (Linnaeus). 6. They hid all day in the rock slides on the mountains and came out at night. Specimens were caught passing through the camp after dusk. *Crotalus horridus* Linnaeus. 1, caught swimming the river. *Chelydra serpentina* (Linnaeus). *Pseudemys rubriventris* (LeConte)? A large river terrapin which was not caught is referred to this species. *Terrapene carolina* (Linnaeus).

E. R. Dunn,
Haverford College.

CHLORETONE, A KILLING AGENT

For some time I have been using chloretone as a killing agent for batrachians and reptiles, and it seems to be in a measure superior to either chloroform or ether. In use the animal is simply dropped into a 1% solution, and no more uneasiness appears than when the same individual is immersed in pure

water. Aquatic forms behave in a natural way, and terrestrial animals do no more than struggle to get out. All die without contorted muscles or an abnormal amount of glandular excretions. Toads, frogs and salamanders usually succumb in 5 or 10 minutes, but reptiles survive longer, occasionally a half hour or more after submersion. Chloretone is especially useful in killing such snakes, *Charina* for example, as are apt to die under chloroform with the muscles in a state of extreme contraction, the body then presenting a knotted and crooked appearance. A solution will keep for years in a closed vessel, requiring only the occasional addition of a few crystals of the drug, and filtering to remove accumulated matter.

Chloretone is not recommended as being equal to alcohol in killing fishes for the reason that the latter acts quickly and serves at the same time as a fixing agent of the tissue of the scale pockets.

J. O. Snyder,
Stanford University, Calif.

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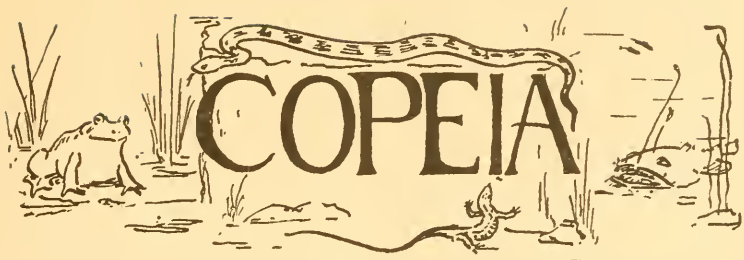

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BORNEO PERIOPHTHALMUS.

Travelling on the main branch of the delta of the Rejang River, northwest coast of Borneo, half way between the mouth of the river and the island of Sibu, which is at the beginning of the delta, July 17, 1912, at ten o'clock A. M., we reached the village of "Billitong" where we tied up to let the tide go down, which it did like a race-horse, while we slept. I purchased five cents worth of sugar at a Chinese store here and got some children to catch me nine or ten mudfishes or Periophthalmus at one cent each.

The falling tide had exposed perhaps 60 feet of mud-flat at the edge of the river. At the shoreward part of the flat among logs and sticks there were many Periophthalmus. Some were on the logs, others on the mud, others more or less hidden in the mud or pools of water left by the tide. When pursued they would run over the surface of the mud, sometimes sinking in so as to impede their progress. The fishes were very agile and slippery and the boys, floundering around in the mud, had great difficulty in catching them in their hands. The fishes seemed to have no definite idea of seeking safety in the river.

D. D. Streeter,
Brooklyn, N. Y.

[Mr. Streeter has presented to the American Museum of Natural History ten small gobioid fishes

obtained at this time bearing his field numbers 1159 to 1168. Six of these are *Periophthalmus* (*Periophthalmodon*) *schlosseri,* two *Boleophthalmus boddaerti,* and two *Apocryptes borneensis.* Of the first named species one about two inches long has the spinous dorsal wanting; in two of the same size it is about XV; in one about two and a half inches long XV, with the first spinous ray noticeably produced; in two about three and a half inches XIII and XVI, the first spinous ray filamentous a distance equal to two-thirds of the head or more. The *Boleophthalmus* have about seven narrow oblique imperfect dark bands on the body, best defined posteriorly and dorsally, and conspicuous pale bluish spots on the body and dorsal fins.—*Ed.*]

FISH AS OWL FOOD.

On March 28, 1915, three horned owls (*Bubo virginianus virginianus*) were hatched near East Patchogue, N. Y. Two of the young survived and I observed them until their flight. Their chief food was rabbits and yellow perch (*Perca flavescens*), with an occasional mouse and gray squirrel. The perch were spawning in a neighboring pond, and large schools of the fish in a sluggish state were collected in shallow water along the banks where the old owls could readily capture them. Great quantities of the scales in the nest, with an occasional fin, together with the strong fishy odor of the nest, left no doubt as to the identity of the fish.

Frank Overton,
Patchogue, N. Y.

AN EXTENSION OF THE RECORDED RANGE OF THREE SPECIES OF FISHS IN NEW ENGLAND WATERS.

Scoliodon terrae-novae (Richardson). Of the range of this species, Garman, in The Plagiostomia

(Memoirs Museum Comparative Zoology, Vol. XXXVI, 1913, p 115) says: "Labrador to Brazil." Kendall, in Fauna of New England, List of Pisces (Occasional Papers Boston Soc. Nat. Hist., Vol. VII, 1908) and Sumner, Osburn and Cole, in a Biological Survey of the waters of Woods Hole and vicinity, Sec. III,—A Catalogue of Marine Fauna (Bull. Bur. Fish., Vol. XXXI, Part II, 1913) do not list this species. The species appears to be not uncommon at Woods Hole. Several examples were taken at this place during the summer of 1915, and an example is in the museum collection of the United States Fisheries Laboratory.

Tarpon atlanticus (Cuvier & Valenciennes). Although this species strays as far north as the southern coast of Cape Cod, Mass., being taken at South Dartmouth nearly every year, and occasionally in the vicinity of Woods Hole, the writer knows of no record for more northern points. On July 25, 1915, a tarpon about 5½ feet in length was taken at Provincetown, Mass.

Harengula sardina Poey. Of the range of this species, Jordan & Evermann, in Fishes of North and Middle America (Bull. 47, U. S. N. M., 1896, p. 430) say: "West Indian fauna; abundant; north to Key West." In the collections of the United States Fisheries Marine Biological Laboratory at Woods Hole are several examples of this species about 3 inches in length which, according to the label, were taken at Woods Hole, Mass., October 10, 1886.

Lewis Radcliffe,
U. S. Bureau of Fisheries.

OCCURRENCE OF THE CROAKER IN NEW YORK HARBOR.

During the past season the Croaker (*Micropogon undulatus*) was taken much more plentifully than in most years in New York Harbor.

Writing of this species in *Fishes of North Carolina,* Smith says: "While it is occasionally taken as far north as Massachusetts, it is not ordinarily numerous north of Chesapeake Bay." In *Fishes within Fifty Miles of New York City,* 1913, the writer listed it as "Rare September." It appears that the information at his command at the time was imperfect and that the Croaker occurs in New York Harbor with sufficient regularity to be known to local anglers, and to give the name of "Croaker Grounds" to Flynns Knoll a couple of miles towards Staten Island from Sandy Hook. At times they are caught at Huguenot, about two miles off shore at Can Buoy No. 3.

According to Messrs. Andrew Johnstone and P. McCabe the fish occurred this year in much greater numbers than usual, so that four men in four hours' fishing from one boat took as many as 120 individuals. According to the same gentlemen the Croaker was present in late July, August and a part of September, 1915; they were taken at the bottom with shedder-crab and white-worm bait, also with parts of Spots (*Leiostomus*), pieces of Weakfish and clams. They ran from 1½ to 4 lbs. in weight and 12 to 16 inches in length, or about the same size as "school" Weakfish, and resembled Weakfish in habits, taking the hook in the same vigorous manner; so that some of the less well-informed fishermen did not distinguish them from Weakfish.

J. T. Nichols,
New York, N. Y.

AQUATIC HABITS OF THE BOX TURTLE

The Box Turtle (*Cistudo carolina*) of the middle section of Long Island has a habit of partly burying itself in the moist sand or mud along the edges of ponds on hot days. Specimens are frequently seen swimming in the water, or resting in the shallows with only the head protruding above the surface. When alarmed, the turtles often leave the land

and enter the water voluntarily. They usually swim beneath the surface, but come up readily to breathe and to take observations. They seem to be familiar with the water, and in their ease and rapidity of swimming they compare favorably with the pond turtle (*Chrysemys picta*).

On July 31, 1910, I took a photograph of nine box turtles in a group in the edge of a pond at Middle Island, where they had lain for hours. On August 15, 1915, I photographed one at the same pond nearly submerged in the water at the end of a log, and four others were in sight partly buried in the mud. I have never failed to find the turtles in that pond in midsummer whenever I have looked for them.

The amphibious nature of the Long Island box turtle is so well known to the native inhabitants that records of the fact seem commonplace. But a note in the September COPEIA, and statements in many standard natural histories, render it worth while to record the aquatic habits of the species.

FRANK OVERTON,
Patchogue, N. Y.

A NOTE ON TWO INTERESTING NEW JERSEY AMPHIBIANS.

For several summers past trips to Lakehurst, N. J., in search of the Sphagnum Frog, *Rana virgatipes* Cope, and Anderson's Hyla, *Hyla andersoni* Baird, have afforded some pleasant outings for my brother, F. K. Barbour, and myself. We have usually left our home at Rumson, N. J., in a machine, and reached Lakehurst in something less than two hours. The afternoons we have usually spent in wandering about the sphagnum bogs and along the cold spring branches which run into the lake, searching for the sphagnum frogs, which we have found at times in considerable numbers. Our observations have con-

firmed those of Davis and of other observers who have recorded their shy ways and strictly aquatic habits. I think our familiarity with *Rana gryllio,* the big frog found swimming among the "bonnets" in some of the Florida lakes, has made this frog's relationship to the New Jersey sphagnum frog seem doubly striking, for their coloration in life is astonishingly similar, and in fact one seems to be but a miniature representative of the other. At dusk we have usually taken our supper, and then waited for darkness to come on and for the Hylas to begin to sing, we have had good luck taking Hylas by the following method: One of us with an electric flashlight would start for the nearest singing Hyla, while the other usually waited some distance away. As soon as the Hyla stopped singing, the person who was not trying to approach would imitate the call of the frog, and this would start it singing again vigorously, and while it was singing the collector bearing the light would approach as quickly as possible, standing still as soon as the singing ceased. This process was kept up until finally the light flashed on the vibrating white throat of the singing Hyla, and its capture then became a perfectly simple matter, as they stared stupidly at the brilliant light.

Up to this year I have known nothing regarding the breeding habits or the time of egg-laying of these Hylas, but have assumed that it was in May, as Davis reported them singing very plentifully at that time. This year, however, we did not get down to Lakehurst until the 8th of July, when we found the Hylas singing in goodly numbers in the white cedars about the lake. After capturing a number of singing males (I had never taken a female before), my light flashed by the merest chance upon a pair of Hylas sitting well up in a pine tree, in embrace. This, and another taken in a similar situation, were the only females secured, although we took several males from the low oak scrub about a small fresh water pool in the pine

barrens. All of our catch was placed in a large-mouthed jar and brought home to Rumson alive. The next morning a number of gelatinous egg masses were found in the bottom of the jar. Since they were pretty well smashed up from the struggles which the Hylas made trying to escape, it was impossible to distinguish whether the egg masses were laid in a characteristic form. We were both much surprised to find these eggs, as we had not supposed that this Hyla laid so late in the year; yet we had always wondered why such a large number of individuals kept on singing so vigorously until at least the 20th of July. I might add that the singing begins with dark, though an occasional voice may be heard upon a lowery afternoon, and the greatest concert takes place before ten o'clock. At about this time the number of singing individuals is noticeably less.

THOMAS BARBOUR,
Cambridge, Mass.

AN UNUSUALLY LARGE PINE SNAKE, FROM NEW JERSEY.

The Brooklyn Museum has received recently as a gift from Mr. R. P. Dow, the skin of a Pine Snake, *Pityophis melanoleucus,* Daudin which on account of its unusually large size deserves to be placed on record. The snake was killed several years ago, on the estate of the late J. Turner Brakeley, Lakaway Plantation, Hornerstown, N. J., and at the time of capture was said to have measured seven feet, four inches. Actual measurement shows a total length of six feet and nine inches, but it is possible that on account of mutilation in the killing, part of the skin was rendered useless, for the head and neck, for a length of eight inches, have been preserved separately.

Together with the skin the Museum has received also an egg, intact and in perfect preservation, which is said to have been removed from the intestinal tract

of the reptile. The egg, undoubtedly, is that of a Ruffed Grouse.

GEORGE P. ENGELHARDT,
Brooklyn, N. Y.

Edited by J. T. NICHOLS, American Museum of Natural History

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SEASONAL ANNOTATIONS ON TWO LONG ISLAND FISHES

In *Fishes Within Fifty Miles of New York City,* 1913 (Nichols. Proc. Linn. Soc. of N. Y., Nos. 20-23). *Raja eglanteria* is listed as occurring in "September"; and *Zoarces anguillaris* in "Fall and winter," with one indefinite August record. The following local data concerning these species in summer is then an addition to the writer's knowledge of their seasonal occurrence.

Raja eglanteria (Clear-nosed Skate).—Probably a not uncommon summer resident near New York and along the entire southern shore of Long Island. Long Island dates available are from June 14 (Moriches Beach) to October 2 (Easthampton). A specimen was taken at Cholera Bank (situated about ten sea miles off Long Beach), July 15, 1915, and presented to the American Museum of Natural History by Mr. Edward E. Wrissenberg, its collector. A fairly fresh specimen was found dead on Moriches Beach by the writer June 14, 1914. Mr. Wm. T. Helmuth writes me concerning the occurrence of the species near Easthampton in 1914 and 1915 as follows:

"The first record that I can give positively is July 26, 1914, when four were taken in a 'fish-trap' in Gardiner's Bay. Several were caught at every haul

thereafter, until the second of October, becoming most abundant during the first week of September and the last week of August. Their numbers did not diminish very noticeably during the remainder of the summer. In 1915 this species were found throughout the summer, beginning with the middle of July. One, also in late June."

Zoarces anguillaris (Eel Pout, "Conger Eel"). —I have a letter from Mr. Louis Wahl stating that this species was caught in 1915 throughout the year at the different fishing grounds off New York and that in June they were taken especially plentifully at Cholera Bank. Mr. Wahl seems perfectly familiar with *Zoarces,* which cannot readily be confused with any other fish, and I am convinced of the accuracy of the indentification. The name "Conger Eel," however unfortunate its misapplication to *Zoarces,* is too firmly established for this fish among local fishermen to be ignored.

J. T. Nichols,
New York, N. Y.

NOTES ON NEW JERSEY FISHES, SEVERAL NEW TO THE STATE

Cypsilurus nigricans (Bennett). Head, 3⅞; D. I, 14; A. I, 9; scales, 48 in lateral line; 30 predorsal scales; 8 scales above l.l. to dorsal origin; snout, 3½ in head from upper jaw tip; eye, 3-2/5; maxillary, 4-1/5; interorbital, 2½. Head wide above. Snout length half its width. Maxillary not quite to eye. Narrow band of fine conic teeth in each jaw. Lower jaw projects. Interorbital broadly concave. Rakers, 5+16; lanceolate, short. Back dusky, neutral tint with violet reflections. Head above similar, with distinct violet streak from upper hind eye edge to pectoral origin. Sides of head brilliant silvery-white, soiled or tinged dusky on trunk. Violet reflections conspicuous at caudal base and at ventral axilla. Iris

brilliant violet. Lips dusky. Dorsal largely jet-black, paler or soiled dusky-gray in front. Upper caudal lobe white, base blackish, lower lobe entirely jet-black. Pectoral largely black, axil with violet tinge, only lower edge and median portion of lower rays gray-white or whitish. Ventrals with outer ⅔ jet-black, outer and inner edges of fin whitish, median rays basally gray and this shade extends to black terminal blotch. Anal white, hinder outer terminal part black. One example, 172 mm. long, found on the beach in a tide-pool at Sea Isle City, September 14, 1915, by Master Edward N. Fox. This interesting fish had evidently been left stranded by the tide, and was alive when discovered. It had one pectoral fin extended in making an effort to escape, suddenly flying out of the pool and dropping helplessly on the sand a few rods distant. It is the first example ever recorded from the limits of the United States, and also an addition to the fauna of New Jersey. It is a well-marked species, readily distinguished by its blackish color and the white half of the high dorsal. At the same locality *Centropristis striatus, Chaetodipterus faber, Orthopristis chrysopterus* and *Leiostomus xanthurus* were also noted. At Ocean City a female *Dasyatis say* with two young, one *Rhinoptera bonasus,* July 7, and three on September 15, an adult *Istiophorus nigricans,* August 20, *Trachinotus carolinus,* eight *Coryphaena hippurus,* September 22, *Tautoga onitis,* and many large *Alutera schoepfii,* July 4, several of which bright golden-yellow. During August at Anglesea, *Euthynnus thynnus* of 1,080 lbs. weight, *Hemitripterus americanus, Sphyrna zygaena, Stenotomus chrysops, Balistes carolinensis* and *Prionotus evolans strigatus.* A few *Chaetodipterus faber* at Atlantic City and on September 25, a large *Lagocephalus laevigatus.* Two examples of *Epinephelus niveatus* are the first to be reported from New Jersey waters. Mr. W. J. Fox secured one 105 mm. long September 26, at Sea Isle City, and Dr. R. J. Phil-

lips, one 115 mm. long, September 29, at Corson's Inlet. Color largely deep dusky-brown with seven vertical rows of pale sky-blue round spots, caudal yellowish and pectorals pale. Both examples were angled on lines. May 15, I noted *Mustelus canis, Raja erinacea, R. ocellata, R. eglanteria, Pomolobus mediocris, Cynoscion regalis, Bairdiella chrysura, Spheroides maculatus, Paralichthys dentatus,* and *Achirus fasciatus* at Cape May Point.

In early September Messrs. S. N. Rhoads and J. R. Lippincott accompanied me on a trip to various streams in Salem County. In Salem Creek, at Daretown, we found: *Ameiurus nebulosus, Abramis crysoleucas, Erimyzon sucetta oblongus, Esox americanus, Fundulus diaphanus, Pomotis gibbosus* and *Perca americana.* In Alloway Creek, at Alloway: *Ameiurus nebulosus, Schilbeodes gyrinus, Abramis crysoleucas, Erimyzon, Esox americanus, E. reticulatus, Umbra pygmaea, Fundulus diaphanus, Aphredoderus sayanus, Pomotis, Boleosoma nigrum olmstedi, Morone americana* and *Achirus fasciatus;* Delaware River at Oakwood Beach; *Anchovia mitchilli, Fundulus heteroclitus macrolepidotus, Menidia menidia notata, Bairdiella chrysura, Pogonias cromis* and *Achirus fasciatus.* In Salem Creek at Sharptown: *Cyprinus carpio, Abramis, Notropis cornutus, Erimyzon, Ameiurus nebulosus, Anguilla rostrata, Esox reticulatus* and *Pomotis gibbosus.* In Game Creek: *Abramis, Pomotis* and *Micropterus salmoides.* Delaware River beach at Oldmans Point: *Alosa sapidissima, Dorosoma cepedianum, Anchovia mitchilli, Hybognathus nuchalis regius, Fundulus heteroclitus macrolepidotus, F. diaphanus, Pomotis, Roccus lineatus* and *Morone americana.* In the mill-pond at Swedesboro: *Abramis, Notropis whipplii analostanus, Lepomis auritus, Pomotis gibbosus* and *Micropterus salmoides.*

Henry W. Fowler,
Philadelphia, Pa.

THE PRESENT STATUS AND BREEDING SEASON OF THE GIANT TOAD (*BUFO AGUA*) IN BARBADOS, ST. VINCENT, TRINIDAD AND DEMERARA.*

Not long ago a question arose regarding the present status, and breeding season, of the Giant Toad (*Bufo agua*) in certain of the West Indian colonies, and in order to secure definite data on the subject I wrote to Barbados, St. Vincent, Trinidad and Demerara (British Guiana), receiving the following replies:

Barbados.—No mention of the occurrence of this toad (known locally as the "crapaud") is made either by Ligon (1673) or Hughes (1750). Schomburg in his "History of Barbados," published in 1848, includes it in his list of reptiles on page 679, with the following note: "I have been assured that this species, which is so common in Demerara, was introduced from there about fifteen years ago [i.e., about 1833]."

It is not known exactly when it was introduced into Antigua. It is now very common both on Barbados and Antigua, though on both islands it has become less numerous in recent years, owing probably to the introduction of the mongoose, which seems to prey upon the toad when pressed by hunger.

It certainly lays its eggs at least twice a year. In August last year (1914) ponds in Barbados were full of tadpoles, and again in February this year (1915) the same thing was noticed. (Extract from a letter from Dr. Francis Watts, C.M.G., Imperial Commissioner of Agriculture for the West Indies, Bridgetown, Barbados.)

St. Vincent.—The large toad (*Bufo agua*) seems to be quite extinct here. I hear old people speak of them, but I fancy the mongoose must have

*Published with the Permission of the Secretary of the Smithsonian Institution.

wiped them out. (Extract from a letter from Mr. W. N. Sands, Agricultural Superintendent, St. Vincent.)

Trinidad.—Toads are plentiful, and about in the wet season, breeding then. The wet season has been very irregular lately. August-October is given as the most likely time for securing material of the young stages. (Information given in a letter from Mr. F. W. Urich, Entomologist to the Board of Agriculture, Trinidad.)

Demerara.—*Bufo agua* is extraordinarily common here and appears to breed about the commencement of the wet season, somewhere in November or thereabouts. (Extract from a letter from Mr. Gilbert E. Bodkin, Government Economic Biologist, Georgetown, Demerara.)

AUSTIN H. CLARK,
Washington, D. C.

ON THE PROBABLE ORIGIN OF THE TYPE SPECIMEN OF COPE'S XANTUSIA PICTA.

There can, I think, be no doubt that Cope's *Xantusia picta* is the same species as Stejneger's *Xantusia henshawi.* Cope, however, stated that the type of *X. picta* was from Tejon Pass, California, a locality situated much to the north of the known range of *X. henshawi.* I shall attempt to show that it is almost certain that Cope's type specimen really was collected at Poway, San Diego County, California, not very far from the type locality of Stejneger's species. The evidence, although circumstantial, seems clear. It is as follows:

1.—The type of *Xantusia picta* was sent to Cope by Mr. Rivers, who previously had sent Cope the type of *Xantusia riversiana,* and who was in charge of the natural history collections belonging to the University of California.

2.—In the early days of California museums the custom was to label specimens not with the exact locality of origin, but rather with the published habitat or range of the species.

3.—A short time after Stejneger described *Xantusia henshawi,* I visited the type locality, at Witch Creek, and obtained three specimens. Some time later Rivers, on seeing these specimens in my office, said:

"I see you have *Xantusia vigilis.* I sent a specimen to Professor Cope."

4.—Some years later Dr. Frank E. Blaisdell gave me a bottle containing several specimens of *Xantusia henshawi,* collected by himself at Poway, San Diego County, California. These he had labeled *Xantusia vigilis* and upon my asking where he had gotten that name for them, he said from Mr. Rivers to whom he had given one of the same lot of specimens a long time before.

It therefore seems almost certain that the type of *Xantusia picta* was collected by Dr. Blaisdell at Poway, San Diego, County, California; that it was sent by Dr. Blaisdell to Mr. Rivers; that it was wrongly identified by Mr. Rivers as *Xantusia vigilis* and labeled with the habitat of that species; and that Cope was thus led into error regarding the type locality of his supposed new species, *Xantusia picta.*

JOHN VAN DENBURGH,
San Francisco, Cal.

A NOTE ON REPTILE COLLECTING.

Where reptiles are plentiful they are usually collected by means of a shotgun. One of the best that I have found for the purpose is built like a pistol, has 2 eighteen-inch, 22 and 44 gage barrels, and uses machine loaded cartridges with fine shot.

It will be found advantageous to carry specimens in a bag with a little corn meal or dry sand. On reaching camp they should be placed in water and left until all blood and foreign matter have soaked loose, when they should be washed and carefully spread out in a pan containing a quantity of 50% alcohol with which about one-twentieth of its bulk of formalin has been mixed. During the first few hours the specimens may be frequently turned over, and fresh fluid injected through abdominal incisions previously made. One incision is usually sufficient for a lizard, but several are necessary for a snake, and one should invariably be made in the tail just posterior to the anal opening. In one or two days the material with the possible exception of certain snakes is sufficiently cured to be closely packed with fresh formalin (about 2%) in glass fruit jars or small metal cases. Fine excelsior placed between specimens will prevent rubbing, assist in keeping them moist if the container should leak, and moreover things packed thus will not arrive at the museum distorted and broken as sometimes happens when they are wrapped with cloth.

Formalin is recommended only as a temporary preservative, and it should not touch specimens intended for osteological study. In all cases they should be removed from it as soon as possible. It is almost indispensable, however, in field work when one must go lightly equipped.

J. O. Snyder,
Stanford University.

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A RECORD OF THE BERMUDA CHUB (KYPHOSUS) FROM LONG ISLAND, NEW YORK.

A Bermuda Chub (*Kyphosus sectatrix*) was taken November 2, 1915, at Orient, Long Island, in Long Island Sound. It was 10 inches long, 3 inches deep, 1 inch thick in widest part near the head. The specimen has been identified by the Department of Fishes of the American Museum of Natural History, New York, from a photograph taken of it at the time of capture.

I have been about pound-fishing for over twenty years on the east end of Long Island, and this is the first specimen of this species that I have seen.

Roy Latham,
Orient, N. Y.

AQUARIUM CULTURE OF TRICHOGASTER LALIUS.

Of all the Labyrinth-fish so far known in this country not one has been such a general favorite as *Trichogaster lalius,* commonly called Dwarf Gurami. Seldom more than two inches in length, this little beauty, which was first imported from India into Europe in 1903, has, through its interesting habits in breeding and general graceful bearing, quickly found many friends in the Aquarium world. At first ex-

tremely shy, and hiding itself away at the slightest disturbance, with proper care it soon becomes tame. It is interesting to see them go up to any new stone or other object which has been placed in the aquarium and examine it with their feelers.

The principle color extending over the body of the male, excepting the fins and tail, is steel blue, with irregular orange zigzag bands running vertically. The fins and tail (except the pectoral fins) are orange, mottled with a great number of red spots the size of a pin-head, the edges of the fins are blue with bright red tips. During the mating and breeding seasons these already bright colors are greatly intensified. The pale orange becomes redder and the blue throat a most brilliant dark steel blue.

The nest-building habits are somewhat different from those of the other fish of this family. Whereas Paradise fish, and other Guramis, Fighting-fish, etc., make their nest entirely of air bubbles, Lalius utilizes small pieces of plants, roots, algae, etc., to form a somewhat dome-shaped structure which projects above the surface and is about two inches in diameter. Under this he builds his bubble nest. The completion of his nest will take him about a day, and there is not a second of rest or inactivity during this process. One minute one may see him tearing on a decomposed plant leaf and carrying the pieces so gotten to the spot chosen for the nest where they are thrown into a compact mass on the surface of the water, the next minute he may be seen chasing his perhaps too inquisitive and eager mate around the tank, punishing her with plainly heard whacks, until she retires to her undisputed hiding place. It is not obvious how the sound, something like that from snapping ones fingers, is produced. Or he may be at the surface of the water taking in air so that one might think he were trying to fill his whole body. After getting his supply he retires under the nest and fills the whole inside of the fibrous mass with small air bubbles.

After its completion he tries to induce the female to come under the nest. In many cases he can get her there only after a wild chase around the tank, but very often the female after watching the male finish his task in building the nest comes without urging to deliver her eggs. Now the male, resplendent in his most gorgeous colors, all atremble, after circling around her a few times, folds or bends himself around her body, at the same time turning her on her back, and then the hardly visible eggs are expurged, fertilized, and rise into and between the bubbles of the nest.

Hatching takes place, according to the temperature, in from 12 to 40 hours. The newly hatched fish are hardly visible. They are only discernible when they move, their eyes being practically the only things noticeable, as their bodies are perfectly clear and not distinguishable from the water. It is always advisable to remove the female immediately after the eggs are safely in the nest, as she is liable to dart up and eat them before her watchful mate can prevent her. As with all Labyrinth fish the male takes care of the eggs and young until the latter are able to leave the nest, and then he, too, should be taken out of the tank.

In order to be successful in raising the young ones, an even temperature of the water of at least 70° is absolutely necessary. It should not be more than three inches deep and there should be plenty of algae and plants such as *Salvinia, Riccia,* where the youngsters can find their food and a place to hide. In artificial feeding great care has to be taken not to feed too much, as any food left to decay will cause untold trouble. In giving live food such as small *Daphnia* or *Cyclops,* it is imperative to strain these through a very fine hair sieve, as the most minute only are fit for the young fish. Should any of the big ones get into the tank, they will in a few days time destroy and eat the fish. One of the worst enemies

which are liable to infest the tank when feeding live food are hydras, which in a very short time will destroy a whole brood, and it is very difficult to rid a tank of this pest.

Lalius will breed three or four and even more times during a season, the first broods always being more numerous and stronger than the later ones, but it is good policy not to let the fish breed too often, as the drain on their vitality may be too much and prove fatal.

RICHARD DORN,
Upper Montclair, N. J.

AMBLYSTOMA TIGRINUM ON LONG ISLAND, I.

After many years of futile search for *Amblystoma tigrinum* on Long Island, the past season has been unexpectedly productive in furnishing records of both adults and larvae of this species.

Records of Adults.

"Rancocas," the first and apparently specific record by William L. Sherwood (Linn. Soc. 1894-95, No. 7), is a misprint as no such place exists on Long Island. Mr. Sherwood admits this, yet in reasserting the occurrence of the species he prefers to withhold the right name of the station, fearing extermination.

Patchogue, 1 specimen from salt marshes near Swan Creek, identified from photograph by Dr. Frank Overton, who reports its capture "some years ago."

Syosset, November, 1914. 1 Specimen 8¼ inches, found near drain, cement basement, 1 Hudson Estate. Sent to N. Y. Zool. Park and is still living.

Yaphank, August 24, 1915. 1 specimen 8⅛ inches found in cellar, A. C. Weeks. Presented to Brooklyn Museum. Still living.

Shoreham, September 24, 1915. 2 specimens from an old well. Sent to Brooklyn Museum. One 7½ inches long is still living, the other, about same size, escaped.

Jamaica (Hill Section). 1 specimen about 7 inches long shown by Hermann Rabenau at Brooklyn Aquarium Society Exhibition, Brooklyn Museum, October, 1915.

Middle Island, October 10, 1915. Dr. Frank Overton, 1 specimen sent to American Museum of Natural History.

All the Long Island specimens examined vary but little in color pattern, which shows numerous irregular, olivaceous blotches, forming more or less connected bands at the sides and on the tail. The ground color is dull black above and lead-color below. The under-side of the head is olive-yellow. Of four living specimens now at hand, two males and two females, the latter are marked with blotches decidedly more olive-yellow than those of the males.

Search for adults under logs, stones, etc., in regions where they are known to occur failed so far. Apparently they have the habit of wandering considerable distances from their breeding places, hiding during the day in deep burrows, stone walls, drains, etc. The foreman of the I. Hudson Estate near Syosset told the author that a number of specimens are found nearly every year about the stables or under rubbish heaps. He also mentioned the reluctance of some of the workmen to clean the catch-basins because "there's lizards in 'em."

Captive specimens have been fed principally earthworms and also on tadpoles, small fishes, and caterpillars. They are voracious and omnivorous feeders. When hungry they will snap at a finger or anything held dangling before their mouths. Earthworms are shaken vigorously bull dog fashion, between gulps, until swallowed. The Museum speci-

mens, kept in a glass vivarium with wet, pebbly bottom and rock-shelter, have remained active throughout the winter, feeding freely, and molting, on the average, every ten days. The cast-off skins are very delicate, usually in the shape of a slimy ball. During the day the salamanders remain under the rock-shelter, but at night they prowl about with considerable agility.

GEORGE P. ENGELHARDT,
Brooklyn, N. Y.

NOTES ON VIRGINIA HERPETOLOGY.

On November 25-28 I collected at Midway, Nelson Co., Va. (see COPEIA 18), and offer the following notes on late activity and additions to the previous list. The day temperature was exceptionally warm for the season, though it was below freezing every night.

Sceloporus undulatus (Latreille). One on a fence, November 27.

Acris gryllus crepitans (Baird). One in a swamp, November 28.

Rana clamata Daudin. One in a spring, November 26.

Desmognathus fusca (Raf.). 16 adults and 17 larvae.

Plethodon erythronotus (Green). 4 adults and 1 young.

Spelerpes bislineatus (Green). 4 adults and 2 larvae.

Spelerpes ruber (Daudin). 2 first year and 2 second year larvae.

Gyrinophilus porphyriticus (Green). One adult female. This was quite a surprise to me as the fauna is Carolinian and the altitude is 500 feet. This, so far as I can find out, is the second Virginian record

for this species, the other one was collected by Baird and is in the National Museum. The locality given as the "upper James River."

Notopthalmus viridescens (Raf.). 5 adult males.

E. R. Dunn,
Haverford College, Pa.

NOTE ON AMBLYSTOMA OPACUM, GRAV.

On September 25, 1913, the writer, with Mr. John Toomey, of the Reptile House Staff at Bronx Park, went to Silver Lake, near White Plains, N. Y., to collect Insects and Amphibia. The weather had been warm and dry for some time and all the pools in the woods were completely dried up. In about the center of one of these dried up pools Mr. Toomey, having lifted one of the many large slabs of bark partially buried among dead leaves, discovered an adult marbled Salamander, *Amblystoma opacum*, coiled around a quantity of gelatinous balls. Upon examination by the writer these were found to be eggs containing living embryos. The eggs were lying in a slight depression, the debris under the slab of bark being fairly damp. On searching further, another female with eggs was discovered, under similar conditions.

The eggs were about 3/16 of an inch in diameter, and not connected with one another in any way. They were covered with small particles of soil and desiccated leaves which adhered to the sticky gelatinous envelope. The eggs were kept in some of the debris in which they were found. On September 27, one batch was placed in a shallow pan of water, where they hatched on September 28.

The larvae were ⅝ of an inch in length, very slender and delicate, translucent and pale gray in color. The gills were very long and the delicate front

legs were fully developed. The second batch of eggs was kept in the damp debris until October 18, when these, too, were placed in water, where they hatched October 19. The writer fed the larvae on small fresh water crustaceans, which they could be observed snapping up with quick forward darts. Unfortunately these interesting larvae succumbed to an unusually hot spell late in October, 1913. Although several trips were made to the same locality during the early fall of 1914 and 1915, no further batches of spawn and very few adults were discovered.

In April, 1915, however, the writer collected about a dozen larvae of this species from another pool, nearer the lake. These were nearly two inches long, black with tiny silvery specks all over the upper surfaces, large gills and four well-developed limbs. They were at first thought to be *A. punctatum,* but when in early June, 1915, they lost their gills, the color pattern consolidated into the typical cross-marbling of *A. opacum.*

In conclusion I will remark that I am not aware of the existence of any other record of Amphibian spawn being found in the fall, as far north as New York State.

Richard F. Deckert,
New York, N. Y.

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THE NOMENCLATURE OF AMERICAN FISHES AS AFFECTED BY THE OPINIONS OF THE INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE.

In the third International College of Zoology meeting at Leyden, Holland, in 1895, an International Commission on Zoological Nomenclature was appointed. At Cambridge in 1898, this Commission was made permanent, and the number increased from five to fifteen. At Berne in 1904, these were divided into three classes, each to serve for nine years. At Boston in 1907, provision was made for giving opinions on problems in zoological nomenclature by vote of the members of the Commission.

These opinions have been printed from time to time by the Smithsonian Institution. (Publications 1938, 1989, 2060, 2169, 2256, 2359.)

In the present paper I have tried to note the changes in nomenclature of American fishes since the publication of Jordan and Evermann's Fishes of North and Middle America (1898), (Bulletin 47 U. S. National Museum), as affected by these opinions.

Etheostoma Rafinesque

Type *Etheostoma blennioides* Rafinesque. The generic name *Etheostoma* should replace *Diplesion,* for *Etheostoma blennioides* (Rafinesque), while *Catonotus* Agassiz should replace *Etheostoma* as the generic or subgeneric name of the group typified by *Etheostoma flabellare* Rafinesque. If the genus is to be recognized in the broad sense adopted by Jordan and Evermann under the head of *Etheostoma,* the name *Pœcilichthys* must be taken instead of *Etheostoma, Etheostoma variatum* Kirt-

land being its type. It is probable, however, that several of the subgenera recognized by Jordan and Evermann should stand as valid genera. Among these are *Nanostoma*, Putnam; *Nothonotus*, Cope; *Torrentaria*, Jordan and Evermann; *Oligocephalus*, Girard; *Nivicola*, Jordan and Evermann; *Rafinesquiellus*, Jordan and Evermann; *Claricola*, Jordan and Evermann; and *Catonotus*, Agassiz.

Amia Gronow

In Opinion 20, it is decided that the generic names of Gronow (1763), with polynomial names for species, shall be accepted, their date being subsequent to that of the Tenth Edition of the Systæma Naturæ (Jan. 1, 1758). The case of Brisson (1760) in Birds (Opinion 37), is exactly parallel except that the names of Brisson have come into more general use than those of Gronow. *Amia* Gronow (1763) must displace *Amia* Linnæus (1766). *Amia* L. thus becomes *Amiatus* Rafinesque (1815), and the species becomes *Amiatus calvus*. *Amia* Gronow replaces *Apogon* Lacépède (1802), and the type species becomes *Amia imberbis*. *Cyclogaster* Gronow must replace *Liparis* (Artedi) Scopoli, 1777. The type species of both is *Cyclopterus liparis* L. *Collyodon* Gronow must replace *Scarus* Forskal (1775), *Scarus* Gronow (1763), being a *Labrus*. The type of *Callyodon* is *Scarus croicensis*, Bloch. *Enchelyopus* Gronow (1763) must replace *Zoarces*, Cuvier 1829, the type of each being *Blennius viviparus* L. *Hepatus* Gronow (1763) must replace *Teuthis* L. (1766) and *Acanthurus* Forskal, 1775, the type of each being *Teuthis hepatus* L. The accepted genera *Holocentrus*, *Pholis*, *Eleotris*, *Albula*, *Synodus*, *Umbra*, *Leptocephalus* and *Pteraclis* must date from Gronow (1763), not from later usage.

Ceratichthys Baird and Girard (Opinion 22)

The name *Ceratichthys* Baird and Girard, monotypic, being based on *Ceratichthys vigilax* Baird and Girard, must replace *Cliola* Girard (1856) based on the same species. *Ceratichthys* of Girard (1856) is synonymous with the earlier *Nocomis* of Girard. This decision conserves also the genus *Cymatogaster*, Gibbons (*C. aggregatus*).

In Opinions 23 and 24 the generic names *Cheilodipterus* Lacépède (vice *Aspro* Commerson) and *Antennarius* (Commerson) Lacépède vs. *Histrio* Fischer (1813) are conserved.

Opinion 25 conserving *Dameseila* Walcott (1905) notwithstanding the existence of *Damesiella* Tornquist 1899, applies equally to the genus *Dekaya* Cooper (1862) as against the prior *Dekayia* of Milne-Edwards and Haime (1851), a genus of corals. *Dekaya princeps* should therefore replace *Caulolatilus princeps,* as the name of the California "Blanquillo."

Opinion 26 confirms the view of Jordan and Evermann that *Cypsilurus* of Swainson is merely a misprint for *Cypselurus* which name should stand. It should be noted that *Exocœtus volitans* L. the type of *Exocœtus* is a species of the genus called *Halocypselus. Exocœtus* should therefore replace *Halocypselus* while the genus called *Exocœtus* by Jordan and Evermann becomes *Cypselurus.*

Opinion 29 regards *Pachynathus* Swainson (1839) as a misprint for *Pachygnathus.* It is in this form preoccupied by *Pachygnathus* 1834, a genus of spiders. The genus typified by *Balistes capistratus* Shaw, being thus left without a name may be called *Sufflamen* Jordan (new generic name). *Sufflamen* (impediment) is a word used by Professor Mitchill for the "trigger" of these "Trigger Fishes." The American species, common on the west coast of Mexico, is different from the true *Sufflamen capistratus* of the East Indies and may stand as *Sufflamen verres* (Gilbert and Starks).

In opinion 33 the generic name *Rutilus* Rafinesque is conserved for the type of *Cyprinus rutilus* L. Apparently, however, no American species are congeneric with this type nor with *Leucos* of Heckel. The species referred to *Rutilus* by Jordan and Evermann are placed in other genera as *Siphatoles* Cope and *Hesperoleucus* Snyder by Professor Snyder. *Myloleucus* Cope is a synonym of *Richardsonius* Girard.

Opinion 58 reverts to common usage from that of Jordan and Evermann. *Esox lucius* L. should stand as type of *Esox,* rejecting *Lucius* Rafinesque, and *Esox belone* L. is type of *Belone* Cuvier.

In like fashion opinion 45 decides that *Syngnathus acus* L. is the type of *Syngnathus* L. of which *Siphostoma* Rafinesque 1810 becomes a synonym.

In opinion 60, *Salmo irideus,* Gibbons (1885), the name of the Rainbow Trout is maintained as against the original misprinted or incorrect spelling *Salmo iridia.* Whether *Salmo gairdneri* Richardson (1836) is based on the same fish or on an imperfect example of

the red salmon (*Oncorhynchus nerka* Walbaum) is still uncertain.

In opinion 52, the names (*Semotilus*) *corporalis* (Mitchill) and (*Notropis*) *cornutus* (Mitchill) as used by Jordan and Evermann are conserved as against the specific names, *bullaris* and *megalops* given to the respective species by Rafinesque. Mitchill's first account (August, 1817) of each species is a brief notice, followed later (March, 1818), by an adequate description. Between these two dates (Dec., 1817) Rafinesque published descriptions. A brief notice if identifiable constitutes a description.

Opinion 54 confirms the genus *Phoxinus* and *Alburnus* as of Rafinesque (1820) not of Agassiz (1835).

Another opinion confirms the decision made by Jordan and Gilbert that the proper type of the genus *Pleuronectes* L. should be *Pleuronectes platessa* L, the type of *Plestessa* Cuvier, and that the proper type of *Sparus* L. should be *Sparus aurata* L. later type of *Aurata* Fleming and of *Chrysophrys* Cuv. and Val.

Under the accepted rules the generic name *Bodianus* Bloch 1790 (type *Bodianus bodianus* Bloch=*Labrus rufus* L.) must replace *Harpe* Lacépède (1902) with equivalent type. *B. bodianus* being of necessity the type of *Bodianus*, through tautonomy.

Opinion 40 with special note by Dr. Stejneger confirms *Salmo eriox* L. as the proper name of the Trout of western Europe, in place of *Salmo fario* and *Salmo trutta*.

Opinion 41, confirms the use of the generic name *Ablennes* instead of *Athlennes* (originally a slip of the pen), for the Gar-fish, *Ablennes hians*.

Opinion 44 confirms the use of *Leptocephalus*, a name applied to a larva, in place of the later *Conger*, applied to the adult.

Opinion 47 confirms *Carcharias taurus* Rafinesque as type of *Carcharias* Rafinesque, thus replacing *Odontaspis* Agassiz. On the same reasoning the type of *Galeus* Rafinesque becomes *Galeus mustelus* as *Galeus* replaces *Pleuracromylon*. This view diverges from common usage, although it accords with the view (unwillingly) taken by Jordan and Evermann. On a similar line of argument we must accept (also unwillingly) *Carapus* Rafinesque in place of *Fierasfer* Cuvier.

DAVID STARR JORDAN,
Stanford University.

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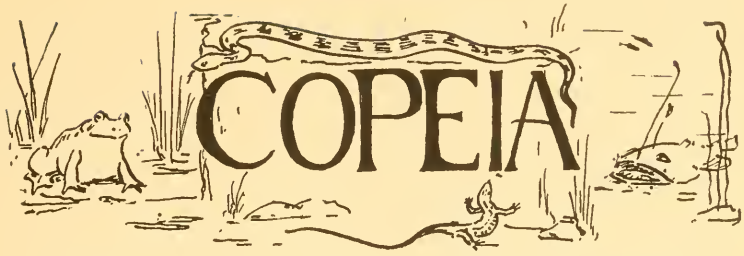

Published to advance the Science of cold-blooded vertebrates

A SECOND OCCURRENCE OF ERILEPIS IN AMERICAN WATERS

Although the giant bass-like fish, *Erilepis zonifer,* was described for the first time from Monterey Bay on the coast of California, it has never since been recorded from American waters, and it has come to be regarded as a stray from Japan, where it is of rather common occurrence, having been occasionally seen by Doctor Jordan and Professor Snyder in their explorations of Japan. It is of great interest, then, to find it, perhaps as a stray, in the waters of Alaska.

The writer had the good fortune to see the specimen in a frozen condition at Prince Rupert, just as it had been landed from one of the halibut schooners, the "Mallola." According to the members of the crew, it had been caught in Southeastern Alaska, in one of the long inland straits which form the "Inside Passage," either in Frederick Sound or Chatham Straits. There is no reason to doubt the fact that the fish came from that locality, as it could not have been imported from other regions, nor was the boat able to make distant trips. The winter had been a very bitter one up to that time, the last of January, and it may have been that changed conditions had led to the straying of this specimen from its usual habitat, or that the halibut fishermen had fished in unusual places.

The specimen was of a hundred pounds weight, eviscerated, but the length could not be taken at the time, although it was estimated as about four and a half or five feet. There were no points of difference in general appearance between it and the specimens from Japan and Monterey Bay, later examined, except in the absence of any dark bars on the body, which was a uniform dark color, save on the lighter ventral surface. The dorsal formula was XI, 16, that of the anal III, 14, in both fins the first spines being indistinct and buried. There were 126 series of scales along the lateral line, 31 longitudinal series above it, and 48 below. The head was contained about 3 or $3\frac{1}{2}$ times in the body length, but, as measurements had to be made very roughly with the hands, they are not of much value, and may be omitted, with the statement that they conformed in general to those of other specimens. The fish was caught on a hook on the halibut trawl lines, baited with herring, "at a depth of 150 fathoms."

Will F. Thompson,
Stanford University.

IS CYNOSCION NOTHUS AN ABNORMAL REGALIS

Cynoscion nothus (called locally "Silver trout") is occasionally caught at Cape Lookout, North Carolina, always singly and always associated with *Cynoscion regalis* (called locally "Grey Trout").

On each of the four occasions on which I have caught a fish identified as *nothus*, I have caught in the same set of the net a large number of *regalis* of exactly the same size.

Three of my *nothus* were adults and on each of those occasions they were caught in company with large numbers of *regalis* of the same size, but this feature came out with striking force when on one occasion while using the small net, I caught several

hundred small *regalis* about 3 inches long, one of which was identified by Mr. Barton A. Bean of the United States National Museum as *nothus*.

In no case have I found the body of my specimens of *nothus* more compressed than the bodies of *regalis* of the same size caught at the same time. There is great variation with age in *regalis,* and in order properly to compare *nothus* with it one must have specimens of the same size and condition of nutrition. Whenever I have made such comparison the color has been the only obvious difference between the two.

The only way that I can explain the remarkable correspondence in size, between specimens of *nothus* and *regalis* with which they are caught is by supposing them to have been spawned with the *regalis;* and as two species of fish cannot come from the same lot of spawn, I consider *nothus* simply an abnormally colored *regalis*.

Russell J. Coles,
Danville, Va.

LOUISIANA WATER THRUSH EATING FISH.

On April 2, 1916, a very early Louisiana Water Thrush (*Sciurus motacilla*) appeared in Central Park, New York City. It was remarkably tame, walking about the edges of some small ponds, and at one time going under a low bridge upon which several persons were standing. The most remarkable action on its part was to dart toward the surface of the water and seize a small fish perhaps an inch and a half in length. The bird did not swallow the fish whole, but pecked it bit by bit, probably consuming all of the flesh.

George E. Hix,
New York, N. Y.

AMBLYSTOMA TIGRINUM ON LONG ISLAND. II.

Records of Larvae.

Investigation concerning the larval stages of this species during the past season were restricted to one station, namely the I. Hudson Estate near Syosset, which comprises about 100 acres, situated in the hilly or moraine region of Long Island. With the highest elevation, about 200 feet on the western part of the estate, drainage is through the eastern part, where in meadow and woodland there are several small permanent ponds and in the spring and early summer numerous temporary pools.

On the first visit to the region, May 31st, both the ponds and pools were examined thoroughly, the results showing an abundance of aquatic life, including spotted and painted turtles, several species of frogs, tadpoles, waternewts and a great variety of aquatic insects. In addition some of the permanent ponds have been stocked with gold fish; others contain yellow perch and sunfish. Larvae of *Amblystoma*, more or less common, were found only in the temporary pools. This observation was verified on subsequent visits.

Condensed field notes and notes on captive specimens are as follows:

May 31st, 1915. Pools in woodlands, with very muddy water on account of cattle, are swarming with tadpoles of *Rana sylvatica.* Caught six larvae of *Amblystoma tigrinum* from 2 to 3 inches long. In color they are dark olive green above, heavily mottled, and uniform dull white below. Fins on tail and back are broad, blade-like and translucent. Head is large, wider than body. Eyes prominent, iris golden yellow, pupil black. Gills long and feathery, three on each side, carried upright and forward when the larvae are resting. Limbs on small

specimens are short and feeble, on large ones rather large and stout. In the woodland or muddy pools the larvae frequently come to the surface for air.

In a deeper and clearer pool, in an adjoining meadow, specimens of larvae ranging in length from less than 2 to over 4 inches, could be readily discerned as they came up for air, though less frequently than those in the muddy pools, or as they remained stationary, supported by a blade of grass or some other slight object, perhaps ten inches below the surface. Averaging larger in size, the larvae in this pool also display without exception, a brighter color of olive green and their general appearance suggests small pike. Only two specimens of moderate size were captured. The entire catch of the day died on the way home and has been preserved in fluid.

June 15th. Second Visit to Hudson Estate. Water in the pools is much lower. Caught nine larvae, 3 to 3½ inches long, in muddy pools, and six 2½ to 4 inches long, in clear pool. In an aquarium at the Museum the larvae proved voracious feeders, preferring tadpoles (*Rana sylvatica*) to earthworms and caterpillars. Small larvae had to be separated from larger ones of their own kind to prevent cannibalism.

June 19th. Largest larva measures 4½ inches. Absorption of gills is beginning.

June 21st. Third visit to Hudson Estate accompanied by Mr. Deckert of New York Zoological Park.

Muddy pools in woodlands had dried up with the exception of one, still containing a few gallons of water. Two Green Herons and a number of Purple Grackles were observed feeding at this pool. The remaining water was alive with tadpoles, well advanced in development, and larvae of *A. tigrinum*, some with gills partially absorbed, others still normal. 32 were counted. Diligent search for specimens

which had completed their metamorphosis failed. In the clear, meadow pool which though reduced still showed a considerable volume of water, Mr. Deckert captured ten specimens of larvae, 3 to 4 inches long. None of these showed traces of transformation.

June 24th. Absorption of gills and fins on largest aquarium specimen (4½ inches) is proceeding rapidly. Color is much darker.

July 12th. During a two weeks' absence all but two of the larvae died while undergoing transformation. The largest living specimen measures 4½ inches, the smaller one, 3¼ inches. Both show only traces of gills; fins have been absorbed. Limbs are large and stout. Color above grey-black; below slate colored.

July 20th. The two living specimens have been transferred to a vivarium with wet, pebbly bottom and rock-shelter. They feed sparingly on earthworms and toad tadpoles. Gill slits are entirely closed. Dull yellow blotches in irregular arrangement begin to appear.

August 15th. Metamorphosis complete. Color pattern same as adults. Food, principally earthworms, is taken freely. Both specimens are sleek and plump.

September 13th. Large specimen total length 5 5/16, tail 2¼ inches. Small specimen total length 4 5/16, tail 1¾ inches.

October 18th. Large specimen total length 5⅞ inches. Small specimen total length 4⅞ inches.

February 17th, 1916. Large specimen total length 6, tail 3¼ inches. Small specimen total length 5⅝, tail 3 inches.

Pending investigations to be continued during the coming season and especially needed concerning breeding habits and early stages, it has been thought best to publish a brief statement of the information obtained so far, in the hope that others, interested in

the subject, may share in the investigations and thereby render as complete as possible the detailed account on this salamander to be published later.

GEO. P. ENGELHARDT,
Brooklyn, N. Y.

WINTER ACTIVITY OF AMBLYSTOMA PUNCTATUM, BAIRD

At noon, Dec. 23, 1911, Manchester, Maine, I found a medium-sized adult crawling on the snow. A warm rain had fallen the night before, but it had cleared off warm and the mercury stood at 42 degrees F. at the time. There was about three inches of snow left on the ground.

The place was on the south slope of a hill in open pasture, about one-eighth of a mile from a little swampy stream. The animal had evidently come from this stream but I doubt if it was going to any definite place, for it was crawling towards a ridge of high land where there was no open water within a quarter mile.

Probably the warm weather had aroused it from hibernation, but why it should have started off across country on the snow is not so clear.

PHILIP H. POPE,
Manchester, Maine.

GREEN FROG ACTIVE IN DECEMBER

On December 18th, 1915, I saw a full grown green frog (*Rana clamitans*) hopping along the edge of Swan Creek pond, one mile east of Patchoque, N. Y. It was somewhat sluggish in its movements, and I readily caught it. There were no excavations by which it could have been thrown up from the mud. The day was warm and rainy, but there had been a cold spell a few days previously.

WM. SANWALD,
Patchoque, N. Y.

THE SHARKS OF THE MIDDLE ATLANTIC STATES

Orectolobidæ
Ginglymostoma cirratum (Bonnaterre)

Scyliorhinidae.
Scyliorhinus retifer (Garman).
Apristurus profundorum (Goode and Bean)

Pseudotriakidae.
Pseudotriakis microdon Capello

Carchariidae.
Carcharias taurus (Rafinesque)

Alopiidae.
Alopias vulpinus (Bonnaterre)

Isuridae.
Isurus nasus (Bonnaterre).
Isurus punctatus (Storer).
Isurus tigris (Atwood).
Carcharodon carcharias (Linn.).
Cetorhinus maximus (Gunner)

Galeorhinidae.
Mustelus mustelus (Linn.)

Eulamiidae.
Galeocerdo arcticus (Faber).
Glyphis glaucus (Linn.).
Eulamia obscurus (Le Sueur).
Eulamia milberti (Müller and Henle).
Aprionodon isodon (Müller and Henle).
Scoliodon terrae-novae (Richardson)

Sphyrnidae.
Sphyrna tiburo (Linn.).
Sphyrna zygaena (Linn.).

Squalidae.
Squalus acanthias Linn.
Centroscyllium fabricii (Reinhardt)

Squatinidae.
Squatina dumeril Le Sueur.

Henry W. Fowler,
Philadelphia, Pa.

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LUCANIA PARVA IN THE AQUARIUM

A case of spawning in the aquarium of *Lucania parva* has just come to the writer's attention and seems worthy of record.

This fish at times becomes very abundant among water weed in a fresh or very slightly brackish tributary of Moriches Bay at Mastic, Long Island. A number were captured here in September, 1914, since which date the writer has kept the species in balanced fresh-water aquaria continuously. From time to time the original stock has been added to by later collections or depleted by turning over fishes to other persons interested in keeping aquaria, so he can not say how long any one individual has lived in his tanks. There has been in general little mortality among them except wild fish immediately after having been placed in the tanks. They have been fed on dried food suitable for Poeciliid fishes. In the aquarium they usually do not show the dark cross marking characteristic of the fish when taken from its native haunt, but this marking has been assumed by fishes kept for several days in a tank where they swam among a thick growth of linear waterplant. One or two specimens have appeared in the writer's aquaria apparently smaller than any placed therein, from which he surmises that they must have done some spawning. Certainly no considerable number of young have been raised.

Lucania seems well adapted for the narrow confines of an aquarium on account of its small size. When several are placed in a tank they at first swim about in a more or less compact school, but when they become accustomed to their surroundings, scatter about the tank. They are moderately active and swim and take their food indifferently at the surface, at the bottom or in mid water. They have more poise than *Fundulus diaphanus* or *heteroclitus*, are less inclined to sluggishness or excitability. They show good spirit, frequently chasing one another, but are not bad fighters.

In February, 1916, Mr. J. Taubles of New York succeeded in getting spawn from four *Lucania parva*, recently obtained from the writer. On March 15, I visited his establishment and was shown several healthy-looking fry about ¼ in. in total length including caudal. They resembled the adults but were proportionately more slender with larger caudal fins. These he estimated to be three weeks old.

The fish had spawned and earlier fry hatched in a 14 x 9 x 9 inch tank placed in a window with water temperature fairly uniform at perhaps 64 degrees, and depth of water about 6 in. The tank had a good growth of water plants, much fine vegetation, plentiful algae. Although precise records had not been kept, I obtained the following opinion from those who had kept and cared for the fish. Younger fry than those referred to above hatched March 9 from spawn deposited on February 24, a period of just two weeks.

J. T. Nichols,
New York, N. Y.

FISH RECORDS FROM ORIENT, LONG ISLAND.

The following records refer to fishes taken near Orient, Long Island, New York. All the specimens referred to were collected by the writer and with the

exception of the Siphostoma have recently been identified at the American Museum of Natural History. Some of the species mentioned are common, but the dates of occurrence given are of interest.

Round Herring *Etrumeus sadina.* Of less regular occurrence than *Clupea harengus,* although more or less common every summer, May to October. It was unusually abundant in 1915, as many as ten barrels being taken in one lift of fishing pounds during June, July, August and September. It is called spearing and sardine, and not differentiated by some fishermen from the common herring.

Common Anchovy. *Stolephorus mitchilli.* A specimen 3 in. total length. Sound. Nov. 4, 1915.

Pipefish, *Siphostoma fuscum.* Two taken in Long Island Sound, March 1, 1916.

Northern Barracuda, *Sphyraena borealis.* A specimen 10 in. total length was taken in the Sound, November 6, 1915.

Scad. *Decapterus punctatus.* A specimen 5¾ in. total length. Sound. October 28.

Goggle-eyed Scad. *Trachurops crumenophthalmus.* A specimen 5¾ in. total length. Sound. October 18, 1915.

Big-eye. *Pricanthus arenatus.* Two specimens 3¼ and 4 in. total length. Sound. October 10 and 21, 1914. A few (all about this size) are taken every fall, September to November. The two specimens referred to have well developed preopercular spines.

Filefish. *Monacanthus hispidus.* A specimen 3½ in. total length. Sound. November 8, 1915.

Mitchill's Sculpin. *Myoxocephalus mitchilli.* A specimen 4½ in. total length. Bay. April 14, 1916.

Lump fish. *Cyclopterus lumpus.* A specimen two inches total length. Sound. October 25, 1914. We get a few of this species, usually about 3 in. long, every season, although it is never common.

Naked Goby. *Gobiosoma bosci.* A specimen 1¼ in. total length. Orient Bay. October 30, 1914.

Rock Eel. *Pholis gunnellus.* A specimen 3½ in. total length. Sound. November 15, 1915.

Roy Latham,
Orient, N. Y.

[Mr. Latham's dried specimen identified as *Myoxocephalus mitchilli* differs from specimens of *aeneus* strikingly in color, being darker, the dark and white more contrasted, the fins more boldly marked. The ventral fins especially have three or four very bold black cross-bands, broader than the white interspaces, whereas in *aeneus* they are but faintly marked. The back seems to have been less elevated than in *aeneus* and the spinous dorsal is more elevated, especially posteriorly, its longest spines equal ½ head. Evidently this is the form described by De Kay as *mitchilli* (Cuvier & Valenciennes), (New York Fauna, Fishes 1842), and presumedly *scorpio* (Mitchill) on which *mitchilli* (C. & V.) was based. It is the same as a specimen with 10 anal rays (No. 718 A. M. N. H.) which was probably supposed to be the young of the Daddy Sculpin, *groenlandicus,* as it is in the same jar with a specimen of that species from Casco Bay, Maine, both labelled *scorpiodes!* This latter specimen of *mitchilli* is in good preservation. It has the back little elevated and the spinous dorsal a little higher than any *aeneus* examined,—its longest spine not quite half head. The colors are like those of Mr. Latham's specimen. An *aeneus* 4¼ in., total length from Long Island with unusually high spinous dorsal has its longest spine 2.3 in head. No satisfactory structural difference, however, has been found between these two specimens of *mitchilli,* and *aeneus.* It is possible that recent authors are correct in synonimizing the forms but they look different.—*Ed.*]

RECORDS OF NORTHERN NEW JERSEY FISHES.

Early in January, 1915, Prof. R. C. Osburn kindly forwarded me records of additions to the New York Aquarium obtained in New Jersey waters. These were derived from the notes of Mr. W. I. DeNyse. I am indebted to both these gentlemen for the opportunity of presenting the greater part of the following list: The localities are Belford (b), Sandy Hook (s), from off Seabright to off Long Branch (o) in 6 to 17 fathoms. Butler (bu), Boonton (bo), Lake Weequahic (w). I am also indebted to Mr. C. F. Silvester for notes on fishes at Elberon (e), Manasquan (m), North Long Branch (n), Long Branch (l) and Princeton in the canal (c), and Stony Brook (p). *Petromyzon marinus* (b, p.), *Carcharias taurus* (b), *Mustelus mustelus* (s, o, l.), *Eulamia milberti* (b, o.), *E. obscurus* (l), *Sphyrna zygaena* (l), *Squalus acanthias* (o, l, e, m.), *Raja erinacea* (b, o, l.), *R. ocellata* (l), *R. eglanteria* (o), *R. laevis,* (b, o, l.), *Narcobatus nobilianus* (s, one June, 1909), *Dasyatis centroura* (o), *Rhinoptera bonasus* (b, one October 13, 1912), *Acipenser sturio* (b), *Tarpan atlanticus* (b), *Dorosoma cepedianum* (c), *Pomolobus mediocris* (b), *P. pseudoharengus* (b), *Alosa sapidissima* (b), *Brevoortia tyrannus* (b), *Ameiurus nebulosus* (w), *Schilbeodes gyrinus* (p), *Abramis crysoleucas* (w, bu, bo.), *Notropis cornutus* (p), *Carassius auratus* (bu), *Catostomus commersonnii* (bo), *Erimyzon sucetta oblongus* (c, p.), *Esox americanus* (c), *E. reticulatus* (bu, Charlottesburg), *Fundulus majalis* (s, Shrewsbury River), *F. heteroclitus macrolepidotus* (s), *F. diaphanus* (Bayshore), *Cyprinodon variegatus* (s), *Tylosurus marinus* (s), *Hyporhamphus unifasciatus* (s), *Syngnathus fuscus* (m), *Hippocampus hudsonius* (l, s, b.), *Mugil curema* (b?, s.), *Scomber scombrus* (e), *Sarda sarda* (l, m.), *Thunnus thynnus* (l, n.), *Scomberomorus maculatus* (l), *Trichiurus lepturus* (l), *Istio-*

phorus nigricans (n), *Seriola zonata* (l, o.), *Pomatomus saltatrix* (s, b, n.), *Trachinotus falcatus* (b), *Rachycentron canadum* (b), *Poronotus triacanthus* (e), *Aphredoderus sayanus* (c), *Lepomis auritus* (c, p.), *Pomotis gibbosus* (bu, bo, w, p.), *Micropterus dolomieu,* (w, bo, Millstone River below Rocky Hill), *M. salmoides* (bo), *Perca flavescens* (bu, bo, c, p.), *Boleosoma nigrum olmstedi* (p), *Roccus lineatus* (b, l, Barnegat), *Morone americana* (s), *Centropristis striatus* (s, b.), *Stenotomus chrysops* (s, b.), *Lagodon rhomboides* (b), *Mullus auratus* (s), *Cynoscion regalis* (l, s, b.), *Bairdiella chrysura* (s), *Leiostomus xanthurus* (s, b.), *Micropogon undulatus* (b), *Menticirrhus saxatilis* (s, e.), *Pogonias cromis* (b), *Tautogolabrus adspersus* (b), *Tautoga onitis* (l, s, b.), *Balistes carolinensis* (o), *Alutera schoepfii* (s, b, n.), *Stephanolepis hispidus* (b, s.), *Lagocephalus laevigatus* (o), *Spheroides maculatus* (o, s, b.), *Chilomycterus schoepfi* (s, b.), *Myoxocephalus octodecimspinosus* (n, m, o.), *M. aeneus* (s, b.), *Prionotus evolans strigatus* (s, b, o.), *P. carolinus* (o, s, b.), *Paralichthys dentatus* (b, s, o, l.), *Pseudopleuronectes americanus* (s), *Achirus fasciatus* (b), *Lepthechenes naucrates* (b), *Opsanus tau* (s, b, l.), *Astroscopus guttatus* (s), *Enchelyopus anguillaris* (o), *Rissola marginata* (b), *Gadus callarias* (o), *Pollachius virens* (o), *Microgadus tomcod* (s), *Urophycis regius* (s, l.), *U. chuss* (o), *U. tenuis* (o), *Merluccius bilinearis* (b, l.), *Lophius piscatorius* (o, l.), *Leptocephalus conger* (l).

HENRY W. FOWLER,
Philadelphia, Pa.

BURROWING HABITS OF THE BOX TURTLE.

Dr. Overton's note in COPEIA No. 26 on "Aquatic Habits of the Box Turtle" (Cistudo carolina) recalls to the writer observations on Long Island, which indicate periods of aestivation for this species.

At Yaphank box turtles can always be found in considerable numbers during hot summer weather buried to a depth of from six to ten inches in the mud bordering a pool and several springs of a cranberry bog. On short visits to the region, usually two or three days, it could not be ascertained with certainty how long a time the turtles remain buried, yet that it must be for days, and, during prolonged droughts, probably for weeks appears certain, since in many cases observed the entry holes of the turtle burrows had been almost closed through sagging, followed by drying of the mud. From such burrows the turtles could not escape, except by breaking through the crust of mud at the top.

While the burrowing habit of the box turtle is commonplace and well-known, the gathering of such numbers of this species as witnessed by the writer and Mr. Wm. T. Davis during August, 1913, on Shelter Island, no doubt, is unusual. In a short, narrow ditch, partly filled with mud and water, we counted sixty, without disturbing the turtles, and there probably were as many more packed away in the mud. New arrivals were still coming in from the surrounding wood.

GEORGE P. ENGELHARDT,
Brooklyn, N. Y.

THE BREEDING SEASON OF BUFO MARINUS (L) IN DEMERARA.

In a recent number of COPEIA (February 24, 1916) Mr. Austin H. Clark says of the breeding season of *Bufo agua* (*Bufo marinus L.*) "appears to breed about the commencement of the rainy season, somewhere in November or thereabouts," crediting this statement to Mr. Gilbert E. Bodkin, Government Economic Biologist of British Guiana.

The writer has no data on the habits of the species in Demerara, except for the months of July, August and September, but it should be recorded that

on the Demerara River, about thirty-five miles south of Georgetown, in 1914, tadpoles were abundant in July and August, and a lot taken during the last week in July reached the adult stage on and after August 16. From this the writer concludes that the eggs were laid about the first of July, and that in Demerara the species breeds in the long wet season, from the middle of April to September first. It is possible that it also breeds in the short wet season, which begins in November and lasts until the end of January, as stated by Bodkin, but, in the opinion of the writer, this has not as yet been established.

ALEXANDER G. RUTHVEN,
Ann Arbor, Michigan.

WATER-SNAKES SWALLOWING FISH.

At Mastic, Long Island, on May 9, 1915, a small water-snake (*Tropidonotus*) was observed on the shore of Home Creek swallowing a large male *Fundulus heteroclitus*, of much greater caliber than itself. The fish was about half engulfed head first, its tail still flopping occasionally. When alarmed the snake took to the water, and when pinned to the bottom with a canoe paddle immediately relinquished the fish which swam away. Almost immediately after this snake was liberated a water-snake of the same size which seemed more strongly marked was seen in the water with a somewhat smaller male *Fundulus* which it had seized by the caudal fin. Getting a firm hold on the fish, which at times struggled violently, it swam ashore with it. The final swallowing took place slowly, tail first, the front end of the snake on the shore. Finally it was able to close its mouth with a gulp around the head of the fish which slipped back towards its middle. Comparatively little distorted by its meal the snake dived into the water and disappeared.

J. T. NICHOLS,
New York, N. Y.

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NOTES ON RADCLIFFE'S SHARKS AND RAYS OF BEAUFORT

In his recent publication, The Sharks and Rays of Beaufort, North Carolina (Bull. U. S. Bur. Fish. XXXIV, Doc. No. 822), Mr. Lewis Radcliffe has given the student of these interesting forms an exceptionally fine piece of work, which adds greatly to our knowledge of them. By the many beautiful figures of dermal denticles and by the prominent position which he gives the use of the microscope as a means of identification, he has brought into the study of the Elasmobranchii added interest and greatly increased accuracy and it is to be regretted that in a work which will be so constantly before ichthyologists he has accepted in its entirety the nomenclature of Garman (The Plagiostoma, 1913) as this pretty surely contains features which will not stand. In my recent publication on *Mobula* I have used the name *olfersi* advisedly. Specimens of this fish which I sent to Paris have been compared by Dr. Jacques Pellegrin with the topotype of *olfersi* taken on the coast of Brazil in 1816 by Delalande and mentioned by Muller and Henle. He has found them to be the same species. Bancroft's description of *hypostoma*, I consider insufficient (following the opinion held by the late Dr. Theodore Gill).

Radcliffe refers to the small electric ray *Narcine* from Beaufort as *Narcine brasiliensis corallina* a subspecific name used by Garman for the Florida specimens apparently on account of their red color. I doubt the taxonomic value of this color difference, as specimens of *Aetobatis* which I have observed on the west coast of Florida had a reddish color, different from the clear black coloring of North Carolina specimens. At any rate Beaufort *Narcine*, which I have taken, have not been reddish.

The large electric ray *Tetronarce occidentalis* has been excluded from the Elasmobranchii of the North Carolina coast by Mr. Radcliffe as the records on which Dr. Smith included it in Fishes of North Carolina were indefinite. When preparing my paper on Sharks and Rays of Cape Lookout (Proc. Biol. Soc., Wash., 1915, page 89) I was of the same opinion, but recently I have taken two examples off Cape Lookout, which are now in the American Museum of Natural History, New York.

Referring to Radcliffe's note on the feeding habits of *Mobula olfersi* (page 280), I will say that like most of the Elasmobranchii they have very varied feeding habits, but I have often seen them feeding on "minnows," have caught them on hook baited with living "minnow" and have usually found in the many that I have examined that they contained "minnows" although occasionally I have found that they contained substances just as described by Mr. Radcliffe, and I saw the examination which he mentions as being made on July 10, 1913, on 9 examples [which I had caught the night before, July 9th] by Prof. W. P. Hay, and in fact opened several of their stomachs for this examination and discussed their unusual contents with Prof. Hay.

Careful measurements of a female *Mobula* are given on page 280 in which "both uteri were equally developed," a condition hard to explain, if this individual had ever had young. I have found the left uterus only functional in this species.

Russell J. Coles,

Danville, Va.

ON HEPSETIA BONAPARTE, A FORGOTTEN GENUS OF ATHERINOID FISHES

The Fauna Italica of Bonaparte was issued in large sheets without date or pagination, the date usually assigned being 1836.

In this volume three new genera of Silversides (*Atherinidae*), are indicated: *Menidia, Membras* and *Hepsetia.* Of these, *Menidia* is defined, but without mention of type. Jordan and Gilbert assumed in 1883 that *Atherina menidia* L. was intended as the type species, a view which is doubtless correct. *Membras* is also indicated without type. Its definition contains nothing tangible. According to Aristotle, the μέμβρας or βέμβρας is a small fish of the shores of Greece, similar to the ἄφυη or *Aphya* (*Atherina hepsetus*), but not so good as food. This account may fit *Atherina mochon* Cuv. and Val, a small species also found in Greece, and is very likely the original μέμβρας. In want of other information we may take *Atherina mochon* as type of *Membras* in which case *Membras* becomes a synonym of *Atherina. Hepsetia* has been thus far overlooked. Its type is expressly stated to be *Atherina boyeri* Risso, while that of *Atherina* is *Atherina hepsetus* L. *Hepsetia* is defined as having rather strong teeth in the jaws, vomer and

palatines, the head small, the first dorsal over the ventrals. *Atherina* is defined by Bonaparte as having very minute teeth, a sharper head and the dorsal over the middle of the length of the pectorals.

As a matter of fact, there is no important difference in the position of the dorsal, which, in both species, is over the middle of the ventrals when depressed, and well behind the tip of the pectorals. *Atherina boyeri* has a shorter head, more oblique mouth and rather larger teeth. But in this no generic difference appears. *Hepsetia* like *Membras,* must be considered as a synonym of *Atherina.*

David Starr Jordan,
Stanford University, Calif.

AMBLYSTOMA TIGRINUM ON LONG ISLAND

Ova and Early Larval Development

Snow and frost prevailing throughout March, field work during the present year was not resumed until April 7th, observations again being made on the Hudson Estate near Syosset, L. I. The day was sunny, but not warm, with a strong north wind. Mr. R. Deckert, of the New York Zoological Park, accompanied the writer. In the woods there were still patches of snow and ice, and the pools, which had served as breeding places last year and had become dry in summer or fall, were now filled to overflowing, indeed, in some places formed ponds of considerable size and depth. Examination of the flooded regions in the woods soon showed that they contained very little aquatic life, aside from numerous fairy shrimps (*Branchippus vernalis*), a few insects, and occasionally a woodfrog (*Rana sylvatica*), or a green frog (*Rana clamata*). The spring chorus of wood frogs

and peepers (*Hyla pickeringi*) came entirely from ponds in adjoining meadows. One of these ponds, from which last season a number of *Amblystoma* larvae were obtained, again showed a profusion of life. One corner teemed with woodfrogs, many of them paired, while others had finished breeding to judge from the egg masses attached to twigs and branches just below the surface of the water. The more secretive peepers were oftener heard than seen. Cricket frogs (*Acris gryllus crepitans*) were also out, but not yet in song.

Though our hopes of finding adults of *A. tigrinum,* either breeding in the water or hiding on the land, were not realized, we did notice, at some distance from shore and barely visible at the depth of a foot or more below the wind-ruffled surface, several masses of jelly attached to the stalks of dead plants. Securing one by means of a long-handled landing net, and feeling sure that it represented an egg-mass of *A. tigrinum,* Mr. Deckert waded in and obtained ten more. He also observed many others in inaccessible parts of the pond.

The egg-masses are rounded oblong or kidney-shaped. The largest measures 3 x 2 inches, the average being about two-thirds of that size. The number of eggs is 30 in the smallest and 110 in the largest mass. Unlike the egg-masses of woodfrogs, which are composed of an aggregation of small, jelly spheres each enveloping an egg, the egg-masses of *A. tigrinum* represent one homogeneous mass of jelly, within which the eggs are distributed irregularly. The eggs measure 3 mm. in diameter, the animal pole being dark brown and the vegetative pole light buff. They are closely surrounded by a clear cell 4 mm. in diameter. I can see no obvious difference between the eggs of this salamander and those of *A. punctatum,* except that the egg-masses of the latter species average larger in size and usually contain considerably over 100 eggs.

Unfertilized ova, indicated by white, opaque eggs, amount to about 20%. While actual observations concerning the date of ovulation were not obtained, it seems safe to assume that this could not have taken place until the ponds were at least partially free from ice, which would fix the date not earlier than April 1st. Some of the egg-masses, judging from the advanced state of disintegration of the unfertilized ova, probably were deposited about that date, others, estimated on the same basis, were not over 2 or 3 days old. Workmen on the Hudson Estate had not come across any of the adult salamanders so far during the present season.

April 10th.—The ova of two out of four egg-masses kept in an aquarium at the laboratory have changed in form from spherical to arcuate, causing a proportionate enlargement of the clear cell surrounding them. The ova in the other two egg-masses are still spherical though somewhat enlarged.

April 18th.—Two larvae have hatched and are actively swimming about. Total length, 13 mm. Head very large, flattened. Eyes prominent, pupil black, iris speckled golden yellow. Gills and caudal membrane well developed. Yolk sack almost absorbed. Limbs not visible. Color, dorsally olive grey, speckled and irregularly blotched; ventrally pale buff. Magnification shows asteroid arrangement of pigment cells embedded in skin. Caudal membrane, extending dorsally to gill slits and ventrally to vent, is translucent, showing very faint pigmentation.

Developing embryos frequently turn or wriggle within the clear cells which attain a maximum diameter of 10 mm. and are filled with "watery fluid."

April 22d.—Twelve larvae have hatched. They are feeding on the very young nymphs of mayflies and dragonflies, introduced with aquatic plants.

The remaining egg-masses are showing signs of decomposition and have been thrown out. A lot of ova of *Rana sylvatica*, collected for the purpose of feeding the Amblystoma larvae with young tadpoles, also had to be discarded for the same reason.

Accepting April 1st as the earliest date of ovulation, the average hatching period would be 20 days—7 under natural conditions out of doors and 13 in the laboratory at an average air temperature of 65° F.

May 9th.—Field observations. Another breeding place has been located in the woods north of the Syosset Railroad Station. Shallow pools, formed by melting snow earlier in the season, contain many egg-masses. An adjacent pond, stocked with fish, has none.

On the Hudson Estate a lower water level of the pools revealed many more egg-masses than were seen in April. The meadow pool alone (surface area about half an acre) has close to 100. Quite a number of the egg-masses are still in the arcuate embryo state; others have hatched recently. Evidently ovulation has been continued since the visit, April 7. The young larvae are rarely seen swimming about, but remain on the bottom, well concealed in their perfect color harmony with the vegetation. The hatching period, under natural conditions out of doors, appears to vary between 30 and 40 days, subject to weather conditions.

The young larvae, hatched in aquarium April 18 to 22, now measure 18 mm. in length. Daphnia and other small aquatic life so far have served as food.

George P. Engelhardt,

Brooklyn, N. Y.

THE NIGHT LIZARD OF THE MOJAVE DESERT (XANTUSIA VIGILIS) IN WINTER.

A specimen of *Xantusia vigilis*, the peculiar night lizard of the Mojave Desert, in California, was collected by the writer about 30 miles southeast of Daggett, on December 29, 1915. It was found by splitting open a Tree Yucca, which, though dead, was still standing. The lizard occupied a small cavity in the heart of the plant, and was fairly active when picked out, especially after having been warmed for a few minutes in the hands. The weather was cold, and a snow storm occurred on the following days, when continued search, both in fallen and standing Yuccas, failed to reveal further trace of *Xantusia*, with the single exception of a shed skin, which was also found in the heart of a standing Yucca. This brief note supplements those given by Dr. John Van Denburgh (Proc. Cal. Acad. Sci., V., June, 1897, p. 126).

Carl L. Hubbs,

Stanford University, Calif.

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THE VORACITY OF THE SOUTH AMERICAN HOPLIAS

Many of the sucker-like and carp-like Characins, such as *Prochilodus* and *Leporinus* when caught in the seine will lie quietly dormant, but *Hoplias*, if permitted to remain undisturbed, is almost certain to bite its way out. This habit, said to be fairly common in the fishes of the Amazonian basin, is not often found in the fishes of the Pacific coastal streams.

In May, 1913, when upon the Landon Expedition of Indiana University, I was collecting in the Rio San Juan of Western Colombia. One morning at one of the Indian ranchos, where we had passed the night, one of the Indians brought in a large *Hoplias*, which he had evidently caught with hook and line and had dispatched by the crash of a machete through its brain. This specimen measured about twenty inches and had the abdomen greatly distended. The Indians called my attention to this and upon opening the fish, we took out an eight-inch catfish (*Pimelodus wagneri*). This, with the head of its captor, I procured in exchange for a few fish-hooks and they are now in the Museum of Indiana University.

Like most of the South American catfishes, *Pimelodus* is equipped with a very sharp dorsal and strong jagged pectoral spines. Just how *Hoplias* can manage to capture these fishes is not known. It is quite

possible that the remarks of Harrington [American Naturalist XXXIII, 1899, p. 721] about the African *Polypterus* may also apply to *Hoplias*.

ARTHUR W. HENN,
New York, N. Y.

NOTES OF THE FISHES OF THE PEE-DEE RIVER BASIN, NORTH AND SOUTH CAROLINA.

During the last week of March and the first week of April, 1916, the writer made a journey by canoe from near Pinebluff, N. C., to Georgetown, S. C., following the Lumbee, Lumber, Little Peedee, Big Peedee, and Waccamaw Rivers. The following is a list of fishes observed. No attempt was made at systematic collecting, and the only apparatus used was a small dip-net, and occasionally a hook and line.

All records, unless otherwise mentioned, are from the Little Peedee River, between its junctions with the Lumber and the Big Peedee.

1. *Amiatus calvus* (Linnaeus). A single example, about 2 feet long was taken in an overflow pool near the river on April 1st. It was guarding its nest, in which the young were just hatching.

2. *Ameiurus platycephalus* (Girard). Abundant. Many examples taken on hook and line.

3. *Schilbeodes insignis* (Richardson). One example, 40 mm. long.

4. *Catostomus commersonii* (Lacepede). Two examples, 44 and 57 mm. long.

5. *Erimyzon sucetta* (Lacepede). One example, about 9 inches long, seen in a gill net. The coloration was very brilliant, approaching that of *Perca flavescens*.

6. *Moxostoma* sp. Abundant. Many seen in the possession of natives. None examined.

7. *Notropis procne* (Cope). Abundant, and of rich coloration. Five examples, 27 to 39 mm. long.

8. *Cyprinus carpio* Linnaeus. Abundant in the Big Peedee River. Many seen breaking water along the shore.

9. *Anguilla rostrata* (Le Sueur). Abundant. Six small examples, 96 to 130 mm. taken in dip-net, and many larger ones with hook and line.

10. *Esox americanus* Gmelin. Abundant, and of remarkably brilliant coloration. Ten examples, 27 to 165 mm. long.

11. *Esox reticulatus* Le Sueur. Common. Two examples 42 and 118 mm. long.

12. *Fundulus nottii* (Agassiz). Abundant. Seven examples 49 to 71 mm. long. Females with eggs (about 2 mm. in diameter) nearly ripe.

13. *Gambusia affinis* (Baird & Girard). Abundant. Numerous examples, 26 to 47 mm. long.

14. *Chologaster cornutus* Agassiz. Six examples of this interesting species were taken, all in drifts of submerged dead leaves at the foot of sand-bars or in shallow indentations of the bank. Associated with this species in such places were numerous larval salamanders, and the resemblance of the two, in shape, color and movement, was striking. Four males, 34 to 40 mm. long, and two females 38 and 41 mm. long, were secured. The females contained large yellow eggs, 1 to 1½ mm. in diameter, which appeared to be nearly ripe.

This fish moves in short wriggling dashes of astonishing rapidity from hiding place to hiding place. One example survived a trying journey to Washington, where it is now living in a small aquarium.

15. *Aphredoderus sayanus* (Gilliams). Abundant. Seventeen examples 32 to 73 mm. long. Two females, 57 and 73 mm. with eggs nearly ripe. The rest, all under 42 mm. in length, were immature.

16. *Elassoma* sp. Abundant, and varying greatly as to color. Twenty-eight examples, 18 to 31 mm. long, including some adult females with hard roe.

The sexual differences appear to be marked. Specific determination is not attempted here, but it is hoped that a large number of adults will be brought alive to Washington for further study.

17. *Pomoxis sparoides* (Lacepede). Common. One small example taken.

18. *Centrarchus macropterus* (Lacepede). Common. One small example taken.

19. *Chaenobryttus gulosus* (Cuv. & Val.). Abundant, and extremely dark in coloration. Three examples, 200, 230 and 240 mm. taken with hook and line.

20. *Enneacanthus gloriosus* (*Holbrook*). Abundant. Seven examples 22 to 78 mm. long.

21. *Mesogonistius chaetodon* (Baird). Common. One example 57 mm. long.

22. *Lepomis auritus* (Linnaeus). Abundant, and of large size. Coloration very dark. One example 270 mm. long.

23. *Micropterus salmoides* (Lacepede). Abundant. One example 61 mm. long.

24. *Perca flavescens* (Mitchill). Common, and of very brilliant color. One example seen in gill net.

25. *Bolcichthys fusiformis* (Girard). Abundant. Two examples 48 and 45 mm.

W. W. Welsh,
U. S. Bureau of Fisheries.

LONG ISLAND TURTLES.

The following notes are published as a basis for the extension of season, range, number of species and knowledge of life history, of the Chelonia of Long Island. Information regarding the status of

several species is very incomplete, and it is hoped that additional data may soon be recorded. The only previous list referring to the turtles of the island is that of Mr. G. P. Engelhardt in *The Museum News*, Brooklyn, Vol. VIII, 1913, p. 128. Mr. Engelhardt includes in his list the wood tortoise (*Chelopus insculptus*), but he has since informed me that subsequent investigation has not confirmed the validity of a supposed record for this species.

1. *Dermochelys coriacea* (Vandelli). Leatherback turtle. Of occasional occurrence along our coast. Large specimens have been taken several times on New Jersey beaches, once at New London, Conn., twice or more in Buzzards Bay, Mass., and at least once on the coast of Nova Scotia.

Dr. Frank Overton writes me that a "1,000-pound leatherback was caught in a sturgeon net off Patchogue about twenty years ago."

2. *Caretta caretta* (L.). Loggerhead turtle. This species has an observed range in the Atlantic extending from the coast of Scotland to 37° south latitude. It is a regular summer visitor to Long Island, frequently entering inlets from the Sound. In July, 1905, Mr. Gustavus Tooker captured a sixty-five pound specimen in Mt. Sinai Harbor by spearing it in the back with an eel-spear. In July, 1910, I bought an example weighing over 70 pounds in Fulton Market. It had been captured near New York.

Others, including one weighing 400 pounds, have been taken within New York Bay. During late November I once found five small loggerheads, of about twenty pounds weight, on the South beach at Mt. Sinai. They had probably been killed by the cold and had been thrown up along the tide line. Two small specimens in the Brooklyn Museum were taken at Lynbrook by Mr. Jacob Doll.

Mr. Roy Latham, of Orient, has records for this species from June 14, 1907, to December 4, 1915.

He states that examples are caught sparingly in fish traps in the Sound and Gardiner's Bay, and even in the smaller, shallow bays. One specimen examined by him weighed 125 pounds.

3. *Eretmochelys imbricata* (L.). Hawksbill turtle. This species is recorded by Sumner, Osburn and Cole,[1] as being more common than the loggerhead in Buzzards Bay, Mass. Mr. V. N. Edwards, of Woods Hole, reports having seen examples in the Long Island Sound as late as Thanksgiving Day. They were taken then exhausted by cold.

4. *Chelonia mydas* (L.). Green turtle. The green turtle has been several times recorded from the coast of New Jersey, and also from Rhode Island. Mr. Latham took one which weighed thirty pounds in the Sound off Orient, on September 30, 1914. In Fulton Market the writer once saw a live one weighing eighteen pounds, which was said to have been caught off the south coast of Long Island.

5. *Chelydra serpentina* (L.). Snapping turtle. Generally distributed and locally common. At Orient, where it was formerly very abundant, it is in evidence from April to October. The largest specimen seen by Mr. Latham weighed 30 pounds. Mr. Latham has found the eggs in June, buried in the sand of a hillside about 200 feet from a pond. Mr. W. T. Davis has seen both the turtles and their eggs in the vicinity of Tobacco Lot Pond, Gardiner's Island, in June. At Mastic and elsewhere, I have frequently found deposits of eggs which had apparently been dug up by foxes or racoons.

The name by which the snappers are known along the south shore is "torup." At Mastic, according to Mr. Francis Harper, at least one fisherman used to capture them to sell to the Poospatuck Indians, who prize the flesh. On June 13, 1915, Mr. Harper and Mr. J. T. Nichols found a large carapace of a freshly-eaten torup in a rubbish heap near one of the Poospatuck cabins.

[1]Bull. Bur. Fisheries, XXXI, 1911, Pt. 2, p. 774.

6. *Kinosternon pennsylvanicum* (Gmelin). Mud turtle. "General in streams and ponds, and still common in such environments within the city limits of Brooklyn," (Engelhardt). Mr. Engelhardt has taken this species at Casino Lake, Flushing, and in Prospect Park, Brooklyn. Mr. Nichols has found examples on the inner beach at Mastic. Dr. Overton took one in the salt marshes at East Patchogue, on September 9, 1913.

7. *Aromochelys odoratus* (Latreille). Musk turtle. Shells of four musk turtles were found near the water's edge of Long Pond, Wading River, by W. T. Davis, on August 8, 1912. Mr. Davis still has one of the carapaces.

8. *Malaclemmys centrata concentrica* (Shaw). Diamond-back terrapin. Formerly common in the bays of Long Island, as elsewhere along the Atlantic coast, but now rather rare because it has been hunted so persistently for the market. I have taken examples in Mt. Sinai Harbor, and I remember seeing, along the tidal creeks of this bay, pens of chicken-wire containing scores of diamond-backs being held for the visit of the wholesale dealer. Mr. Nichols reports a similar pen at Brookhaven, where several hundred of the terrapin were recently confined. A fisherman of Mt. Sinai, who deals in these turtles, once found a large example on the pine barrens three or four miles south of the harbor.

At Orient, Mr. Latham has taken this species in fishing fikes, from April to November.

9. *Chrysemys picta* (Hermann). Painted turtle. Very plentiful in streams and ponds. March 14, 1915, (Hempstead), to October 31, 1915, (Mastic).

10. *Clemmys guttatus* (Schneider). Spotted turtle. Abundant in ponds and streams, and active from March until November.

11. *Emydoidea blandingi* (Holbrook). Blanding's turtle. Known on Long Island from a single

specimen found by Mr. John J. Schoonhoven at Queens, in June, 1909, and recorded in "Science," N. S., XXXIV, 1911, p. 917.

12. *Terrapene carolina* (L.). Box tortoise. Abundant throughout the island. April 2 to November 10 (Orient). Mr. Latham has found the eggs in cultivated fields during June and July.

R. C. Murphy,
Brooklyn, N. Y.

Edited by J. T. Nichols, American Museum of Natural History
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FISHES OF THE SALTON SEA.

Recently (May 7-14) I visited Salton Sea in southern California and, incidentally, obtained some information regarding the fishes of that interesting body of water.

As is well known, the Salton Sea was formed in 1905-6 by the breaking of a dike which permitted the water of the Colorado River to rush through into the Salton Sink, a vast area below sea-level. Although the break was finally gotten under control, and the lake began to dry up, it has, nevertheless, remained an enormous expanse of water. The depth varies considerably within the year, being greatest in the winter and least in the fall. The average depth for any one year is always somewhat less than that of the previous year. Considerable fresh water finds its way into the lake each year by seepage from the irrigation operations in Imperial Valley, so that the water is kept fresher than it otherwise would be.

When the water was flowing in through the break in the dike, some fishes were carried with it. At one time they were said to be very abundant. Just how abundant they were can not now be determined, nor do we know all the species represented. At the present time the following species are known to be in the lake:

1. Carp, *Cyprinus carpio.* This is undoubtedly the most abundant species. It probably escaped into the Colorado River from private fish ponds in Arizona. I saw several specimens, all of good size (3 to 10 pounds) at Cormorant Island.

2. Bony-tail, *Gila elegans.* Said to be not uncommon; I saw no specimens.

3. Humpback Sucker, *Xyrauchen cypho.* Rather common; I saw several specimens. They all had a starved appearance.

4. Colorado River Trout, *Salmo pleuriticus.* Although the water of the Salton Sea is quite brackish, strongly alkaline, and very warm, this trout seems to thrive in it amazingly well. It is said to be fairly common. I saw one fine example about 16 inches long. It was in excellent condition, albeit somewhat bleached in color.

5. Common mullet, *Mugil cephalus.* Next to the Carp, the most common species. Numerous examples were seen. It is said to reach a large size (as much as 6 pounds) and to be unusually fine as a food-fish.

6. Desert Cyprinodont, *Cyprinodon macularius.* This interesting little fish was found in Figtree John spring in a small oasis near the north end of the lake some 7 miles southwest of Mecca. This spring or water hole was grown up thickly with cattails (*Typha latifolia*) and the surface of the water was covered with a thick coating of algæ of various species. The water was only a few inches deep and quite warm, perhaps as warm as 90° to 100° on hot days. The fish, however, were active and apparently in good condition. I caught a number of them and succeeded in bringing two alive to San Francisco. One of them died a few days ago, the other is still alive and doing well.

This cyprinodont appears to be found in many of the isolated springs and water-holes in the deserts

of southern California. Only this week (June 1) Mr. Samuel Hubbard of Oakland, brought me 14 fine specimens of this species from Saratoga Springs, Death Valley, where Mr. Hubbard says they are very abundant.

BARTON WARREN EVERMANN,
San Francisco, Calif.

A COMPARISON OF ATLANTIC AND PACIFIC SPECIMENS OF THE HAMMER-HEAD SHARK, *SPHYRNA ZYGAENA*.

In their review of the elasmobranchs of Japan, Jordan and Fowler (Proc. U. S. Natl. Mus., XXVI, 593, 1903) raise the question whether the hammer-head of the Pacific usually referred to *Sphyrna zygaena* is really identical with that species from the Atlantic. They say that specimens from the two regions need comparison.

I have recently made a detailed comparison of hammer-heads from the Atlantic and Pacific and found them absolutely similar, and this note is intended to record this fact.

The specimens examined were, one from Woods Hole, Mass., 60.5 cm. in length, and two from Japan respectively 51 and 56 cm. The three were found entirely similar in all characters that could be considered specifically diagnostic—such as, body proportions, shape and position of the fins, form and relative size of the "hammer," and the size and position of the eye, mouth and gill area. The coloration only was a little different, the Woods Hole specimen being dark brown above while the Japanese ones were blackish gray. This, however, is not important since differences in coloration are not rare in fishes from widely separated localities, and besides, it may have been due to different preserving fluids having been used in the two cases.

It is worth noting, by the way, that the three specmens showed nicely three successive stages in the growth of the teeth in the hammer-head. In the 51 cm. shark no teeth had yet appeared in either jaw. In the 56 cm. one, minute teeth could be felt by the finger in the lower jaw, but none could be detected in the upper. In the 60.5 cm. specimen, teeth were well developed in both jaws and were from 1.5 mm. to 3 mm. in height. Since none of the three specimens was embryonic, but all were free-swimming young sharks, it follows that *Sphyrna zygaena* is born toothless and that teeth make their appearance when the shark is about 55 cm. in length. The teeth then grow rapidly, reaching a length of 1.5 to 3 mm. in height by the time the shark is 60 cm. in length.

L. Hussakof,
New York, N. Y.

NOTES ON SOME FISHES FROM CHILI.

Through the kindness of Dr. W. P. Wilson, I have been enabled to examine some market-fishes received from Valparaiso by the Commercial Museum of Philadelphia. Among them I found:

Catulus chilensis (Guichenot), *Squalus acanthias,* Linn., *Raja lima,* Peoppig, *R. flavirostris,* Philippi, *Callorynchus callorynchus* (Linn.), *Carassius auratus* (Linn.), *Ophichthus ocellatus* (Le Sueur), *Clupanodon sagax* (Jenyns), *Ethmidium coerulea* (Valenciennes), *Mugil cephalus,* Linn., *Sarda chilensis* (Valenciennes), *Thyrsites atun* (Euphrasen), *Seriolella violacea,* Guichenot, *Trachurus picturatus* (Bowdish), *Percichthys trucha* (Valenciennes), *Paralabrax humeralis* (Valenciennes), *Isacia conceptionis* (Valenciennes), *Sciaena fasciata* (Tschudi), *Aplodactylus punctatus,* Valenciennes, *Chromis crusma* (Valenciennes), *Sebastodes darwini* (Cramer), *S. chilensis,* Steindachner, *Pinguipes chilensis* (Molina), *Prolatilus jugularis* (Val-

enciennes), *Porichthys porosus* (Valenciennes), *Gobiesox marmoratus,* Jenyns, *Scartichthys eques* (Steindachner), *Genypterus blacodes* (Schneider), *Eleginops maclovina* (Valenciennes), *Bovichthus diacanthus* (Carmichael), *Paralichthys kingii* (Jenyns).

HENRY W. FOWLER,
Philadelphia, Pa.

A LARGE POLYODON FROM IOWA.

The American Museum of Natural History has received the photograph of a very large, mounted Polyodon, taken in Lake Okoboji, Northern Iowa, February 22, 1916, by Mr. R. D. Vanderbeck of Arnold's Park, Iowa, who writes that it was taken with a spear and gives the length of the fish as 7 ft. 1 in., its girth 45½ in., the length of the bill 17 in.

J. T. NICHOLS,
New York, N. Y.

NOTES ON CISTUDO CAROLINA FROM ORIENT, LONG ISLAND.

Considerable has been said in COPEIA about the aquatic habits of the Box Tortoise on Long Island. I would like to put on record a few instances of its frequenting both fresh and salt water near Orient.

One quite remarkable occurrence was in August, 1909, at East Marion. In the center of a dry woods there was a depression where the water had recently evaporated, leaving a deep oozy mire. In and around this sink I counted between sixty and seventy of these turtles. More than half of these were partly or entirely submerged in the mud. Specimens were poked out that were buried near a foot in depth. Circling around the hole at varying distances I observed numbers of others working toward it from all directions. The most surprising thing to me was

the speed that the more distant ones were traveling. It may not be an uncommon fact that the Box Tortoise hurry, but was new to me, for these outsiders were moving on at the gait of a fast walk. This was a gathering of tortoises that I have never witnessed before or since.

Cistudo also frequently enters salt water near Orient. Lying between a sandy cedar-grown beach and the mainland of Orient is a bay one mile wide. I have on several occasions found these turtles midway across, always swimming leisurely toward the mainland. It seems evident that they enter the water of their own free will, as the beach to the south is flat and no creeks running out.

While off on the fishing ledges on the sound I have on two occasions seen this species more than half a mile from land. Although both these specimens were swimming toward the Orient hills to the south, they were being carried rapidly east or west with the strongly flowing tide. It is a question where these specimens came from, whether from the nearest inlet fifteen miles west, or the New England rivers. It is improbable that they entered the water near Orient.

The record flood tide of December, 1909, washed over a portion of the beach south of the bay that had not been inundated in about fifty years. Taking observation there a few days after the water had receded—which overflowed for one tide only—I found four of these turtles that had left their hibernation burrows and frozen to death. The flood ebbed off in the afternoon and that night it became severely cold. The salt water coming in from the ocean at that time, early in the winter, was warm. In every case the animal was not over four feet from the burrow. I was interested to notice that the holes were only deep enough to slightly cover the shell with sand.

Whether this species' preference for eating a certain mushroom is well known I am not aware. In this section the *Russula obscura* is devoured almost

exclusively. When collecting fleshy fungi I have wondered at the wisdom of a turtle to pass *Amanita, Amanitopsis, Lactarius* and *Boletus* forms, while only the stipe of practically every *Russula obscura* along the lane is left and the ground strewed with crumbs.

It was a common practice in former days to carve initials on the plastron of these tortoises. Among the long list of names in the writer's possession is one dated 1838.

Roy Latham,
Orient, N. Y.

NOTES ON NEW JERSEY BATRACHIANS AND REPTILES.

Spelerpes longicauda. Common along brooks and about springs in the Watchung Hills near Plainfield.

Bufo americanus. The common toad of the vicinity of Plainfield and, so far as known, of the whole southern two-thirds of New Jersey is *Bufo fowleri.* I have found *B. americanus* at Budd's Lake, Newfoundland, and Newton and recently at Mine Brook, about one mile west of Bernardsville, Somerset Co. The latter locality is a quarter mile north of Lat. 40° 42′ and lies in a narrow valley of 200 feet elevation between hills which on the south rise to a height of 530 feet and immediately north to 680 feet, two miles further north reaching 857 feet.

The long parallel trap ridges a few miles to the south attain a height of 600 feet, but I have never found the American Toad in those hills. The Mine Brook locality is the southernmost known station for this species in the state. In the more northern New Jersey stations, where the altitude is greater, it is associated with a distinctly more northern flora and fauna than that of Mine Brook.

I first discovered *B. americanus* at this locality on April 11, 1915. On that date there were fully a 100 of the toads singing and breeding in a small pond by the main road near the corner of the Mount Harmony Road. A number of specimens were secured, all characterized by the large warts, thick, fleshy hind feet, and bright yellowish or reddish tints of this species, while in many individuals the underparts were spotted with black. In the same pond were Pickerel Frogs and Spring Peepers (*Hyla*). Eggs of the toad taken home hatched in six days or a little less.

Hyla andersoni. About eight years ago James Chapin and I found this beautiful Tree Frog at the Runyon Pond two miles south of Sayreville, Middlesex Co. Since that time I have found it at several other localities in the same region—one mile south of Old Bridge, about one mile southeast of Browntown and at Freneau near Matawan. These localities are all in the sandy pine barren "island" north of the Pine Barrens proper. Thus this species extends northward to within three miles or less of the lower Raritan River, its range coinciding at this point with that of the Carolina Chickadee.

Virginia valeriae. Some years ago I came across several individuals of this small snake on the trap ridges immediately north of Plainfield. With one exception, they were on the north side of the First Mountain at Watchung, a single individual being found on the Second Mountain less than a mile further north. All were hiding under boards or stones in dry deciduous woods. The single specimen preserved was collected on May 30, 1903.

This species has not, so far as I am aware, been found elsewhere in New Jersey, and the above locality is its northernmost known station.

W. DeW. Miller,
Plainfield, N. J.

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OCCURRENCE OF GROUND SHARKS, *CARCHARHINUS*, IN GREAT SOUTH BAY.

For the past fifteen years I have harpooned sharks in Great South Bay, Long Island, New York, and during that period there have been seen from my boat probably not less than twenty-five hundred between Lindenhurst and Great River on the north side of the Bay and Cedar Island and Cherry Grove on the south side. I think it is conservative to say that between three hundred and fifty and four hundred have been killed. The greatest number seen in any one year of which I have a record was 277 in 1916 and the greatest number killed was 60 in 1906. Not counting smaller Sand Sharks (*Carcharias taurus*)[1] those killed have been of two species, namely the Brown Shark (*Carcharhinus milberti*)[1] and the Dusky Shark (*Carcharhinus obscurus*)[1] with the single exception of a male *Carcharhinus limbatus*[2] taken July 14th, 1910. This fish, the longest I have ever secured, measured 9 ft. 2 in. and weighed 300 lbs. A single small Hammerhead (*Sphyrna zygaena*)[1] *about* 2½ ft. long was seen but not taken.

[1]Brooklyn Museum Science Bulletin, Vol 3, No. 1.

[2]Identified by J. T. Nichols after an examination of the jaws.

Beginning with the year 1911 careful records have been kept, during which time dates for the sharks seen range from June 17th to September 6th. It is my distinct remembrance that in a previous year I have killed them as late as September 15th. The sharks taken were *Carcharhinus*[1] and those noted as seen, with the exception of the small Hammerhead, were undoubtedly the same.

During the years from 1911 to 1916, inclusive, I went out on 123 occasions, frequently for a small portion of the day as weather conditions were unfavorable. About 1123 were seen, and 146 were taken. Of these 146 only 7 were males. The females taken were all *C. milberti*. Two of the males were *C. milberti* and measured 7 ft. and 6 ft. 6 in., the latter weighing 121 pounds, and 5 were *C. obscurus* which measured 8′, 8′ 2″, 8′ 5′, 8′ 3″ 7′ 8″.

The	8′ 2″	specimen	weighed	275 lbs.
"	8′ 5″	"	"	322 "
"	8′ 3″	"	"	312 "
"	7′ 8″	"	"	250 "

The earliest any male was taken was August 3d, and the latest, August 29th.

The females ranged in length from 5′ 4″ to 7′ 8″.

A	6′ 1″	specimen	weighed	95 lbs.
"	6′ 9″	"	"	142 "
"	6′ 9″	"	"	125 "
"	6′ 10″	"	"	124 "
"	6′ 11″	"	"	125 "
"	7′	"	"	136 "
"	7′ 2″	"	"	184 "

Eight of the females contained young and were taken from June 22d to August 5th. Eight was the smallest number and eleven the greatest number of young, and of a total of 75 young 31 were males and

44 females. The young when born are about 22 inches long and weigh 2½ lbs.

On one occasion when a female shark was suspended by the tail, three young dropped from her mouth one at a time, and swam off apparently unhurt. This is the only incident of the kind I have known. The same fish contained several unborn young. Young are sometimes born on deck, tail first, after the mother has been caught.

The principal diet of the sharks I have examined has been various bottom fish and an occasional weak fish, dog fish, eel or crab. Flat-fish very largely predominate. I have never found what could be identified as a blue fish, nor have I ever found anything except what is mentioned above in a shark's stomach, except two fish hooks with the snells attached, neither of which was imbedded and which were probably fast to some smaller fish which the shark had swallowed.

The greatest number of sharks I have ever taken on any one day was 17 on August 3d, 1905. Some of these, however, were Sand Sharks. On August 11th, 1906, fourteen Brown Sharks were taken. The greatest number seen in one day of which I have a record was 82, on August 14th, 1916, and of these 42 were in sight at one time. These were all seen in the morning before noon. On a previous occasion when I kept no record, my captain at the mast head said he thought he saw during the day, over three hundred. I would say a conservative estimate was two hundred as they were much more plentiful on that day than on the day that 82 were seen. They were so thick at times that it would have been impossible to count them with any degree of accuracy.

I have killed approximately as many on the ebb tide as on the flood.

EDWIN THORNE,
Babylon, N. Y.

REMARKS ON SHARKS TAKEN IN GREAT SOUTH BAY.

During the past years the writer has made several trips on Great South Bay, Long Island, from Babylon with Mr. Edwin Thorne in pursuit of ground sharks (*Carcharhinus*). The most successful day's hunting he has experienced was on July 27, 1916, when five female *Carcharhinus milberti* from 6 ft. 1 in. to 6 ft. 11 in. in total length were taken. As the five sharks lay together on deck some individual variation was evident. One of them had a distinctly long caudal, one was notably heavy, another, the most aberrent of the five was slender. It differed from the others slightly in color, the under surface of the pectoral terminally having an ill-defined dusky blotch, rather than being shaded with the color of the upper parts as in them. In the jaw of this specimen the re-entrance in the lateral margin of the upper teeth comes to a sharper apex. The dermal denticles under the microscope are essentially the same, but with ridges slightly less sharp. These differences are too slight to be of specific value. All five had the proportionate length of the dorsal and pectoral similar, the dorsals in the predorsal length 1.6 to 1.7 times, pectorals in the same 1.15 to 1.3. Second dorsal and anal were of approximately the same size and nearly apposed, the anal very slightly in advance in all but one in which the second dorsal was slightly in advance. The anal was of the same form throughout, bilobed, the anterior lobe rounded. In the water the sharks looked brownish grey to my eye, although their appearance varies considerably according to whether they are seen against light or dark bottom, on deck mostly grey-blue above.

It is remarkable that whereas the female sharks taken by Mr. Thorne have all been *C. milberti,* five of the seven males taken in six years have been *C. obscurus*. One of these was taken on August 3, 1916, and examined by the writer on the following day.

It had a considerably smaller dorsal than female *C. milberti,* proportionately longer lower caudal lobe, and the second dorsal was noticeably more advanced than the anal in position. The head was strikingly blunter and more rounded than in female *C. milberti,* as well as the fish being of heavier build. The jaws and teeth are much larger than those of female *C. milberti.*

Mr. Thorne had made the following measurements of this male shark, made along the curve (except total length). Total length 8 ft. 1 in.; head and body along the back, 6 ft. 1 in.; dorsal fin, from snout, 2 ft. 6 in.; dorsal from base of tail, 2 ft. 9½ in.; length of front of dorsal, 1 ft. 2½ in.; top of caudal, 2 ft. 1½ in.; front of pectoral fin, 1 ft. 9 in.; pectoral, from snout, 2 ft.; ventrals from snout, 4 ft. 1 in.; circumference at root of tail, 1 ft. 1½ in.; at front of dorsal, 4 ft. 4⅛ in.; at eye, 2 ft. 5 in.; eye to snout, 8¼ in.; mouth to snout, 6 in.

On August 29, 1916, a male *C. milberti* was taken of which Mr. Thorne made the following corresponding measurements: Total length, 6 ft. 6 in.; head and body, along the back, 5 ft. 2 in.; dorsal fin, from snout, 2 ft.; dorsal from base of tail, 2 ft. 5 in.; length of front of dorsal, 1 ft. 1 in.; top of caudal, 1 ft. 7 in.; front of pectoral fin, 1 ft. 5½ in.; pectoral, from snout, 1 ft. 7½ in.; ventrals from snout, 3 ft. 6 in.; circumference at root of tail, 9½ in.; at front of dorsal, 2 ft. 8 in.; at eye, 1 ft. 8 in.; eye to snout, 6½ in.; mouth to snout, 5 in.; weight, 121 lbs. Mr. Thorne further informs me that this fish resembled the females of *C. milberti,* except that it seemed slightly lighter in color, and differed from the males of *C. obscurus.* Its eyes were pale yellowish in color like female *C. milberti* and like a male *C. limbatus* which he has taken, whereas the eyes of males of *C. obscurus* are dark brown.

J. T. Nichols,
New York, N. Y.

AN INSTANCE OF ALBINISM IN THE WESTERN GOPHER SNAKE.

Cases of complete albinism are fairly common among wild birds and mammals, and a large number of instances have been recorded by various observers, but reports of this condition in reptiles are quite rare; there are but few records from Europe and only a single one from America so far as the writer knows. It becomes of interest therefore to report a case of albinism (complete for one color) occurring in the Western Gopher Snake [*Pituophis catenifer* (Blainville)].

The specimen under discussion was captured in a dormant state at Pescadero, a coastal locality in San Mateo County, California, early in November, 1913, on black adobe soil where gopher snakes were said to be fairly common. The snake was kept alive for more than a year and is now in the reptile collection of the Department of Zoology of the University of California.

The coloration of a typical gopher snake seems to be made up of three distinct materials: a yellow deposit found generally distributed in the scales of the body and forming the ground color, and two darker pigments, a red and a black, occurring locally and forming the contrasted part of the color pattern. The yellow pigment is present in the scales of the albino specimen as is also (in part at least) the red, but the black is entirely lacking. Upon the anterior portion of the body, where ordinarily the black and red together form brown spots only the red is present, and on the tail where a normal specimen is black, only pale bluish or uncolored areas are to be seen. The iris and tongue which are normally dark shared in the loss of color and were of a light pinkish cast. Evidently the factor controlling the formation and deposition of black pigment failed of operation throughout the entire body.

Accompanying this abnormality in coloration there were irregularities in scale pattern, especially on the head, which suggests that whatever cause operated to prevent the formation of black pigment also may have had some effect on scale formation. Several of the head scales are of quite different shape than those found on a normal specimen, and some show suggestions of divisions which were not completed. There are four postoculars, where but three normally occur. The body scales, save for the interpolation of an incomplete gastrotege which extends but half way across the body, are quite typical and numerically are within the limits given by Cope. (The Crocodilians, Lizards and Snakes of North America, Ann. Rept. Smithsonian Inst., for 1898, 1900, pp. 877, 878), viz: Dorsal scale rows, 31 (Cope, 29-33); gastrosteges, 223½ (204-245); urosteges, 64 (56-72).

This snake was kept in captivity for more than a year, confined in a glass terrarium with a screened top. It was provided with water and at intervals small white mice were fed to it; one of these bit the snake on the head and produced a "scalp" wound. One morning after the animal had been in captivity for about four months the skin on the preorbital portion of its head was seen to be free from the scales beneath. Some straw was placed in the terrarium and within a few minutes the snake was working rapidly back and forth through the straw, freeing itself from the old skin. At the place where its body was just being freed from the skin, violent muscular expansions and contractions were being executed. The surface of the snake's body and the outside, originally the inside, of the sluffed skin were noticeably moist as a result of the secretion which had been poured out to assist in moulting. For several weeks previous to moulting the snake had been quite sluggish, remaining coiled in one corner of the terrarium and refusing food. During this time its eye became grad-

nally dulled and the skin was seen to be free from the body in several places. Immediately after the moult the animal became very active.

Several European observers, among them notably Boulenger, Tornier and Werner have reported instances of albinism among snakes, and I have found a number of other European titles on the subject. Opinion, so far as expressed by the latter two workers, seems to be that albinism results from a shortage of yolk in the developing embryo, a supposition which would be in accord with the fact that albino animals are often of smaller size and of a more delicate nature than normal individuals of their species. Perhaps some light could be had on this problem by crossing albino snakes with normally colored individuals of the same species as has been done with trout among fish, and with various species among the higher vertebrates.

Tracy I. Storer,
Berkeley, California.

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NOTES ON THE FISHES OF THE LUMBEE RIVER.

The notes on the fishes of the Peedee River basin by Mr. W. W. Welch in COPEIA of July 24, are very interesting. In the spring of 1913 I made some observations on the fishes of the upper portion of the Lumbee and I venture to give here a list of the species observed, to supplement that of Mr. Welch.

Apparently Mr. Welch obtained 4 species which I did not find, while I saw 7 species which he does not record. The total number recorded in both lists is 32.

The Lumbee River has its rise in the southeastern part of Montgomery County, North Carolina. In its upper course it is, on some maps, called Drowning Creek, a name which has no valid claim and which because of its handicap to a proper development of the canoeing possibilities of the stream, as well as its lack of claim to originality, should give way to the very appropriate name Lumbee River, the original Croatan Indian name, which means "beautiful water." The name "Lumber," sometimes applied to this stream, especially in its lower course, is merely a corruption of "Lumbee."

On Monday, March 31, 1913, Dr. John Warren Achorn of Boston and Annisquam, Mass., and I put our canoe (a fine 16-foot Cambridge boat weighing

about 70 pounds) in the water at Blue's Bridge, near Pinebluff, he in the stern, I in the bow, and started down the Lumbee bound for the Turnpike Bridge, 25 miles below. The day was delightful, just cool enough, sky nearly clear, very little breeze,—an ideal spring day.

At Blue's Bridge the Lumbee is about 30 feet wide and several feet deep; water very clear, only slightly brown stained from the cypress and other trees standing in the water.

The banks are fairly well defined only in a few places, and the water spreads much beyond them here and there and covers considerable areas of cypress swamp. Besides the cypress, which is the principal tree, there are in the water, loblolly pine, a few small bay, a few holly, soft maples with brilliant red samaras, a few gums (probably two species), and Simons says some junipers, but I saw none. A great many old dead snags that afford good nesting places for such birds as downies, white-bellied nut hatches, chickadees, and golden swamp warblers. Many of the trees have mistletoe growing on them. Growing in the water are a few yellow nuphars and potamogetons, while in the smaller tributaries and swamps the golden club was in full flower.

Owing to the uncertain character of the banks the stream simply flows in a widening, indefinite channel through a series of cypress swamps. Only at intervals is there any dry ground. The swamps are of varying and indeterminate width, but nearly everywhere wider than the eye could penetrate.

The course of the stream is very sinuous, there being rarely a straight stretch of more than a few yards. The points projecting into the concave side of the curve are known locally as "cowfaces." There is everywhere a good, strong current, particularly where the water sweeps around the "cowfaces." Where the stream has straightened itself by cutting across the cowface, the abandoned "ox-bow" is local-

ly called a "logan" (lagoon). Occasionally small sandbars of yellow sand were noted, showing beautifully in water up to 4 or 5 feet deep.

On either side the cypress and other trees and vines form a pretty dense forest through which a boat could scarcely be taken. Some of the cypress trees are 4 feet or more in diameter and over 100 feet high. Cypress knees everywhere, and many old dead snags. Sometimes a cypress tree is seen growing in the stream well out from either shore; these are known as "dram trees,"—the guide or canoeman being permitted to take a drink every time he comes to one of these trees! I did not see many such trees; the canoemen, however, become very expert in locating them.

Although we paid no special attention to the fishes I am able to present the following list of 28 species that occur in the Lumbee between Blue's Bridge and Turnpike Bridge:

1—*Amiatus calva.* Grimmel; also called "Cotton-fish," because "when one chews the meat it is like chewing cotton." Common. 2—*Ameiurus platycephalus.* Brown Cat. Common. There are 2 or 3 other species not identified. 3—*Catostomus commersonii.* May Sucker. Common. 4—*Moxostoma pidiense.* Redhorse. Said to be common. Two other species of suckers, locally called Mud Sucker and Humpback Sucker, were reported but not seen. 5—*Cyprinus carpio.* Carp. "They are here and a big nuisance," so says Dr. Achorn. 6—*Campostoma anomalum.* One taken. 7—*Semotilus atromaculatus.* Several seen. 8—*Notropis procne.* Common. 9—*Abramis crysoleucas.* Shad Roach. Common. 10—*Hybopsis kentuckiensis.* Hornyhead. Common. 11—*Anguilla chrisypa.* Eel. Common. 12—*Esox reticulatus.* Common. 13.—*Esox americanus.* Abundant. 14—*Fundulus nottii.* Common. 15—*Gambusia affinis.* Several seen. 16—*Aphredoderus sayanus.* Two examples in a pond near Pinebluff. 17—*Elassoma*

evergladei. Not very common. 18.—*Centrarchus macropterus.* Flier. Common; a good foodfish. 19—*Enneacanthus gloriosus.* Speckled Perch. Common. 20—*Chaenobryttus gulosus.* Abundant. 21—*Mesogonistius chaetodon.* Common. 22—*Lepomis auritus.* Red Robin. Common. 23—*Lepomis pallidus.* Mud Perch. Common. 24—*Eupomotis gibbosus.* Sun Perch. Common. 25—*Micropterus salmoides.* Common. 26—Perca flavescens. Yellow Perch. Common. 27—*Hadropterus peltatus.* Several taken. 28—*Boleichthys fusiformis.* Common.

Barton W. Evermann,
San Francisco, Cal.

NOTES ON CALIFORNIA FISHES.

Mr. T. S. Manning of Avalon, Cal., the secretary of the Tuna Club, furnishes some interesting notes. Two hundred and fifty-one specimens of the Japanese spear-fish, *Tetrapturus mitsukurii,* have been taken at Avalon in the last seven years. Their average weight is 182 pounds, the largest weighed 340 pounds and measured 10 feet and 10 inches. Mr. Manning has a photograph of one taken in Hawaii said to have weighed 736 pounds. Thus far no spear-fish has been recorded from Hawaii and this weight seems gigantic. The largest sword-fish taken at Avalon weighed 377 pounds, was 11 feet, 11 inches long. Mr. Manning sends specimens of a fish caught in very great schools at San Clemente and never noticed by anyone in that region before. It is the short-nosed saury, *Cololabis brevirostris,* of which hitherto less than a dozen specimens have been known.

David Starr Jordan,
Stanford University, Calif.

A RARE SHARK (*CARCHARHINUS LIMBATUS*) ON LONG ISLAND.

On August 7, 1916, two sharks were caught in a bluefish net off Easthampton, Long Island. They

were identified by me as the spotted-fin shark, *Carcharhinus limbatus*, and this identification has been confirmed by Mr. J. T. Nichols. The largest fish, a female, approximated seven feet, while the smaller, a male, accurately measured, was 6 feet, 4 inches. This appears to be the second record of this species for Long Island, and is therefore worthy of note. About September 1, I examined four other sharks of this same species at Montauk Point, where they had been taken by fishermen some days before.

WILLIAM T. HELMUTH,
Easthampton, New York.

GROUND SHARKS. A CORRECTION.

In COPEIA No. 35, p. 70, second paragraph, for "only 7 were males" read "only 8 were males." In the last line of same paragraph after 8′ 2″ insert 8′ 1″. Foot of p. 72 for "five of the seven" read "six of the eight." The *C. obscurus*, measurements of which were given on p. 73, was by editorial error omitted from the record on p. 70.—J. T. N.

HABITS AND BEHAVIOR OF THE TEXAS HORNED LIZARD, *Phrynosoma cornutum*, Harlan. I.

Unlike the desert species of the genus, these forms are far more active in the middle of the forenoon than during the hottest part of the day, which lasts from about noon to the middle of the afternoon. In the forenoon, *Phrynosomas* are actively feeding, and the collector finds them readily. Their favorite haunt seems to be along the edge of thick vegetation. In such a place, during the feeding hour, they may be seen running rapidly up and down, often passing each other; and snatching with their viscid tongues any insects which emerge into the open. The next most likely spot is in the thick vegetation near some ant road.

While burrowing deeply in the winter, it appears that the Texas horned lizards do not bury themselves at night, as do most of the desert species. Nor do they do so in rainy weather, or during brief cold snaps. At such times they retire into the burrows of rodents or under flat rocks. It is an interesting fact, that, at such times, horned lizards are very abundant under the cross ties of railroad tracks. Often they burrow through into the area between the two rails. Here they emerge and are literally trapped. The rails are usually too high to be climbed over, and the lizards run up and down frantically; occasionally one climbs up on a rail just in time to be crushed by a passing train. Many live for the rest of the summer in this uncomfortable pasture.

In the area of their greatest abundance, horned lizards first appear from their winter burrows about the middle of April. At this time, they are markedly grouped into two sizes; one the full adult size, averaging about 125 mm.; and the other the half sized, averaging about 50 mm, from the hatching of the previous autumn. From this, it seems clear that these lizards do not reach full size until the end of their first year. Some specimens go through an incomplete moulting at the time of their emergence from hibernation; but the most important moult takes place during the first two weeks of July. It is during this time that the blood ejecting habit is most conspicuous. The extraordinary habit of occasionally squirting blood from the eye when attacked has been observed and recorded by a number of writers. Hay supposed that it was a mode of protection during moulting. Bryant, speaking of the California species, says that blood ejecting is just as liable to occur between moults as during moult. Bryant sectioned the eyelids of a blood ejecting specimen, but could find nothing except that the lids were rather swollen and vascular. Several writers have suggested that the blood ejecting is due to the weakening of a portion of the

cornea by some parasite,—perhaps one of the mites which so commonly infest these lizards. The writer has recorded elsewhere (Science Vol. XL, 784-85) a very careful examination which he made of several blood squirting specimens. He found no parasites of any kind, and expressed the belief that the blood ejecting, in this species at least, is intimately connected with moulting. Since this study was published, the writer has found seven more blood ejecting specimens and all were moulting.

In feeding, small insects are clearly preferred; but, sometimes, a venturesome individual will swallow a large grasshopper or even a *snail*. The writer once watched one of these animals eating a large brown May beetle. The beetle lumbered before the eyes of the lizard. The reptile slowly turned his head a little to one side and watched the insect, then raised himself high on his legs and snatched at the insect with his tongue, whipping it against his lips, but not bringing it into his mouth. The lizard hastily jumped back and puffed himself out in the usual warning attitude of these animals. The beetle began to crawl away. The lizard returned to the attack, carefully stalking his prey for a yard or so then rushing on it, seized it in his mouth without using his sticky tongue. After turning it about against the ground, the lizard finally gulped the insect down. The writer expected to see the lizard use its front feet, as the common toad does when handling a large mouthful, but, although the front feet were waved alternately in the air, they were not used.

Mention has been made before of the reaction of these lizards toward various animals. When attacked, the lizard puffs itself out into an almost flat shape, tucks the head down, exposing the horns, and waits for the enemy. The habit of charging on an enemy, which has been mentioned, may be more common than is suspected; although the writer has ob-

served it only once. Specimens seldom attempt to bite the collector.

Bryant discovered that the California species of horned lizards are very subject to a form of hypnotism. The writer has confirmed this on the Texas form, also. Bryant's method is to stroke the animal between the eyes. After three or four gentle strokes, the lizard closes its eyes and becomes very quiet, even losing some of the reflexes. The writer has discovered that if the region over the pineal eye is simply touched a few times with the tip of the finger, that the hypnotic effect can be induced. He has further found that if after a time, when the animal begins to show signs of awakening, if gentle passes are made in the air over the region of the pineal eye, the animal will return to the hypnotic condition. So far, he has not been able to find a definite explanation of this, but it would seem to suggest that the pineal eye in these animals may be more or less functional.

W. M. Winton,
Fort Worth, Texas.

Edited by J. T. Nichols, American Museum of Natural History

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NOTES ON THE TOTUAVA (*CYNOSCION MACDONALDI* GILBERT).

[In the northern part of the Gulf of California there is found in great abundance, a species of weakfish which reaches a huge size, six feet or more in length, and which has much value as food. It is known locally as *Totuava*. I have received from Mr. Eiichiro Nakashima, a graduate of the Fisheries School at Tokyo, a man who has had considerable experience in the pursuit of this fish, a series of notes concerning it. I here present a condensation of his observations.—David Starr Jordan.]

CYNOSCION MACDONALDI GILBERT.

The Totuava is caught mainly about the mouth of the Colorado River and southward to Guaymas in Sonora. Shallow points with sandy bottoms are the best fishing grounds. These fishes are rare in winter, very abundant in summer. They live both in clear and muddy water. The preferable temperature is from 57 to 80 degrees F.

In the winter they go southward to Guaymas. Their migration is in part coincident with that of the small fishes on which they feed. These avoid the inflowing cold water of the Colorado. They spawn mainly in early May, apparently in shallow water. After this they are very lean. They often come into very shallow water. They are omnivorous, feeding on any kind of small fish or crabs, but especially on

shrimps. In pursuing small fish they often leap a foot or two from the water. They are not very shy or very active; when one is hooked or speared the others crowd around as if in curiosity.

The male makes a very peculiar noise, "gu-gu," when caught. The female is larger than the male and deeper in the body. The air-bladder is very large and thick, spread in the greater part of the abdomen. The bladder in the male is thin, like paper.

In the spring the young of three inches swim close to the shore; by the rings on the scales we estimate these to be a year old; those of three feet in length as four years old, those of 6 to 6½ feet, 8 or 9 years old, this being the maximum size. The males seem to breed at the age of four years; the females develop more slowly.

Along with the *Totuava* occurs a related species, *Cynoscion reticulatus* (Gunther). It is much smaller, less than three feet in length. Its colors are more lustrous, very beautiful green, blue and purple above and below posteriorly light yellow.

The eggs are larger than in the *Totuava* and the spawning season comes earlier. [This species, (unlike the *Totuava*) extends southward to Panama, and with other related forms, it is known as *Corvina*.]

Eiichiro Nakashima,
Kingsburg, Calif.

EVIDENCE OF THE PRESENCE OF *CARCHARODON* ON THE NEW JERSEY COAST DURING THE PAST SUMMER

As there exists some doubt whether the Great White Shark, *Carcharodon carcharias,* was among the species present on the coast in this vicinity during the recent shark scare, the following evidence seems worth noting.

In a Broadway window there were recently on view two teeth of a freshly caught shark, indubitably

belonging to *Carcharodon carcharias*. On inquiry I was informed that they were secured from a shark caught on the New Jersey coast in the early part of June. The teeth were about an inch in height (including root), which would indicate a juvenile specimen of this species, 7 or 8 feet in length. This accords with the label accompanying the teeth, which said the shark was 7 feet long.

L. Hussakof,
New York, N. Y.

[The editor has seen a mounted *Carcharodon carcharias* 7½ feet long taken off South Amboy, N. J., July 14, 1916, by Mr. Michael Schliesser, of 29 East 132d Street, N. Y.—J. T. N.]

NOTES ON THE DISTRIBUTION OF THREE CALIFORNIA RAYS.

Platyrhinoides triseriatus (*Jordan and Gilbert*).

A ray of this species was found washed up on the beach immediately north of Point Conception, on July 13, 1916. This is the northernmost record for this species.

Raja binoculata Girard.

A large specimen of this giant ray was noted on the beach between San Simeon and Piedras Blancas, in northern San Luis Obispo County. A small one, 192 mm. long, was taken from the stomach of a Rock-cod, *Sebastodes auriculatus,* which was caught in about 60 feet of water off Pizmo Beach, on the southern coast of the same county. These two records are the southernmost for this ray.

? *Manta birostris* (Walbaum).

Two rays were noted by the writer, several years ago, off the wharf at Redondo, in Los Angeles County. One was swimming near the surface, while the other was caught by hook and line. They measured

about four feet across the "wings," had cephalic fins, and lacked the serrated spine on the tail. The only record heretofore published on the Devil Ray in California was based upon the stories of fishermen of San Diego, and is given by Jordan and Evermann (Fishes of North and Middle America, 1896, I, p. 92). The present record is presented with the intention of corroborating the evidence of the occurrence of this or a related ray on the coast of Southern California.

CARL L. HUBBS.
Stanford University, Calif.

AMBLYSTOMA OPACUM ON LONG ISLAND.

To the records of adults published in COPEIA, July 1, 1914, nothing has been added.

Concerning the ova Mr. Deckert writes, COPEIA, March 24, 1916, that two egg masses containing living embryos were found, September 25, 1913, under bark in a dry pool near Silver Lake, White Plains, N. Y. The larvae hatched one day after having been placed in water. Observations made during the present season support this interesting and exceptional habit of fall ovulation for Amblystoma.

While searching for the ova of *A. tigrinum* on the Hudson Estate near Syosset, L. I., April 7th, we found larvae of *A. opacum*, 1⅛ to 1¼ inches long, in several of the temporary pools. It is obvious that these could not have developed and reached their present size from ova deposited in the same spring, since the pools were ice covered up to nearly April 1.

Sixteen of the larvae after having been placed in a laboratory aquarium developed a disease (white growth on gills) from which they recovered quickly after a small quantity of salt had been added to the water. They are feeding freely on earth worms, cut into small pieces, and measure, May 4th, 1¾ inches

in length. The front legs were present at the time of capture, the hind legs appeared April 18. In color they are heavily-mottled dark grey on a yellowish background, including the caudal membrane. A more or less well defined line of yellowish dots runs laterally from behind the gills to the tip of the tail.

Late in May, 1915, a number of larvae, 2½ inches in length, were collected on the Hudson Estate and another lot was brought in by Mr. A. H. Helme, who reported them very common in a pool near his home at Miller Place. These larvae began to transform early in June, but all died during the process.

Other larval records for Long Island are: East Norwich, April 20, 1916, Larvae (1¼ inch) common in small pond near Oyster Bay Road.

Near Coram, April 30, 1916, larvae (1 inch), Dr. Overton.

Although only two adult records were obtained during many years, the larval records sufficiently indicate a general distribution and a common occurrence for this salamander on Long Island.

GEORGE P. ENGELHARDT,
Brooklyn, N. Y.

NOTES ON AN UNUSUAL FEEDING HABIT OF THE SNAPPING TURTLE, *CHELYDRA SERPENTINA* (LINN).

The *Chelydra serpentina* is considered among naturalists to be a strictly carnivorous animal. The following quotations are examples: "They are extremely voracious, feeding on fish, reptiles, or on any animal substance that falls in their way."[1] "Their food consists entirely of aquatic animals; fishes and young ducks are their ordinary prey."[2] "The turtle

[1] North American Herpetology. Vol. I, p. 145, by J. E. Holbrook.

[2] Contributions to the Natural History of the United States of America. Vol. I, p. 346, by Louis Agassiz.

is entirely carnivorous."[3] "It is wholly carnivorous in its habits, and is very destructive to fish and young water-fowl."[4]

The above statements are undoubtedly true in the main, fish and other animal life constituting the chief part of its food. The following record is, therefore, of interest as being an exception to the usual habit.

On July 9, 1916, I took a Snapping Turtle (carapace 12 inches in length) from a mud hole on the border of a salt marsh at Sagamore Beach, Cape Cod, Massachusetts. The stomach was well filled with recently eaten marsh grass (*Distichlis spicata*), the blades being intact, although bent and tangled. There was nothing else in the stomach. The turtle was a male, quite fat and apparently in a healthy condition.

H. L. Babcock,
Dedham, Mass.

SNAKE CONSERVATION IN CALIFORNIA.

The Lorquin Natural History Club of Los Angeles, Calif., is at present devoting some time and money to calling the attention of Californians to the use of some of the harmless snakes and the reasons why they should not be killed. In the vicinity of the city signs are being posted at mountain resorts, small cities and along roads. These signs read as follows:

DO NOT KILL HARMLESS SNAKES.

They are useful in destroying disease-bearing rodents.

The only snake in California that can harm you is the Rattlesnake.

Lorquin Natural History Club,
Los Angeles.

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[3] The Reptile Book, p. 14, by R. L. Ditmars.

[4] The American Natural History. Vol. IV, p. 41, by W. T. Hornaday.

The club is not a snake club, for only about two out of its twenty Active Members are deeply interested in herpetology.

Among the most useful of the California snakes is the Pacific Bull Snake (or Gopher Snake), *Pituophis catenifer,* which is common on the Pacific Coast. Its food consists chiefly of rodent pests, such as gophers, mice, ground-squirrels and small rabbits. Although he prefers these animals for food, the Pacific Bull Snake has a rather accommodating appetite, which must under the force of necessity adapt itself to circumstances and include in his ophiological menu, birds, an occasional rat, bats, and sometimes a lizard or two. Sometimes an egg (or several) is commandeered, but I have never known of a Pacific Bull Snake's having eaten any egg as large as a chicken's.

One sixty-four inch Pacific Bull Snake that was brought to me was handled too much. A slight touch of *mal de mer* resulted in his vomiting four full-grown gophers, none of which was more than slightly digested. On another occasion more than a dozen mice had the misfortune to run foul of a mouse trap I had set for living mice. These same mice had the additional misfortune all to find their way into the stomach of a good-sized hungry Pacific Bull Snake.

Taking it all in all, the good done by the Pacific Bull Snake has already earned him the protection of many ranchers and far outweighs any harmful depredations his lack of discretion may at times mislead him to make.

Paul D. R. Ruthling,
Los Angeles, Calif.

NOTES ON THAMNOPHIS SIRTALIS FROM CAPE ANN, MASSACHUSETTS.

Dr. A. G. Ruthven in his monograph on the Garter Snakes, plots out some curves of scale variation in the genus and suggests the desirability of securing data on the scale formulae of specimens from other

sections of the country. Accordingly having had the opportunity this summer of getting the specimens to make some measurements from the neighborhood of Rockport and Gloucester, Mass., I present the results here:

SEX, LENGTH	LABIALS Upper	LABIALS Lower	OCULARS Pre.	OCULARS Post.	SCALE ROWS Ant.	SCALE ROWS Med.	SCALE ROWS Post.	VENTRALS	SUBCAUDALS
1. Fem. 24 in.[5]	8-8	8-10	1	3	19	19	(?)	150	66
2. Fem. 13½ "	7-7	10-11	2-1	3	19	19	17	142	63 8 undivided
3. Fem. 24 "	7-8	9-9	1	3	19	19	17	148	60
4. Fem. 26 "	8-9	9-9	1	4	19	19	17	145	60
5. Male 23 "	7-7	9-9	1	3	19	19	17	151	75
6. Fem. 13 "	7-7	9-10	1	3	19	18	17	144	60
7. (?) 20 "	7-7	10-9	1	3	19	19	17	149	Tail partly lost 1 undivided
8. (?) 25 "	8-7	10-9	1	3	20	19	17	147	67
9. Male 21 "	7-7	9-10	1	3	19	19	17	141	74
10. Male 8 "	7-7	9-9	1	3	19	19	17	139	75
11. Male 18½ "	7-7	10-10	1	3	18	18	17	148	74

[5] Aug. 6 bore 19 young.

The Garter Snakes of this region show somewhat more uniformity in coloring than those of the Middle Atlantic States. I have found that most of the adults are a very dark brown or black in the ground color, the stripe being fairly clear and well defined. As a rule, too, the spots are not as prominent as in specimens that come from the region to the south.

F. G. Speck,
Philadelphia, Pa.

Edited by J. T. Nichols, American Museum of Natural History

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A SECOND RECORD OF THE SCOMBROID FISH *GERMO MACROPTERUS* FROM THE COAST OF CALIFORNIA.

A specimen of this species was found stranded on the beach between Santa Barbara and Carpenteria, along the Santa Barbara Channel in Southern California, on July 12, 1916. This species is caught off the Japanese and Hawaiian Islands, but has been recorded from the California coast only from Santa Catalina Island.

Carl L. Hubbs,
Stanford University, Calif.

POLYODON IN WESTERN MISSOURI.

Through the kindness of Mr. G. C. Roe the Museum of the University of Colorado has received the head of a Spoonbill Cat, *Polyodon spathula* (Walbaum) collected in western Missouri about 15 miles from the Kansas-Missouri state line. This fish was hooked in Dry Wood Creek, near Nevada, Missouri, August 10, 1916, and weighed 26 pounds when taken from the water. The head measures 21 inches from the tip of the gill-flap to the tip of the paddle. Dry Wood Creek is one of the small head-water streams of the Osage River system, and is usually only a few feet wide. The Polyodon was caught

during high water, however, when the creek was over a mile wide in many places. Local fishermen report that the Spoonbill is seen every few years during such floods.

MAX M. ELLIS,
Boulder, Colorado.

MEASUREMENTS OF A LARGE EXAMPLE OF *CESTRACION ZYGAENA* (LINNAEUS).

On August 3, 1916, a large male hammerhead shark was taken by the U. S. Fisheries Schooner *Grampus*, about 90 miles east from Cape May, N. J. It was first noticed following in the wake of the vessel immediately after two of the party had been in swimming. It was evidently excited and swam rapidly, crossing the wake in short zig-zags, being apparently guided by sense of smell. A large hook baited with a chunk of tilefish was cast over, and the shark was so eager in his rushes for this bait that he missed it repeatedly. When hooked, he made a determined fight for more than five minutes against the combined efforts of five men. Finally a sword-fish iron was fastened in him, and he was brought on deck without further trouble.

The stomach was empty.

Measurements as follows:

	cm.		cm.
Total length	302	Anal to ventrals	29
Width of head	63	Base of ventrals	17
Snout to 1st dorsal	83	Length of claspers	29
Base of 1st dorsal	29	Height of ventrals	15
Height of 1st dorsal	43	Ventrals to pectoral	60
1st dorsal to 2d dorsal	70	Pectoral base	18
Base of 2d dorsal	10	Length of pectorals	37
Height of 2d dorsal	11	Pectoral to rear angle of head	32
2d dorsal to caudal base	21	Pectoral to snout	57
Caudal base to tip upper lobe	89	Depth of body	50
Caudal base to tip lower lobe	34.5	Diameter of eye	3.5
Caudal base to fork of caudal	21	Width between nostrils	51
Tip of caudal to notch	17	Snout to upper lip	14
Caudal base to anal	19	Snout to angle of jaw	25.5
Base of anal	15	Width of mouth	19
Height of anal	13		

Color: upper parts of head, body and fins lead gray; lower parts of same grayish white; tips of pectorals black; and tips of other fins dark.

W. W. Welsh,
U. S. Bureau of Fisheries.

AN ADDITION TO THE CHELONIAN FAUNA OF MASSACHUSETTS.

None of the published lists[1] of the reptiles of Massachusetts include the Red-bellied Terrapin, *Pseudemys rubriventris* (Le Conte). As this turtle inhabits at least one locality in the Commonwealth, the fact should be brought to the attention of naturalists, and the occurrence definitely placed on record.

The Red-bellied Terrapin has been known for some years to inhabit certain ponds in Plymouth County, where it seems to remain localized. Specimens have been taken or observed in Gunners Exchange, Hoyt, Island, Nigger, Hallfield, Boot, Upper West, and Micajah's Ponds, and reported from several others. These turtles are attractive in appearance, young animals especially being very delicately marked. Roughly, their elongated form, the irregular red markings on the carapace and the red or yellowish tinted plastron make them at once conspicuous among our New England turtles. Adult specimens average ten to twelve inches (length of carapace—axial measurement).

They are very shy,[2] living in comparatively deep water, and are rapid swimmers. On warm, bright

1 (1) Catalogue of the Animals and Plants of Massachusetts, by Edward Hitchcock (1835).
(2) A Report on the Reptiles of Massachusetts, by D. H. Storer, M.D., Boston Journal of Natural History, Vol. III, 1840.
(3) Catalogue of the Reptiles and Batrachians found in the vicinity of Springfield, Mass., by J. A. Allen, Proc. B. S. N. H., Vol. XII, 1868, (additional list 1870).
(4) List of the Reptilia, Fauna of New England, by Samuel Henshaw. Occasional Papers of the B. S. N. H., Vol. VII, 1904.

2 I am indebted to Mr. Henry J. Thayer for information regarding the habits of these turtles.

days they can be seen sunning themselves on rocks in the water, but always ready to disappear at the slightest sign of danger. They are difficult to approach, although specimens have been obtained by swimming up to and taking them by surprise. During the breeding season (June, in this region), they have been found at considerable distances from water.[3] The nests are found in sandy soil, the female depositing her eggs about two inches deep and carefully smoothing over the surface above the nest afterward. Without doubt many of these are destroyed by skunks, which "smell out" and devour the eggs of all our turtles each year. This cause alone is sufficient to prevent rapid increase in numbers. These terrapins are active here from May to October, with the exception of a short period in August, when they are said to disappear.[4]

Holbrook,[5] in discussing the habits of this species, says it is found in "streams and rivers of running water, generally preferring those with rocky beds." In the as yet unpublished "Survey of Inland Waters of Massachusetts," by the State Commissioners of Fisheries and Game, I find the following data regarding three of the larger ponds in which these turtles are abundant: *Gunners Exchange Pond*: "Greatest depth 25 ft.; middle west shore boggy; several wide sand beaches; bottom muddy." *Boot Pond*: "Area 74 acres; greatest depth 31 ft.; bottom, slight accumulation." *Island Pond*: "Area 50 acres; bottom, pebbles, stone, gravel, and brown mud." Thus it appears that a rocky bed is not an essential factor in its environment.

3 Dr. F. A. Lucas writes me that he found a large specimen in 1913 in the middle of the road, half a mile from Crooked Pond. He also has seen a broken shell found near Sparrow's Hill, one-half mile from Billington Sea.

4 Mr. Thayer reports finding on one occasion in May, a specimen which had just died, in which the only indication of disease or injury was a nasal hemorrhage. He thinks numbers die from this affection each year.

5 North American Herpetology, Vol. I, J. E. Holbrook, M.D., 1842, p. 55.

Formerly its range was considered very limited. Holbrook[6] (1842) states that it does not extend north of the Delaware River, or south of Chesapeake Bay, although abundant within those limits. This includes the Pine Barrens of New Jersey. DeKay[7] gives the "neighborhood of the city of New York" as its extreme northern limit and states that it is not found farther south than Virginia. Agassiz[8] says "it extends only from New Jersey to Virginia." Ditmars,[9] however, in 1908, makes its distribution much wider, as follows: "Occurs in eastern Ohio, Pennsylvania, New Jersey, Delaware, Maryland, the two Virginias, and northern North Carolina." This Massachusetts record, therefore, establishes a new northern limit of distribution.

This species is the *Ptychemys rugosa* of Agassiz, drawings of which appear on Plates XXVI and XXVII in Vol. II of his "Contributions to the Natural History of the United States of America." His specimens came from Washington, D. C. There are three specimens from Plymouth in the collection of the Museum of Comparative Zoology at Cambridge,[10] and one in the collection of the Boston Society of Natural History.[11]

Commercially these terrapins are known as "Sliders" and are assuming an important role in the localities where they are abundant, as a substitute for the more expensive "Diamond-back." The flesh is said to have an excellent flavor.

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6 Ibid.

7 Zoology of New York, Part III, James E. DeKay, 1842, p. 16.

8 Contributions to the Natural History of the United States of America, Vol. I, Louis Agassiz, 1857, p. 432.

9 The Reptile Book, R. L. Ditmars, 1908, p. 39.

10 (1) Specimen from Upper West Pond. Collected October, 1905, by F. A. Lucas.
(2) Specimen from Boot Pond. Collected July, 1912, by H. J. Thayer, weight 10 pounds.
(3) Specimen from Gunner's Exchange Pond. Collected July, 1912, by H. J. Thayer.

11 Specimen from Hillfield Pond, Plymouth. Collected June 19, 1916, by H. L. Babcock. Length of carapace, 11⅜ inches. Male.

Why this species remains confined only to certain ponds of a large number which are situated in Plymouth County, and why this locality is so isolated from the rest of its range, are questions which require further study. The fact remains that this terrapin is an interesting addition to the fauna of Massachusetts.

H. L. Babcock,
Boston, Mass.

[Director Frederic A. Lucas, of the American Museum of Natural History, with whom the editor has frequently discussed the occurrence of *Pseudemys* at Plymouth, has kindly furnished the following notes.—J. T. N.]

OCCURRENCE OF PSEUDEMYS AT PLYMOUTH, MASS.

Having been the first, so far as I am aware, to recognize the occurrence of *Pseudemys rubriventris* at Plymouth, Mass., I am glad of the opportunity to present a few notes in regard to the species.

In 1869 I found the carapace of what I now know to be this species lying by the roadside on Sparrow's Hill, about half a mile from Billington Sea. At the time I was acquainted only with the local species of turtles and simply recognized the carapace as belonging to some species that I had never seen, but suggestive of a huge "snake" turtle (the local name for the Painted Terrapin).

From 1869 to 1905 I saw very little of Plymouth. On September 15, 1905, I took two fully grown females of *Pseudemys rubriventris* in Upper West Pond. They were fighting and held on to each other so tenaciously that they allowed themselves to be taken into the boat with my landing net and did not let go for some time. As a matter of record, one of these specimens was sent to the Museum of Comparative Zoology and one to the U. S. National Mus-

eum, where Doctor Stejneger confirmed my offhand recognition of the species. My friend, Mr. Nickerson, told me that he had seen a turtle of this kind some years previous in Boot Pond.

On May 27, 1911, when passing Island Pond (the one near Gunner's Exchange) I saw several specimens, supposedly of this species, sunning themselves on the rocks on the eastern side of the pond. Upon stopping the carriage to get a better look at them, they immediately plunged into the water. A little later in the day a specimen in Hoyt's Pond swam from the shore directly under the boat, almost within reach of the dip net, and still later, in Gunner's Exchange, several of these specimens were seen on shore, but they literally ran to the water as soon as our boat came within sight, so that it was impossible to capture one. Hoyt's Pond is not given on the U. S. G. S. map, but it immediately adjoins Gunner's Exchange, and the two formerly were connected. Owing to the shrinkage of all the ponds about Plymouth, the two have been rarely united of late years.

On September 15, 1911, I found a carapace of this turtle in a cottage near Micajah's Pond, and was told by Mr. Standish that he had taken it there a year or two previous.

Finally, on September 26, 1913, I found, when returning from College Pond, a large specimen in the middle of the road about half a mile from Crooked Pond. It was so extremely snappy that I did not attempt to keep it.

That this species was not earlier recognized in the vicinity of Plymouth is not so surprising as it may seem. It is, as Mr. Barbour has noted, extremely shy, and even when seen or taken, there was probably no one in Plymouth who would have been acquainted with the species, but would, as I did when a boy, think it might possibly be an overgrown Painted Turtle.

Island Pond is the only one where it would probably be possible to capture specimens of this turtle with the seine. I had arranged with Mr. Barbour to seine this pond and obtained the permit for this purpose, but owing to circumstances this was never done.

Nigger Pond, included in Mr. Babcock's notes, is not on the map, but is a small, privately-owned pond, being under the twenty-acre limit, near the heel of Boot Pond.

Hallfield or Hillfield Pond is not given on the map, nor included in Davis's list of ponds, nor is it known to myself or to any of my friends. I am inclined to think the name is an error for "Half-way Pond." If so, this would extend the known range of *P. rubriventris* in Plymouth by about four miles.

It may be said that some of the names given on the U. S. G. S. map are not those in use in Plymouth. For example, Ellis Pond above West Pond, should properly be called Sabey Pond. In many instances the apostrophe is omitted, so that we have King Pond, Micajah Pond, etc., when they should be King's Pond, Micajah's Pond, etc.

The weight of ten pounds ascribed to this species is undoubtedly too great. The actual weight of a specimen of the allied *P. mobiliensis*, having a carapace 13 inches long, is only 6½ pounds; so that 5 to 6 pounds is probably the weight of a full grown *rubriventris*.

F. A. Lucas,
New York, N. Y.

Edited by J. T. Nichols, American Museum of Natural History

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A BALISTES VETULA TOPOTYPE FROM ASCENSION.

Through the kindness of Major H. N. Benett, R. M. I., Commandant of H. M. Island Ascension in the tropical Atlantic, we have had the pleasure of examining a topotypical example of the trigger fish, *Balistes vetula* Linnaeus. Reference to this fish was made by the writers in 1914, in connection with the description of a new race of the species from Trinidad Islet in latitude 20 south (Bull. Amer. Mus. Nat. Hist., Vol. XXXIII, pp. 265-266). At that time we knew of no specimen in America of *Balistes vetula* from the type locality, and in describing the subspecies *trinitatis*, which obviously differed from the West Indian form, we stated that the former might possibly prove to be identical with Linnaeus's *B. vetula* of Ascension, in which case a new name should be sought for the well-known representative of West Indian waters. Major Benett generously agreed to assist in settling the problem, and in due course an adult specimen preserved in formalin has reached us, and has been catalogued as number 553 in the collection of the Brooklyn Museum.

We have compared the Ascension Island fish with the type of *trinitatis* which it almost exactly equals in size (being 380 mm. long to base of caudal) as follows: Head, 3.0 in length to base of caudal; depth, 2.0; thickness of body, 2.0 in head. Head bluntly pointed, dorsal and ventral outlines similarly

oblique, both gently arched. Dorsal soft rays 31, anal 29. A line drawn from the origin of the soft dorsal to the origin of the anal would cut the lengthwise axis of the body a distance before the base of the caudal contained 2.4 times in the length to base of caudal. The stripes on the head are like those of the West Indian fish.

Although somewhat intermediate, the Ascension specimen is closer to West Indian examples than to the one from Trinidad. From the former it is very probably not taxonomically separable. This is in line with our idea of the probabilities in spite of the greater distance of Ascension from the West Indies than from Trinidad, based on the probable distribution of a sluggish swimming fish of this nature. The Northwesterly trade wind currents would make it difficult for a *B. vetula* to reach Trinidad from the West Indies, and as, on the other hand, Trinidad fish would not drift north of Cape San Roque, *B. vetula* from that island would be pretty effectually isolated from the North Atlantic current circuit, whereas those from Ascension would be on the outskirts of the same.

The high fin-count of the Ascension fish places it with descriptions of those from the Indian Ocean, which may leave the West Indian form as *Balistes vetula bellus* (Walbaum). We suspect that if the West Indian fish is separable from the Ascension, the Indian Ocean one will be found to be so also. As far as is determinable from a single specimen, *trinitatis* is a valid race.

J. T. Nichols,
R. C. Murphy,
New York, N. Y.

FISHES FROM PUNTARENAS, COSTA RICA.

A collection of fishes was obtained from the Costa Rica government many years ago by the Commercial Museums of Philadelphia. Recently, having

had the opportunity to study it through the kindness of Dr. W. P. Wilson, Director of the Museums, the list of species given below was ascertained:

Urotrygon mundus Gill, *Sciaedichthys troscheli* (Gill),

Gymnothoraæ punctarenae, sp. nov.: Head, 6½; depth, 11; snout, 5¼ in head; eye, 7; mouth cleft, 2⅓; interorbital, 4-4/5. Eyelids joined to skin of head. Teeth all uniserial, large compressed, lower front five enlarged and firm, and six large front upper ones with three depressible inwards. Hind edge of each tooth on its basal half, finely serrated. Lips fleshy. Front nostrils in short tubes, hind ones each as simple pore close over edge of each eye above. Body reticulated with brownish, leaving pale irregular blotches which become much larger and less defined on tail, until at tail end they form several large irregular vermiculations of brownish. Dorsal fin with basal half like color of back, border with dark brown broken marginal blotches. Anal largely dark brown, at least over greater marginal portion. Upper surface of head finely spotted or dotted with paler. Lower surface of head and belly pale, with faint and darker reticulations. Iris olive. Slight brownish blotch above gill-opening, though latter not surrounded by brown. Length 20-5/8 inches, from snout tip to vent 10¼ inches. Only one example. This species falls within the subgenus *Priodonophis* Kaup, on account of its serrate teeth. It differs, however, from the common Atlantic *G. ocellatus* in coloration.

Echidna nocturna (Cope), *Fundulus dovii* (Günther), *Mugil hospes* Jordan and Culver, *Holocentrus suborbitalis* Gill, *Caranx hippos* (L.) *Apogon dovii* Günther, *Centropomus nigrescens* Günther, *C. robalito* Jordan and Gilbert, *Dermatolepsis punctatus* Gill, *Lutjanus jordani* (Gill), *L. argentiventris* (Peters), *Haemulon scapfasciatum* Gill, *Anisotremus pacifici* (Günther), *A. dovii* (Günther), *A. interruptus* (Gill), *Brachydeuterus leuciscus* (Gün-

ther), *Pomadasis branicki* (Steindachner), *Buccone praedatoria* (Jordan and Gilbert), *Bairdiella ensifera* (Jordan and Gilbert), *Xystaema cinereum* (Walbaum), *Gerres brevimanus* Günther, *Kyphosus analogus* (Gill), *Pomacentrus rectifraenum* Gill, *Nexilarius concolor* (Gill), *Abudefduf mauritii* (L.), *Chaetodipterus zonatus* (Girard), *Pomacanthus zonipectus* (Gill), *Holacanthus passer* Valenciennes, *Balistes naufragium* Jordan and Starks, *Spheroides annulatus* (Jenyns), *Tetrodon hispidus L. Eumycterias punctatissimus* (Günther), *Scorpaena histrio* Jenyns, *S. mystes* Jordan and Starks, *Philypnus lateralis* Gill, *Dormitor maculatus* (Bloch), *Mapo soporator* (Valenciennes), *Paralichthys woolmani* Jordan and Williams.

Henry W. Fowler,
Philadelphia, Pa.

A COLLECTION OF FOOD-FISHES FROM ARGENTINA.

The Academy of Natural Sciences of Philadelphia received during the past summer a collection of the larger and more important food-fishes from the Argentina government. Though no definite locality is assigned, the specimens were doubtless obtained at Buenos Aires:

Mustelus mustelus (L.), *Luciopimelodus pati* (Valenciennes), *Pimelodus albicans* (Valenciennes), *Pseudoplaytystoma coruscans* Agassiz, *Doras granulosis* Valenciennes, *Loricaria anus* Valenciennes, *Prochilodus platensis* Holmberg, *Salminus brevidens* (Cuvier), *Menidia bonariensis* Valenciennes, *Mugil brasiliensis* Agassiz, *Sarda sarda* (Bloch), *Seriola rivoliana* Valenciennes, *Trachinotus glaucus* (Bloch), *Pomatomus saltatrix* (L.), *Perona signata* (Jenyns), *Polyprion oxygenius* (Schneider), *Acanthistius patagonicus* (Jenyns), *Sparus pagrus* L. *Cynoscion striatus* (Cuvier), *Sagenichthys ancylodon* (Schneider), *Micropogon opercularis* (Quoy and Gaimard),

Pogonias cromis (L.), *Pinguipes fasciatus* Jenyns, *Chilodactylus macropterus* (Schneider), *Helicolenus dactylopterus* (De Lar), *Prionotus punctatus* (Bloch), *Paralichthys brasiliensis* (Ranzani), *Percophis brasiliensis* Quoy and Gaimard, *Genypterus blacodes* (Schneider), *Phycis brasiliensis* Kaup, *Merluccius gayi* Guichenot.

HENRY W. FOWLER,
Philadelphia, Pa.

GRAND CANYON NOTES.

On a first and brief visit to the Grand Canyon of Arizona, June 6-10, 1916, en route to California, as might be expected, little time was available for herpetological observations. The few notes that were taken seem worth recording, chiefly because they come from a region of such extraordinary interest.

Two days were spent in conventional trips along the rim of the Canyon, the third day on a walk down the Bright Angel Trail to the Colorado River, and the fourth and last day in Camp near the Indian Garden on the inner plateau of the Canyon.

The dry season being well advanced, no batrachians, but many lizards of the genera Sceloporus and Holbrookia, were seen on top of the Canyon. Lizards in the Canyon averaged larger in size, and in addition to the genera mentioned included Crotaphytus, Gerrhonotus and Cnemidophorus. A specimen of *Sceloporus clarkii* captured in the Indian Garden is still living in the New York Zoological Park.

Two Batrachians—*Hyla arenicolor* and *Bufo punctatus*—were common in the Canyon.

Hyla arenicolor was observed along the small stream which runs through the Indian Garden, enters a narrow inaccessible gorge and reappears at the foot of the Bright Angel trail near the Colorado River. Dense thickets of willow, sedges, etc., border the stream, except at trail crossings, where clear, shallow pools have formed. In and about these pools the

frogs were most numerous, some still mating. No ova, but plenty of tadpoles were found in the water.

The tadpoles were about one inch long; uniformly dark gray above and iredescent light gray below; tail broad, heavily marbled, dark gray; eyes golden. The adult frogs averaged about two inches in body length, and were uniformly light gray above, with numerous minute spots and granulations, giving the skin the appearance of roughness.

The call of this frog is lower in pitch, but is otherwise very much like the bleating notes of *Hyla versicolor*. It was heard, occasionally, during the day, increased in volume towards dusk, and continued through the night. Only two of eight specimens, captured and sent to the New York Zoological Park, arrived alive.

Bufo punctatus, without doubt, is the most abundant of Batrachians in the Canyon, yet so secretive and strictly nocturnal is this toad that none are likely to be encountered, except after dark. During the one night spent in the Canyon its call, mingling with that of *Hyla arenicolor,* was the dominant sound of animal life. Search for the toads with an acetylene lamp revealed such numbers that no attempt was made to count them. There were hundreds—many on the trail and many more in the shallow pools in the Indian Garden. None were seen mating, but their small, black tadpoles, not exceeding half an inch in length, were swarming along the margin of the stream. Breeding evidently had taken place during May.

In size as well as in general appearance there is so little difference between this toad and *Hyla arenicolor* that one might easily be mistaken for the other. The call, though loud, is not harsh and consists of a series of deep, whistling notes, repeated at short intervals.

At least two more species of frogs are to be found along the stream in the Indian Garden. Of one, a

species of Rana, the tadpoles, fully two inches in length, were seen in the pools. Several times during perhaps an hour, a short, deep croak was heard coming from the willow thickets. It reminded the writer of *Rana palustris*.

Of another frog only the call, a soft click-click-click, was heard. It came from a cluster of aquatic plants in the middle of a pool, but the songster, undoubtedly a very diminutive creature, could not be found.

GEORGE P. ENGELHARDT,
Brooklyn, N. Y.

A NEW RECORD FOR THE RING-NECKED SNAKE IN MICHIGAN.

A specimen of *Diadophis punctata* (L.), captured near Marquette, has been presented to the Museum of Zoology, University of Michigan, by the Northern State Normal School. This is of interest not only as a new locality for the snake but also because it extends the known range of the species considerably, since it is the first authentic record of its occurrence in the Northern Peninsula. The species had been reported from Marquette, but, in view of the fact that young Storerias may be easily mistaken for ring-necked snakes, this record has been "open to question," as stated by Ruthven in the "Herpetology of Michigan."

HELEN THOMPSON GAIGE,
Ann Arbor, Michigan.

HABITS AND BEHAVIOR OF THE TEXAS HORNED LIZARD, *Phrynosoma cornutum*, Harlan, II.

An interesting fact mentioned by many writers, and easily confirmed, is that the horned lizard is very sensitive to the stings of the large agricultural ants which form its principal food. The lizard will fidget

nervously when stung by an ant on the back or on the leg, yet can swallow the insect alive and entire. The lining of the esophagus and the stomach seems to be peculiarly resistant.

A common habit, seen in about twenty-five per cent. of specimens, is that of wagging the tail when irritated. Incidentally, this habit is quite general among reptiles. Many non-venomous snakes vibrate the tail when surprised. Often they are mistaken for rattlesnakes, as the sound of a rapidly vibrating tail in leaves or dead grass is not unlike the warning of *Crotalus*.

The male horned lizards sometimes fight each other in hot weather,—if confined closely. This fighting seems to be rather harmless, consisting mainly of vigorous puffing and blowing. The writer once observed a large male dragging around a smaller one holding its tail in his mouth.

Horned lizards, unlike other lizards, do not have the power to break off the tail, when that member is grasped. In fact, a convenient method of capture is to seize the animal by its tail.

The Texas form may at times greedily lap up water, but seems to depend mainly on drops of dew on the vegetation. This habit is shared by the other members of the genus.

In North-central Texas, the horned lizards disappear with the first cold burst, which comes on usually between the middle of September and the first of October. Occasional specimens, especially very young forms, may be found as late as the first of December; but the majority are gone for the winter, after the first "norther" despite the many warm days which may follow.

W. M. Winton,
Fort Worth, Texas.

Edited by J. T. Nichols, American Museum of Natural History

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FURTHER NOTES ON ERILEPIS, THE GIANT BASS-LIKE FISH OF THE NORTH PACIFIC.

In Copeia for April 24, 1916, (No. 30) the writer noted the second occurrence of *Erilepis zonifer* (Lockington) in the North Pacific. Since then several interesting facts have come to light concerning this huge fish that have modified what was previously said. It is especially noteworthy that there is no special reason for believing the fish a stray from Japan, as has been conjectured.

According to one of the fishermen, the specimen already recorded had been taken in "Southeastern Alaska, in one of the long inland straits which form the inland passage, either in Frederick Sound or Chatham Straits." The captain of the halibut schooner, however, when seen at a later date stated positively that the specimen was taken off the western coast of the Queen Charlottes, near the northern end. His record is undoubtedly correct, and it is evident that *Erilepis* was taken on the continental shelf, rather than in enclosed waters.

While in Vancouver during November, at the plant of the Canadian Fishing Company, the writer was shown two other specimens of this fish. Under

the heading "A Freak Fish," a statement with a photograph of the larger was given in the "Pacific Fisherman" for November, as follows: "While the halibut schooner Borealis was fishing with halibut trawls in 240 fathoms of water in Rennel Sound on the west coast of Queen Charlotte Island, British Columbia, during October, a fish which weighed, in the round 175 pounds, and when dressed 145 pounds, was caught. It measured 5 feet 10 inches in length." The opinion was expressed that it was "a large sea bass," from "Southern Pacific waters." The large example was given to the British Columbia Provincial Museum, where a cast will be made and placed on exhibition. Through the kindness of the company manager a smaller specimen caught at the same time was sent to Stanford University in a frozen condition. There it has been carefully examined, and compared with a Japanese specimen, undoubtedly the same species.

It will be noted that the locality was the same as the corrected one for the first specimen. The probability is that there is an available explanation for the occurrences. In the region indicated, the continental shelf drops with great rapidity to oceanic depths, and a halibut trawl set in 150 fathoms on its shoreward end frequently drops as far as its buoys will allow it on the seaward end. This may be as much as 400 fathoms. It has only been in recent years, particularly in the winter, that halibut fishing has been carried on in depths of 140 fathoms and more, as has been shown in the reports of the British Columbia Commissioner of Fisheries for 1915. The cousin of the present species, the Alaska black cod *Anoplopoma*, inhabits considerable depths also, and in the last few years more of them are being caught by the halibut boats. The fishermen even occasionally bring up Macrouroid species, formerly utterly unknown to them. This "rare" fish, then, has perhaps been

caught by the fishermen while they were utilizing unusual depths, and it may well be common and relatively abundant in its peculiar habitat.

The Japanese fishermen, it is worthy of note, fish their waters more closely than is done on our coasts, and Dr. Jordan and Prof. Snyder say: "According to Kuma Aoki, an intelligent fisherman of Misaki, it is occasionally taken in the Kuro Siwo, it is not rare, and reaches a weight of 200 pounds. Although so rare in collections the species is well known to the fishermen." There is no good reason why more extensive exploitation of our fishing grounds will not bring to light at least an abundance equal to that of the species in Japan. It is hence unjust to call the fish a "stray," and one must be reserved in calling it "rare."

Since the only specimens known to be preserved in museums have come from Japan, and the type of the species (from Monterey, California,) which was in the collection of the California Academy of Sciences in San Francisco has been destroyed, the following notes regarding the specimen now at hand are appended.

The fish, 112 cm. in total length and 98 to base of caudal, is bass-like with massive head and rotund body, its width ⅔ its depth, but with somewhat slender caudal peduncle, nearly round and quickly tapering. The interorbital is wide, convex. The eyes are small, slightly oval, lateral in outlook, and over a wide suborbital. The maxillary ends below the center of the pupil. The lower jaw projects somewhat; its tip, lying in the axis of the body, continues the profile lines of the head and body, which taper evenly anteriorly and posteriorly.

The teeth are in a band six or seven series wide anteriorly in the upper jaw, four or five below, narrowing posteriorly; recurved, slender and sharp; none of them canine-like, or enlarged; in a V shaped patch

on vomer; in narrow bands on palatines. The gill arches and viscera were removed when the fish was frozen.

The dorsals are apparently separated by the space of two spines, but dissection shows these to be present, buried below the thick skin; two anterior spines are very short; the third is the longest, with the margin of the fin falling straightly to the first buried spine; preceding the soft rays are two unjointed rays (or spines), closely applied to the third. The soft dorsal is highest at the fifth ray, slightly emarginate in outline. When supine the longest dorsal ray reaches over the basis of seven following rays, while that of the similarly shaped anal reaches to the base of the last. The last rays in both fins are less in length than the eye diameter. The pectorals are a little falcate in shape, and extend back to the level of the eighth dorsal spine. The ventrals are inserted a short distance behind the pectorals.

Scales are present everywhere on exposed surfaces save the lips, edges of fins, membranes of spinous dorsal, edges of branchiostegal flaps, and the inner surfaces of paired fins; rough to touch, they are not roughly ctenoid; they appear non-imbricate because buried deeply.

The color is very dark, save for projecting whitish edges of scales; only traces of dark bands are present, one as wide as ⅔ of the head length lying under the pectorals, 3 others of equal width respectively just before the vent, over the posterior two-thirds of the anal, and on the caudal peduncle. Ventrally the body is not markedly lighter than dorsally. The peritoneum is scraped away, but the buccal lining shows very dark. Lips and fin edges are black, with strong tinges of blue.

The measurements follow: Head .32 of length to base of caudal; depth. 30; body width .19; eye .045; maxillary length .13; width .032; suborbital width

.04; snout length .11; mandible .16; interorbital .12; pectoral base .075; length .18; ventral .125; 3rd dorsal spine .085; 5th dorsal ray .11; last .037; 5th anal ray .12; last .037; soft dorsal base .25; anal base .16; depth of caudal peduncle .085; width .07; dorsal rays XIII, II 17; anal II 13; pores in lateral line .126; scales from lateral line obliquely forward and upward to dorsal insertion 30, downward and backward to anal 51; pectoral rays 19; branchiostegals 7.

WILL F. THOMPSON,
British Columbia Fisheries Dept.

ANOTHER RECORD FOR *ASCAPHUS TRUEI* STEJNEGER.

There have been, to the writer's knowledge, but two additional records for the American Bell Toad, *Ascaphus trui,* since the report of the capture of the single original specimen (the type of a new genus and the only member of the family *Discoglossidae* known from the Western Hemisphere). The type was found nineteen years ago at Humptulips, Chehalis County, in southwestern Washington. In 1906 the species was discovered on the southeast slope of Mount Ranier at an altitude of 6,000 feet, and was taken later on the same mountain at 4,861 feet altitude on the southwest side.[1]

Dr. A. C. Chandler of the Oregon Agricultural College, Corvallis, Oregon, has recently sent the writer a specimen of *Ascaphus truei* taken in Oregon. Dr. Chandler's specimen was captured on Red Creek in the Santiam National Forest, Linn County, Oregon, at an altitude of 3,000 feet. The district is a heavily forested one; and trees common in the locality are Douglas Fir, Coast Hemlock and *Pinus monticola.* The "toad" was found at the edge of the creek which is here a cold, swift mountain-stream.

Judging from the cartilaginous condition of the limb bones and the skull-roof and the small size the

[1]Van Denburgh, Proc. Calif. Acad. Sci., ser. 4, 3, 1912, pp. 259-264.

specimen is an immature. Its measurements are: total length 26 millimeters, "tail" one millimeter, hind limb 39, hind foot 18, overlap of heels behind anus 4, head width 9, length of parotoid 7, width of parotoid 2.7. The specimen agrees in all but minor points with descriptions of *truci*. There is a gular fold across the chest. The color in alcohol is uniform, dark, slaty grey above, without any traces of darker markings, and including the top of the head anterior to the eyes. The snout has a lighter Y-shaped median, vertical band between the two darker spots about the nostrils. Below the eye is another dark area separated from the nasal patch by a lighter spot. The underparts are dusky yellow and a continuation of this color is seen in a light band across the shoulder. The numerous small tubercles on the back are each tipped with white.

CHARLES L. CAMP,
New York, N. Y.

SOME AMPHIBIANS AND REPTILES FROM BUCK'S COUNTY, PENNSYLVANIA.

While working over the collections of the Academy of Natural Sciences of Philadelphia, the following records were noticed. As no list of these animals has ever been given for this section, all the species are included.

Hemidactylium scutatum, Fallsington; *Plethodon erythronotus,* Woodbourne; *Spelerpes bislineatus,* Hulmeville; *S. ruber,* Woodbourne and Hulmeville; *Desmognathus fusca,* Bristol, Hulmeville, Woodbourne and Wycombe; *Bufo americanus,* Bristol, Pigeon Swamp, Cash Ledge, Tullytown, White's Island, Langhorne, Wycombe, Doylestown; *Pseudacris triseriatus,* Kintnersville; *Acris gryllus crepitans,* Bristol, Edgely, Badger Island, Rocky Woods, Penn Manor, Scott's Creek, Edison, Woodbourne, Doylestown; *Hyla pickeringii,* Bristol, Tullytown, Scott's

Creek, Rocky Woods, Kintnersville; *H. versicolor,* Bristol; *Rana pipiens,* Bristol, Emilie, Fallsington, Tullytown, Cash Ledge, Rocky Woods, Scott's Creek, Langhorne; *R. catesbeiana,* Scott's Creek, Tullytown, Langhorne, Bridgetown, Woodbourne, Edison, Wycombe, Doylestown; *R. clamata,* Bristol, Emilie, Rocky Woods, Cash Ledge, Scott's Creek, Bridgetown, Langhorne, Woodbourne, Fallsington, Edison, Wycombe, Doylestown; *R. palustris,* Andalusia, Emilie, Tullytown, Scott's Creek, Woodbourne, Fallsington, Bridgetown, Edison; *R. sylvatica,* Rocky Woods and Fallsington; *Natrix sipedon,* Eddington, Bristol, Scott's Creek, Rocky Woods, Woodbourne, Langhorne, Core Creek, Wycombe, Edison; *Storeria dekayi,* Eddington and Bristol; *Diadophus punctatus,* Croydon; *Coluber constrictor,* Rocky Woods and Bristol; *Thamnophis sauritus,* Croydon and Emilie; *T. sirtalis,* Bristol, Hulmeville, Rocky Woods; *Sceloporus undulatus,* Nockamixon; *Chelydra serpentina,* Croydon, Bristol, Woodbourne and Edison; *Kinosternon pensylvanicum,* Tullytown, Core Creek and Woodbourne; *Sternothoerus odoratus,* Bristol, Tullytown, Scott's Creek, Langhorne; *Pseudemys rubriventris,* Bristol; *Chrysemys picta,* Bristol, Tullytown, Emilie, Rocky Woods, David's Well, Croydon, Scott's Creek, Woodbourne, Wycombe, Edison; *Clemmys insculpta,* Bristol; *C. guttata,* Bristol, Tullytown, Rocky Woods, Scott's Creek, Woodbourne, Edison; *Terrapene carolina,* Woodbourne and Doylestown.

HENRY W. FOWLER,
Philadelphia, Pa.

STUDYING THE BOX TURTLE.

While collecting insects in woods at Orient, Oct. 8, 1916, I met an unusual, large, handsome male box turtle *Cistudo carolina.* The plastron measured six and a half by five inches. The head and neck exceptionally bright orange.

Placing the animal on the sand in a small clearing, I reclined under a shrub oak to study procedure. Shortly the splendid head and neck were erected and held in a steady gaze. Presently a rustling was heard among the dry leaves to one side, which gradually drew nearer. Finally the upstretched neck and shell of a smaller male box turtle appeared in view at the margin of the clearing 12 feet from the powerful specimen, which had remained absolutely motionless, but staring intensely at the new arrival. The small one advanced 4 feet, then paused, then another 4 feet venture and another pause. At the last pause, which was 4 feet from the first individual, the big fellow suddenly rushed at the new-comer with open mouth and grabbed it by the nape with such force as to roll it over on the side. It held the head to the ground for about 2 minutes, while the victim struggled unsuccessfully to draw its head within the shell. Releasing its hold, it actually climbed over the conquered foe and walked rapidly away. It had traveled 10 feet when the small one hurried directly after it. The leader paused every few feet in the usual manner, but the other continued without halting till it was 2 feet in the rear. Thereafter it was very alert and copied perfectly every start and pause of the leader, which, evidently, was in ignorance of its shadower. I watched this interesting bit of wild life for 60 feet, when the head animal disappeared into thick cover, leaving the rear tortoise gazing ahead in a puzzled, undecided quandary. It finally turned and came directly by the writer, while passing about 3 feet to one side. I talked loudly, whistled and sought to arrest its attention by mouth, while remaining perfectly motionless, but without success. However, the slight raising of one arm caused the head to be drawn suddenly into the shell with alarm.

ROY LATHAM,
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Edited by J. T. NICHOLS, American Museum of Natural History
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Published to advance the Science of cold-blooded vertebrates

MIGRATION NOTES OF FISHES, 1916, FROM ORIENT, LONG ISLAND.

The records mentioned below were all taken from Long Island Sound, unless otherwise noted. Our pounds were removed on December 15. This is a considerably later date than usual, and several new late records were made for the locality. All the measurements given are in total lengths. Most of the species herein listed were either identified or verified at the American Museum of Natural History.

Mustelus canis. Smooth Dogfish. First one taken May 29, four, 36 to 49 inches. Last one taken December 4, one 14 inches. One 14 inches taken November 28, also a 13-inch specimen from Long Beach Bay, November 13. Largest individual of the season was 51 inches, taken on August 18. It is known among the fishers here as "Swing-tail Dogfish."

Carcharias littoralis. Sand Shark. First taken July 6, one 4 feet. Last taken October 21, one 24 inches.

Squalus acanthias. Spined Dogfish. Last one taken in Spring, May 17, one 30 inches. First one taken in Fall, October 20, five 36 inches. On October 23, 500 were taken in two traps. Were of daily occurrence till December 12. It is called here Horned Dogfish.

Raja erinacea. Common Skate. A permanent

resident in Orient waters. It is washed ashore in winter gales. Several seasons ago we kept a trap in Gardiner's Bay throughout the winter, and this species was secured at all the weekly hauls. It is taken more commonly during the hot summer weather in shallow water traps than in the deep water gears. Known as "Tobaccobox" and less frequently as "Old Maid."

Raja laevis. Barn-door Skate. First one taken May 8, one 48 inches. Last one taken December 14. Regular, but not common, throughout the summer. A specimen taken December 12 had the following measurements: Length, 52 inches; expansion across wings, 38 inches. The local name is "Sharp-nosed Skate."

Acipenser sturio. Common Sturgeon. One record, December 8, one 4 feet.

Elops saurus. Big-eyed Herring. One October 30, 14 inches. We usually obtain one or two records each Fall, averaging about this size.

Etrumeus sadina. Round Herring. First taken May 24, one 3 inches. Last taken December 8. It appeared in large schools in September and continued in abundance till November 20. It was noted daily till December 1. On December 4, 100 were taken. The average length was 5 to 6 inches in the schools and the largest taken 7 inches.

Brevoortia tyrannus. Bunker. First taken May 5, fourteen. Last taken December 15. The young, ranging in length from 1½ to 6 inches, were very common from October 29 to the end of the season. Not so many young have been noticed before in fifteen years. The last adult was taken November 25, in Long Beach Bay.

Stolephorus mitchilli. Common Anchovy. Arrived June 23, in large schools. Last taken December 14. Abundant from October 1 to December 4.

Osmerus mordax. Smelt. Last one taken in Spring, June 9. First one taken in Fall, October 2.

Also the following summer records: July 14, two; August 28, two. All about 7 inches in length.

Synodus foetens. Lizzard Fish. One taken October 9, 12 inches in length. This is the only example of this species the writer has secured from Orient.

Tylosorus marinus. Billfish. First taken May 7, two 14 inches. Last taken November 19. One was taken on November 13, and one November 10. Largest specimen of the year was 28 inches, taken September 28.

Hyporhamphus roberti. Half-beak. First taken July 12, one six inches. Last one taken November 6, three. Two were taken July 17, and one, October 18. All these latter records were near 9 inches in length.

Mugil curema. White Mullet. First taken June 4. Last taken December 13. Large schools of young were observed late in September and through October.

Sphyraena borealis. Northern Barracuda. First one taken June 20. Last one taken October 19, one 12 inches. This fish was extremely rare during the season. Only one specimen was taken after September 15. In 1915, it occurred daily through October and most of November.

Scomber scombrus. Common Mackerel. First taken May 23, two, 6 inches. Last taken December 14, three, 7 inches. Was common in schools till November 22, ranging in size from 7 to 10 inches. There were swarms of young on June 23, about 2 inches long. By July 17, these had obtained a length of 3 inches.

Scomber colias. Thimble Mackerel. First taken July 14. Last taken December 12, three, 5 to 8 inches.

Sarda sarda. Bonito. One record. One 12 inches on September 15. This is a very uncommon

species in Orient waters. Occasionally a dozen may be taken at one haul, or single individuals up to twenty in a season.

Scomberomorus maculatus. Spanish Mackerel. One September 6, 18 inches in length, with a weight of 1¾ lbs. is the only record. It is at present a very rare species. In 1915, no record was made. In 1914, four, of 2 lbs. each, were caught at one time. In 1913, one individual of 6 inches. It is forty-five years since the last big run occurred at Orient.

Xiphias gladius. Swordfish. A specimen weighing 200 lbs was taken in Gardiner's Bay, July 1. A rare visitor near Orient.

Seriola zonata. Banded Rudder Fish. First one taken August 1. Last one taken October 28. Specimens range from 3 to 6 inches.

Decapterus punctatus. Scad. First taken August 29. Last taken November 17. Specimens are from 2 to 6 inches. It is most common in October.

Caranx hippos. Jackfish. First taken July 30. Last taken October 30. Specimens 2½ to 8 inches. More common than usual, 20 to 30 sometimes being captured at a single lift.

Vomer setipinnis. Lookdown. First September 29. Last taken October 19. Specimens are 1½ to 3 inches.

Trachinotus carolinus. Pompano. One 7-inch specimen, October 30, is the only record. More than one record a year is an exception.

Pomatomus saltatrix. Bluefish. First adult taken June 23, and the last, October 3. Young "snappers" were common till November 1, and the last taken November 28. Young individuals from 1 to 2 inches in length were common in the Sound on July 6, but had entirely disappeared by the 15.

Rhombus triacanthus. Butterfish. First one taken May 15, two 8 and 10 inches. Last one taken December 14. Young specimens from 1 to 4 inches

were common in the Fall, till December 1. It is an abundant species and better known as "Shiner."

Centropristes striatus. Sea Bass. First one taken May 3, and the last, a specimen of 2½ inches, in Long Beach Bay, on December 7. The last adult was taken on October 18.

Orthopristis chrysopterus. Pigfish. One taken June 29, 9½ inches. The first specimen in several years and the largest record taken here.

Stenotomus chrysops. Porgy. First one taken May 15, two 8 and 10 inches. Last one taken December 4. There was a great abundance of young from October 20 to December 1. From ten to twenty thousand ranging from 1 to 3 inches would collect in a trap over night.

Cynoscion regalis. Weakfish. First one taken May 17, two 13 and 14 inches. Last one taken December 8, three, 4 to 7 inches. Six were taken on November 27. The last adult was taken on October 30, weighing 4 lbs. The largest individual of the season had a weight of 14 lbs.

Leiostomus xanthurus. Lafayette. First one taken September 2. Last one taken November 28. Specimens ranging from 2 to 12 inches. The specimen of 12 inches, taken on September 27, weighed ¾ lb., and is the largest I have record of. September 16 one was taken 10½ inches. On October 21, three 9-inch specimens were caught. Three were taken on the date of November 27.

Menticirrhus saxatilis. Kingfish. First one taken May 15, one 10 inches. Last one taken December 8. There were numerous November records from 3 to 7 inches.

Chaetodipterus faber. Spadefish. One taken October 2 was 16 inches in length, 9 inches deep, weight 3¾ lbs. One October 4, about the same size and a third specimen on October 6, 12 inches in length.

Balistes carolinensis. Triggerfish. One on November 11, 10 inches.

Monacanthus hispidus. Filefish. First one taken September 10. Last one taken November 22.

Lagocephalus laevigatus. Rabbitfish. A specimen of 6 inches November 1.

Spheroides maculatus. Swellfish. First one taken May 29, two 6-inch. Last one taken December 15. Young of 1 to 3 inches were frequently taken through November and first of December. Last adult taken October 28.

Myoxocephalus aeneus. Pigmy Sculpin. Last one in Spring taken June 8. First one taken in Fall, November 4. Three females were taken on November 20, that measured 7 inches each. Of the form called *M. mitchilli* the following records, all from Long Beach Bay, were taken: two November 25, (first); one December 2; four, December 4. All of these were uniform in size and very conspicuous with their bold black markings amongst the numbers of Brassy Sculpins in a boat.

Myoxocephalus octodecimspinosus. 18-spined Sculpin. Last one taken in Spring, June 9. First one taken in Fall, October 1. Common throughout the winter. Known locally as "Horned Fish."

Prionotus carolinus. Sea Robin. First one taken May 17. Last one taken November 29. Six adults were taken October 31. All those following were young from 2 to 5 inches.

Merlucius bilinearis. Whiting. One 4 inches was taken March 3. Three individuals were taken on June 9, and one on July 13, 6 inches in length. Arrived from north, October 3, and was taken regularly to December 15.

Pollachius virens. Pollack. Young individuals from 2 to 6 inches were taken all through the summer. On May 29, one weighing 21 lbs., with a length of 36 inches was secured. Another of 14 lbs. was

taken on June 14. Adults are exceedingly rare in local waters.

Urophycis regius. Codling. The following summer records were made: one, May 19; one, June 9; one, August 11. Averaging about 7 inches.

Urophycis tenuis. Codling. Last taken in Spring, May 6. First taken in Fall, September 25; was common by October 3, which is much earlier than usual.

Paralichthys dentatus. Summer Flounder. First one taken May 4. Last one taken December 15, a splendid specimen of 15 lbs. One of 22 inches was taken on November 30. November 27, four were secured from 28 to 30 inches.

Roy Latham,
Orient, N. Y.

FISHES FROM THE VIRGIN ISLANDS, WEST INDIES.

A small collection made by Mr. A. D. Brown in 1878 was recently sent to me for study, by Mr. C. F. Silvester, of Princeton University. Only one example is with definite locality, and that reads St. Thomas, July 18, 1878. This is one of the larger islands, and due east about forty miles from Porto Rico. As no fishes have previously been reported from the Virgin Islands, the following list is offered:

Myrophis punctatus Lutken. *Hemiramphus brasiliensis* (Linnaeus). *Holocentrus adscensionis* (Osbeck). *Caranx latus* Agassiz. *Trachinotus glaucus* (Bloch). *Epinephelus striatus* (Bloch). *E. adscensionis* (Osbeck). *Lutianus synagris* (Linnaeus). *Ocyurus chrysurus* (Bloch). *Haemulon plumieri* (Lacepede). *Bathystoma aurolineatum* (Valenciennes). *B. striatum* (Linnaeus). *Calamus calamus* (Valenciennes). *C. kendalli* Evermann and Marsh. *Upeneus maculatus* (Bloch). *U. martinicus* Valenciennes. *Sparisoma xystrodon* Jordan and

Swain. *S. abildgaardi* (Bloch). *S. aurofrenatum* (Valenciennes). *S. viride* (Bonnaterre). *Callyodon taeniopterus* (Desmarest). *C. vetula* (Schneider). *C. caeruleus* (Bloch). *Pomacanthus arcuatus* (Linnaeus). *Hepatus coeruleus* (Schneider). *Balistes vetula* Linnaeus.

HENRY W. FOWLER,
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ANOTHER RECORD OF *AMBLYSTOMA OPACUM* FROM LONG ISLAND.

During the summer and fall of 1916 several collecting trips for the adults of the tiger salamander were made, with rather negative results as regards that species, but two adults with eggs of the marbled salamander, *Amblystoma opacum*, were found by Mr. J. M. Ketcham, of Glen Head, L. I. They were discovered under logs in a dried-up pond on the Hudson Estate near Syosset, and were kept in damp soil. After several weeks Mr. Ketcham presented them to the N. Y. Zoological Park, where the ova arrived on October 31, in rather a dry condition, and shrunk to about one-third of their original size. The writer placed them into a small aquarium with four inches of water, and after being submerged about 45 minutes, they began to hatch. The gelatinous cover had absorbed the water, bringing the ova back to their natural size, which was about 3-16 of an inch. Within an hour after beginning to hatch, all the larvae had emerged. Of the 88 larvae hatched, 76 found their way to the Rockefeller Institute, where Dr. Eduard Uhlenhuth is using them in his experiments on the transplantation of the amphibian eye and other biological work. A dozen were retained and are now on exhibition in the Reptile House at Bronx Park.

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ABSTRACT OF THE PROCEEDINGS OF THE SECOND ANNUAL MEETING OF THE AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS, held in the Lecture Hall of the Academy of Natural Sciences of Philadelphia, March 8, 1917.

THE FISHES OF THE LANG-CHAPIN CONGO EXPEDITION. John T. Nichols. (No abstract.) These results will be incorporated in Mr. Nichol's forthcoming report to be published by the American Museum of Natural History, New York.

A RESTORATION OF THE CARBONIFEROUS AMPHIBIAN ERYOPS. Dwight Franklin. (No abstract.)

SOME EXPERIENCES WITH SNAKES AND TURTLES. J. Fletcher Street. (No abstract.)

NOTES ON THE TAXONOMIC VALUE OF DERMAL DENTICLES AND TEETH IN IDENTIFYING SHARKS. Lewis Radcliffe.

Sharks represent one of the most interesting groups in the field of ichthyology, but a very difficult one for the average worker. For many of the species it is almost impossible to find satisfactory descriptions, or was so until very recently. One reason for this is that we cannot transport a shark 10 to 50 feet in length, weighing from 300 to 10,000 pounds or more, with ease to our laboratories, and very often our field notes do not suffice for identification purposes. Even when it is possible to bring large specimens to the laboratory, identification must be made at once and the remains cast adrift, the element of large size prohibiting the preserving of large numbers for compara-

tive purposes. On the other hand, there is a paucity of material in our collections which could have been preserved easily and would have aided us greatly in our studies.

In the summers of 1912-14, while at Beaufort, N. C., excellent opportunities were afforded for collecting material, but very little time for studying it. This directed attention to the minimum of material that should be saved and the following plan developed:

1. Make as detailed field notes and measurements as time will permit. Include careful descriptions of parts of head, form of fins and distinctive color-markings.

2. If provided with a camera, photograph lateral view of entire fish and ventral surface of head including pectorals. These often aid in checking measurements and supply important details which may otherwise be overlooked.

3. Preserve a piece of shagreen from the middle of the side below the first dorsal fin. A piece 3 inches square is ample and may be preserved in alcohol in a small vial or bottle, or dried.

4. Remove the jaws entire. For doing this a stout, sharp pocket or hunting knife is much more satisfactory than an axe or cleaver and after a little practice you will be surprised at the ease with which it may be done. As soon as convenient the jaws should be cleaned and dried. They are then easily shipped by parcels post or express.

When one is prepared to study the material collected in the field, a small piece of the shagreen should be permanently mounted on a dry cell. The denticles may then be studied with the microscope after which the slide may be filed for future comparisons. At first one may be somewhat bewildered by the marked similarity of denticles of various species. Others, however, will be found with characters which are distinctive and by the process of elimination assistance will be afforded.

In studying the denticles it should be noted whether they are close set, imbricated or more or less scattered, whether uniform or variable in size, the number and character of the keels on the outer surface and the individual variation with age.

As the worker becomes familiar with the denticles of various species he will find the habit of briefly examining those of new material an important aid in his cursory search for clews as to the identity of the species. Only a few days ago a section of a shark, including that part of the body between the origin of the first dorsal and base of the ventral fins, was received and identified at once by this character. Without this knowledge identification would have been difficult and it oftentimes will prove so. In fact this point must be emphasized that these are not an open sesame by which all sharks may be readily identified, but that in a troublesome group they are an aid. In addition the material is easily obtained and retained in permanent form for comparative purposes.

All who have made a study of sharks know the important diagnostic value of the teeth. Considering the ease with which the jaws may be removed and preserved, the dearth of such material in collections is surprising. While there is some range of variation in the number of rows of teeth, there is a marked constancy of form in a given species.

In large measure the practice of fishermen is to fish intensively for the more important forms and allow the unimportant ones to live and multiply, often at the expense of the more valuable species. If practical uses can be developed for those that are especially destructive to the important forms our gain may be twofold. Many are familiar with the grayfish campaign inaugurated last year by the Bureau of Fisheries, and that this fish is being canned on both coasts. The demand is at least ten times the pack and the eggs as well as the livers are by-products of value.

Owing to the scarcity of leathers the time seemed opportune to interest tanners in the utilization of fish skins. Over 225 shark hides and about 50 skins of other fishes, including cod, hake, grouper, garfish and rays, have been distributed among about 25 tanners for experimentation and a few very creditable samples of the finished product have been received.

The utilization of this product is not a new idea as many have experimented with it almost universally without success. Lack of success is due to the fact that fish skins have to be processed in a special manner in order that they may be tanned into acceptable grades

of leather. Two companies are now tanning them and are in the market for large quantities of raw hides and two others are perfecting tanning processes and preparing to engage in the industry. Fishermen who have not known that these products have a value are being advised as to the proper methods for removing the skins and curing and boxing them for shipment. Those collecting this material are furnished information as to where it may be marketed. The Bureau of Standards will test the tanned skins as to tensile strength and wearing qualities and later manufacturers of leather goods will be encouraged to experiment with the finished product to ascertain to what uses it is best adapted. Thus it is hoped that an economic loss will be turned into a profit.

ON CERTAIN CONGO REPTILES. Herbert Lang. (No abstract.)

FISHERY WORK IN THE TROPICS. Alvin Seale. (No abstract.)

SOME REMARKS ON THE HISTORY OF THE HERPETOLOGICAL COLLECTION OF THE ACADEMY OF NATURAY SCIENCES OF PHILADELPHIA. Dr. Witmer Stone. (No abstract.)

NEW GENERA OF DEEP-WATER GURNARDS *(Peristidiidae)*. Dr. Hugh M. Smith. (No abstract.) These results will probably appear in the Proceedings of the United States National Museum.

BREEDING HABITS OF *Ambystoma opacum*. G. P. Engelhardt. (No abstract.)

THE CAPELIN *(Mallotus villosus)*, WITH NOTES ON ITS OCCURRENCE ON THE COAST OF MAINE. Dr. William C. Kendall.

Recently the Bureau of Fisheries, Washington, D. C., received for identification three specimens of fish unrecognized by fishermen in the locality where they were taken. Recognizing that they constituted a new record for the coast of Maine, information supplied by Mr. H. M. Loomis, Director of the Office of Sardine Inspection, follows: "Last fall these fish had been noted from time to time during October and November with receipts of herring, but they did not appear in any great quantity with the 'herring' until the latter part of November, or from the 26th to 30th.

On the 27th three hogsheads of 'herring,' or about 3000 pounds, were received from the Dennysville River, and were found to contain over two hogsheads of capelin. I am unable to state anything regarding capelin earlier in the season, as no particular attention was paid to them, as distinguished from the common smelt." The species has not previously been recorded south of Halifax, Nova Scotia. In a number of books and catalogues of fishes pertaining to the western Atlantic vague references to the Halifax record are found. These seem to be based upon the list of fishes of Nova Scotia by J. Mathew Jones, published in 1863. Aside from it as a new Maine record interest attaches to the occurrence of capelin in Panamaquoddy Bay, as during the summer the water was unusually cold off shore, at intermediate depths on the Continental Shelf as far south as the latitude of the Middle Atlantic States. This cold water was accompanied by an abundance of planktonic fish food of species usually found in more northern waters (Fisheries Service Bulletin, September 1, 1916, No. 16, p. 1). The possible connection of these phenomena with the presence of capelin so far south of its normal range is obvious. The Halifax occurrence previously referred to may be accounted for in the same way. This is indicated by a subsequent notice by the same J. Mathew Jones (in a letter to Forest and Stream, vol. 10, 1878, p. 502). If Mr. Loomis had asked for information regarding the habits of the capelin he would have likely been given an extract from the short account by G. Brown Goode in Fishery Industries, which is about as complete as most recent data available allows. This account is largely quotations from others, and curious to note the most thorough account of the fish appears to have been overlooked. Such is that by the previously mentioned Mr. Jones, read December 7, 1863, before the Nova Scotian Institute of Natural Science and published in the Transactions of that institution (see vol. 2, part 2, pp. 4-13). In Dr. Goode's account of the spawning habits of the capelin one Charles Lanman is credited with a very thorough observation. However, it has subsequently appeared that Charles Lanman was an "inveterate cribber" in things ichthyological. In the article just mentioned Captain Hardy quotes verbatim, giving full credit from an earlier account of the spawning habits of the fish given by Lieutenant Edward Chappell, R. N. (Voyage of His Majesty's Ship Rosamond to

Newfoundland and the Southern Coast of Labrador, 1818, pp. 131-134). Charles Lanman's account is a word for word transcription of this account, but whether his apology is due Captain Hardy or Lieutenant Chappell the Recording Angel only knows.

BITTEN BY A RATTLESNAKE. William T. Davis. (No abstract.)

REPTILE LORE OF THE NORTHERN INDIANS. Dr. F. G. Speck. (No abstract.)

NOTES ON THE TYPES OF WEST AFRICAN SPECIES OF LIZARDS DESCRIBED BY DR. EDWARD HALLOWELL. Karl P. Schmidt. (No abstract.) The results set forth in this communication will appear in Mr. Schmidt's forthcoming report on the Lang-Chapin Congo reptiles, to be published by the American Museum of Natural History, New York.

HERPETOLOGY AT THE UNIVERSITY OF MICHIGAN. Dr. Alexander G. Ruthven.

It has seemed to me that a brief account of the work in herpetology which is being done at the University of Michigan would probably be of some interest to the Society since the University is geographically a little remote from the museums where most of the research in this field is carried on, and it has been thought best, in view of the conditions, to emphasize a certain field and method of investigation.

The nature of the work in herpetology in the Museum of Zoology is determined by the general policy adopted for the Museum. This policy covers both the field and the methods of investigation, and it is restricted both because the Museum is a state institution and because its resources are so limited that it is necessary to concentrate them to obtain the greatest results. Very briefly, it is purposed to make an exhaustive study of the Michigan fauna, and to encourage more comprehensive studies only in those groups which the members of the staff select for individual study. It has been decided to emphasize research, to attach secondary importance to the assisting of schools and local naturalists and to consider as third in value the preparation of exhibits. In the field work the environmental relations are to be emphasized, in the belief that these relations are an important factor in determining distribution and that a knowledge of the

geography gives important clues to systematic affinities.

This policy has always had the support of the University authorities and has not been modified in the ten years since its adoption. During this time the reptiles and amphibians have received considerable attention, as they are groups selected for individual study. They have been studied in some part of Michigan every year, and also in various other places in North America, Mexico and South America, with the result that the fauna of the state is becoming fairly well known and contributions have been made to knowledge of the faunæ of other regions and also it is hoped to the general subjects of zoogeography and systematic herpetology.

Consistently with the general policy the field work on reptiles and amphibians has been restricted to intensive environmental studies. The method employed is to select a general region which presents a geographical problem with apparently few complications and not too large to be covered in the time available, to locate the possible habitats, and to work each habitat thoroly to obtain all of the inhabitants and to determine as much as possible of the habitat relations.

At the present time we are working on the material obtained by expeditions sent to the Santa Marta Mountains, Colombia, in 1913, to British Guiana in 1914, to the Davis Mountains, Texas, in 1914 and 1916, and on preliminary collections from the Olympic Mountains in Washington. To illustrate the nature of the general problems attacked, permit me to say that the main object of the work in Colombia is to determine the effects of isolation and of precipitous topography, the problem attacked in Guiana is the effect of the old sand reefs on the fauna, the work in the Davis Mountains is in the nature of an investigation of the problems of altitudinal distribution in an arid region, and in the Olympics it is the altitudinal distribution in a wet region and the occurrence of forms with Asiatic affinities upon which it is hoped to obtain information. Although other expeditons will be sent to each of the regions mentioned, it is apparent that the field work has yielded results from which conclusions bearing on the problems stated may be drawn.

That data on the relations between the animal at all stages of its life history and its environment are valuable, must, I believe, be evident to every one. The

course of evolution in a group can never be demonstrated by analytical systematic work, synthetic results can only be relied upon when supported by a knowledge of the geographical history of the group, and environmental relations are a potent factor in geography. It may also be pointed out in conclusion that while fewer species will be obtained by the collector in the intensive study of a small area, this work may be depended upon to yield large returns not only in habitat data, but also in information on habits, life histories and individual variation, and is the most efficient way of obtaining a comprehensive knowledge of the fauna of a locality.

AN EXTENSION OF THE RANGE OF CLEMMYS MUHLENBERGII. Dr. Harold L. Babcock.

The northern limit of distribution for Muhlenberg's Turtle, *Clemmys muhlenbergii* (Schweigger) has been considered, heretofore, to pass through southern New York State. It is therefore of interest to herpetologists to report a hitherto unpublished record of occurrence of this turtle at Newport, Rhode Island. In 1902, Mr. Alexander Agassiz took three specimens (two males and one female) at Newport, Rhode Island, and presented them on September 23 to the Museum of Comparative Zoology at Cambridge, Massachusetts, where they now are. While it is possible that these were escaped caged animals, it is not at all likely. This turtle is not generally abundant throughout its range and often occurs locally as in this instance. As several southern New York records exist it is probable that the range extends through southern Connecticut as well, although there are no published records as yet.

Muhlenberg's turtle often leaves the water to lead a distinctly terrestrial existence, but is found usually in swampy localities near clear running streams. It is able to swallow food without submerging the head.

This record not only establishes a new northern limit of distribution for this species but adds, as well, a new member to the chelonian fauna of New England.

SOME NOTES ON THE BREEDING HABITS OF LOCAL CATFISHES. Henry W. Fowler.

The white cat *(Ameiurus catus)* spawns in early summer, or over a period of about one week in duration. About Philadelphia the usual time is between May 28 and June 4. The nest is a hollow depression, scooped

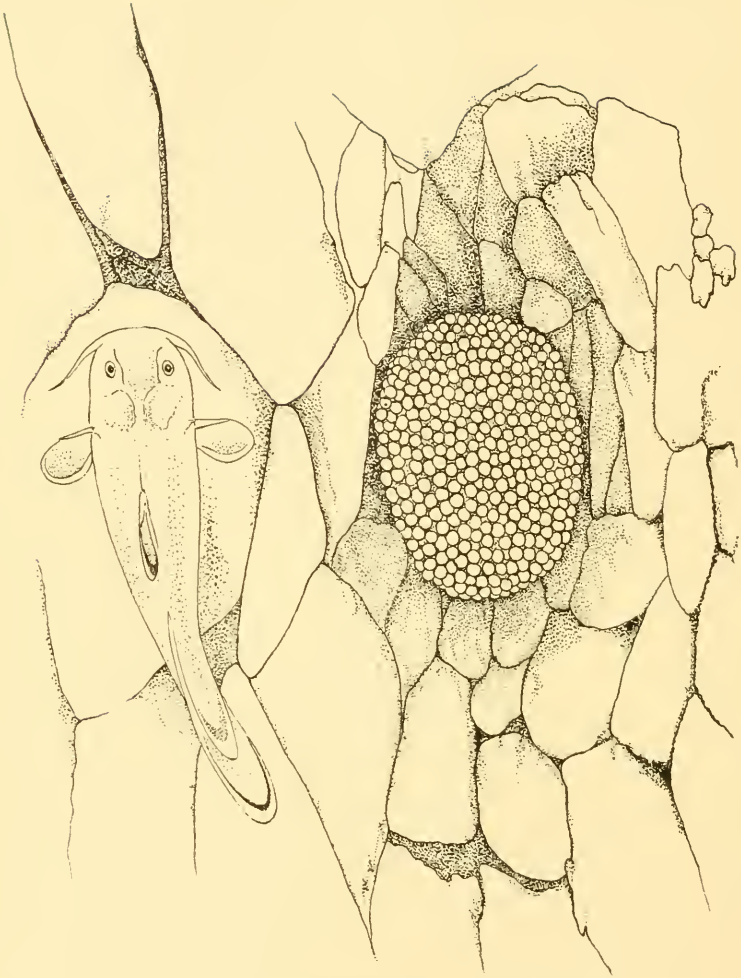
out of the bottom by both sexes. It is usually situated in a gravel-bank or a sand-bank. The labor of excavation is performed by both fishes carrying out pebbles in their mouths or brushing about with their fins. In dimensions the nest may reach a diameter from thirty inches to a yard and may vary in depth from twelve to fifteen inches, or even eighteen. When spawning the fish may remain quiet in the bottom, close together and parallel. The eggs appear to be forced out of the female by a vibrating of her body as she presses against the male, who remains close alongside showing the same movement. The milt and eggs are expressed at the same time, or at intervals until the spawning is completed. The clusters of eggs are all deposited in a day or so, and fall in a heap in the bottom of the nest. They may be covered for a greater or lesser extent with the surrounding gravel by both parents, and sometimes to a depth of five or six inches. In color the eggs are of the usual yellowish-white tint, and number about 1400 to 1500. The care of the eggs is shared mostly by the male, though both sexes may even act as guardians, or the female alone may even guard the nest. At least in the aquarium on one occasion such occurred, and she even fought and drove her companion away. The eggs are very adhesive and usually remain in compact masses until hatched, which occurs in two or three days. The young are brooded for some time by the male, in similar fashion to those of other species in the genus.

The spawning habits of the yellow cat *(Ameiurus natalis)* are similar to those of the common catfish. The nest is a hollow or small excavation usually but little larger than the fish, or it may be situated in a hole or even a sort of a burrow. If a burrow is used it may extend for an inclined depth of two feet. It is excavated as a nest by the labor of both sexes. The spawning season is of about two weeks extent or from May 15 to June 1. Mr. R. E. Van Deusen, who has found the burrow-like nests in western New York, noticed that often small roots from the surrounding vegetation would be left in the burrow, and frequently served as an anchorage for the yellowish-white adhesive eggs. The latter are deposited usually to the extent of about 300 to 700 in a nest. The male guards and broods the young, and when the latter leave the nest cares for his charge for some time.

The nesting-habits of our common catfish or bullhead *(Ameiurus nebulosus)* are, perhaps, best known and have been noticed by a number of observers. It nests in various situations, or in water of from several feet in depth to that of but a few inches. Though only a few nests were noticed in a restricted area, sometimes a dozen or more may be found on one shoal and close to one another. Frequently the fish take advantage of any objects, such as logs, rocks, etc., for sheltering the nest. The eggs are deposited at intervals and may number from about 50 to 500 or more. In the construction of the nest, spawning habits and care of the young, this species acts like the white cat. There is always a great range of variation in many of these features, especialy due to the individuals and conditions. No two nests were ever found exactly alike. and the same was true of the spawners. Even the female will sometimes, at least in the aquarium, brood her young, and in most cases the parents will devour the eggs, especially if disturbed. Usually the male guards the nest and broods the young, as the female deserts the nest by the time the young hatch. When just hatched the young catfish collect in a dense school, move in circles or close gyrations, and the whole crowd in constant motion.

The black bullhead *(Ameiurus melas)* has not been observed spawning by me. Dr. Van Deusen gives me the following notes on a pair spawning in the aquarium July 15, 1916. Both sexes assumed charge of the nest and both guarded the young. Both parents remained in the nest at the same time and at alternate times. The female was apparently the more savage and the male would bite one's finger when disturbed. The nest was a shallow depression, scooped out of the bottom, and its diameter about equal to the fish's length. The eggs, when deposited, were 200 and of a pale creamy-white color. As the water was warm they hatched in five days.

During the past summer I was so fortunate as to find the stone cat *(Schilbeodes insignis)* nesting. On July 2, with Mr. H. E. Thompson. we visited the middle course of the Tohickon Creek. This is a small tributary of the Delaware, flowing through typical Piedmont country a few miles above Trenton on the Pennsylvania side. At the point we visited, the stream was shallow, with a gentle current of pure fresh water flowing over



NEST and EGGS of *SCHILBEODES INSIGNIS*
(Slightly Reduced)

stones and rocks. Below are long reaches of more smooth water, only occasional rocks or larger stones appearing at intervals, and the banks with long grasses and other vegetation. Just above a riff, or small rapids, formed by some more crowded rocks or boulders to form a sort of natural dam is a somewhat quiet extent of water. This was the nesting ground and extended about 200 yards or more, but as conditions did not offer suitable stones or rocks we did not explore further. Below the limits outlined we did not find any nests, and only an occasional stone-cat. Altogether ten nests were located, eight with eggs and two with newly hatched young. These nests were simply very shallow excavations below flat rocks, usually under those situated near the middle of the stream, at least well off from the shore. The rocks in question were in most every case flattened more or less, and in diameter would range from one foot to nearly twice as much. By simply turning over such a stone the fish and his eggs or young would be discovered below. As a constant current of clear water passes all about or over the eggs, they are doubtless well freshened or cleansed. Upon first raising a stone the most conspicuous object was the very pale-creamy to yellowish-white mass of eggs or young, the latter evidently just hatched. It was our plan in studying these fishes to poise the stone on end, though care was required in raising it, as its elevation must be gradual so the current of water could carry off the sediment or other debris and at the same time not disturb the fish or his charge too much. After the water has cleared sufficiently the male fish may be made out, usually lying placidly near his charge, or, if more timorous, in the shadow of the up-raised stone. In no case was he savage, rather appearing either passive or seclusive. A conspicuous character of the guardian male is the conspicuously pale nasal and maxillary barbels as well as the edges of the fins, all appearing more or less milk-white as the fish is seen in the water. The male would scarcely allow himself to be handled. In depth the cavity forming the nest proper would scarcely exceed the dimensions of the mass of eggs in some cases, to twice as large in others. The depth of the cavity was not much over two inches, and rarely three or more. Each egg measured about three mm. in diameter, and by rough estimate about 200 were deposited in a nest. In most cases this egg-mass would not exceed 55 mm. in length or diameter,

and as the crevice forming the bottom of the nest was variable, so too the complement of eggs would vary from spherical to ellipsoid in form. The egg-mass is very compact, and each egg is quite adherent to its fellow. In no case could we actually find the male directly on or about the eggs, but do not doubt that he may assume such positions. In some nests the young had just hatched and they were all crowded together, a constantly moving compact mass. The males attending such nests were not more bold than those with eggs.

The most interesting and striking feature of the nesting of this species is that unlike any of our other catfishes it always appears to lay its eggs below flattened stones, situations in which it dwells continuously. Though unable to give any details as to the parental care, it would seem quite likely that the male may brood the young for at least some time. Associated in the spawning grounds were numerous small fishes, as silver fins *(Notropis whipplii analostomus)*, red fins *(N. cornutus)*, black-nosed dace *(Rhinichthys atronasus)*, suckers *(Catostomus commersonnii)*, killfish *(Fundulus diaphanus)*, sunfish *(Lepomis auritus)* and darters *(Boleosoma nigrum olmstedi)*. As the eggs were fairly well protected in their rocky retreats, besides guarded by the vigilant male, it is hardly likely that any great depredations were committed by the smaller fishes in the vicinity. Once, when we disturbed a nest of young, several carried helplessly on by the current were seen devoured by a minnow. The newly hatched young are the same pale creamy-white color as the eggs, at least in their early stages, and may not assume the dark coloration of the very young of the common bullhead.

ILLUSTRATIONS OF FISH IN MEDIAEVAL MANUSCRIPTS AND EARLY PRINTED BOOKS. Dr. Charles R. Eastman. (No abstract.)

For sale by J. T. Nichols, American Museum of Natural History

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New York, April 24, 1917. No. 43

Published to advance the Science of cold-blooded vertebrates

A WINTER RECORD OF *SPHYRNA ZYGAENA* FROM LONG ISLAND.

A Hammerhead Shark, *Sphyrna zygaena*, was taken in Long Island Sound, at Orient, February 14, 1909. The fish was 22 inches in length.

I was collecting algae in the shallow water along the ebb tide mark when I discovered this specimen moving sluggishly in about one foot of water. It was captured with ease and a drawing and notes entered in note book at the time.

This shark appears to be unknown, or exceedingly rare in Long Island waters in winter.

The local pound fishermen tell me that 40 or more years ago this species was frequently caught in traps during the summer and early fall months. Late years it seems to be uncommon near Orient. We have taken but two examples in our pounds in Long Island Sound over a period of twenty years. A 6-foot specimen on October 2, 1908, and one of 2 feet, July 20, 1912.

Roy Latham,
Orient, N. Y.

A NOTE ON THE FOOD OF SQUALUS SUCKLII, THE CALIFORNIA DOGFISH.

During the months of May and June, 1915, the writer had occasion to prepare, for laboratory use, a

number of sharks (*Squalus sucklii*). They were obtained from the Chinese fishermen of Monterey, California, and were caught near the southern end of Monterey Bay. The contents of the stomachs of these sharks were examined to determine the nature of their food. This consisted largely of squids (*Loligo opalescens*) and Sardines (*Sardinella caerulea*); there were found also the eggs of the squid, and remains of hake (*Merluccius productus*) and salmon (*Oncorhynchus* sp.). Perhaps the most interesting species used by the shark as food was one of the lantern-fishes (*Myctophidae*), probably *Lampanyctus leucopsarum;* these fishes formed the larger part of the food in the stomachs of several specimens. *Atherinops insularum* has been found in the stomach of a *Squalus* at Avalon, on Santa Catalina Island off southern California. The squid and the five species of fishes mentioned are all littoral-pelagic animals. Much the same type of food is accredited to *Squalus acanthias* in the vicinity of Woods Hole, Massachusetts; the prey of that shark in those waters is stated* to consist of such surface-swimming forms as "Ctenophores, *Pleurobrauchia* in great numbers, squid, *Nereis*, fishes (hake, herring)."

Carl L. Hubbs,
Chicago, Ill.

COLD-BLOODED VERTEBRATES FROM FLORIDA.

Three small collections were obtained by Mr. Morgan Hebard. The fishes are from Carrabelle in Franklin County, on September 2, 1915, and bayou at Boca Grande in Lee County on May 24, 1916. All the fishes listed were obtained at Boca Grande, and the few as well from Carrabelle are indicated with an *. A few amphibians and reptiles were secured about Miami in February and March, 1916, while collecting insects.

*Bull. Bur. Fish., 31, 2, 1911 (1913), p. 737.

Sardinella humeralis (Valenciennes). **Fundulus similis* (Baird and Girard). **F. grandis* Baird and Girard. **Cyprinodon variegatus* Lacepede. **C. mydrus* Goode and Bean. *Tylosurus notatus* (Poey). *T. marinus* (Walbaum). **Menidia peninsulae* (Goode and Bean). *Eudulus subligarius* (Cope). **Orthopristis chrysopterus* (L.). **Lagodon rhomboides* (L.). **Leiostomus xanthurus* Lacepede. *Eucinostomus gula* (Cuvier). *E. harengulus* Goode and Bean. *Leptecheneis neucrates* (L.). Three small ones, one from large hammer-head (*Sphyrna zygaena*) and two from tarpon (*Tarpon atlanticus*. *Mapo soporator* (Valenciennes). *Gobiosoma bosci* (Lacepede).

Pseudacris nigritus (Le Conte). Brickell's Hammock and Nursa Isle. *Hyla squirella* Bosc. Snapper Creek Hammock near Cocoanut Grove. *Sphaerodactylus notatus* Baird. Brickell's Hammock. *Sceloporus undulatus* (Latreille.) Boca Raton.

HENRY W. FOWLER,
Philadelphia, Pa.

AMPHIBIANS AND REPTILES FROM THE PECOS VALLEY.

While collecting fishes in the Pecos Valley, near Roswell, New Mexico, last April, several specimens of amphibians and reptiles representing four species were taken. The records are given below:

1. *Acris gryllus crepitans* (Baird). Western Cricket Frog. Common in swampy situations along the North Spring, South Spring and Berrendo rivers, near Roswell, and near Sulphur Spring, Pecos Hills, 18 miles east of Roswell.

2. *Rana pipiens* Sherber—Leopard Frog. A few were taken near the head of North Spring river, two and one-half miles northwest of Roswell. This frog was very abundant, however, near Sulphur Spring in the Pecos Hills.

3. *Thamnophis sauritus proxima* (Say). Western Ribbon Snake. One specimen, 500 mm. in length was obtained on April 3, 1916, near the head of North Spring river.

4. *Chrysemys bellii* (Gray). Bell's Painted Turtle. Two specimens were caught in a drag seine at the head of North Spring river. Several other turtles, evidently belonging to this species, were seen in the lake-like enlargement of North Spring river, near Roswell.

MAX M. ELLIS,
Boulder, Colorado.

THE BREEDING HABITS OF AMBYSTOMA OPACUM (GRAVENHORST).

The first account of the breeding habits of the marbled salamander is a letter from the Rev. Charles Mann to S. F. Baird, in which he states that at Gloucester Court, House, Va., they are found with eggs in the "beds of small ponds in the woods," from the summer to December, in which month he found one in a nest with 108 eggs. Apparently some of the eggs were broken, as he speaks of newly hatched young. This letter appears in the Report of the Smithsonian Institution for 1854, pp. 294-5.

In 1886, in the first Bulletin of the American Museum of Natural History, Col. Nicholas Pike gives an account of the breeding habits on Long Island. He accuses Mann of misidentification, (Mann's specimens are still in the U. S. N. M. and are *opacum*), and claims that *A. opacum* breeds in the spring, laying eggs in the water as does *A. maculatum*. He got larvae ½ inch long in March. A mass of eggs hatched 15 days after taking, and transformed about July 29, at a length of 2½ inches. He also got some May larvae 3¼ inches long.

In the light of the many following observations, all of which support Mann, there is little doubt but that Pike was in some error. The May larvae were

probably *opacum*, but the March larvae and the eggs were probably not. Pike contrasts the egg-mass with that of *A. maculatum*, but not with that of *A. tigrinum*, and possibly he had eggs of that species as it is known to breed on Long Island, and lays its eggs in the water in spring.

Brimley, in the *American Naturalist* for 1896, p. 500, says that at Raleigh, N. C., *A. opacum* lays eggs in October and November, on the edges of dry pools, where the larvae hatch quickly when the pool fills with water.

McAtee, in the Proceedings of the Biological Society of Washington, vol. 20, 1907, p. 13, describes the breeding habits in Monroe Co., Indiana. He speaks of "nests in the ground near the surface," which "contain from 50 to more than 150 eggs." The larvae may reach a length of an inch while in the egg, but they must have water to live in while completing their development. They transform in February and March.

In COPEIA 8, July, 1914, Engelhardt says he found larvae in June at Lakewood, N. J., in a locality in which adults had been caught; these larvae were one to one and a half inches long.

In COPEIA 28, March, 1916, Deckert speaks of getting eggs with the adult on September 25, near White Plains, N. Y., in the bed of a dried-up pool; the eggs were separate from each other and covered with dirt. They were kept in the debris for a day, and on September 27, some were put into water. These hatched on September 28; the larvae were 5/8 inch long and front limbs were apparent. Other eggs were kept in the deep debris until October 18, put in water and hatched on October 19.

Larvae, 2 inches long, were collected in April, which transformed in June.

Brimley (Bull. Elisha Mitchell Sci. Soc., vol. 32, no. 2, July, 1916), says that at Raleigh, N. C., the habits of *A. opacum* differ from those of *A. maculatum* in that the eggs are not in gelatinous masses,

but separate from each other, and are laid not in the water in spring, but under dead logs in the beds of dried-up pools in October. The transformation takes place about May, the larvae reaching a length of at least 2½ inches.

Engelhardt, in COPEIA 37, November, 1916, referring to Long Island (where Pike worked), states that he got larvae 1⅛ to 1¼ inches long on April 7. He argues that these could not have come from eggs laid that spring as the pools were ice covered until April. The hind legs of these larvae appeared on April 18. Other larvae collected in May measured 2½ inches in length.

Finally on September 20, 1916, near Mt. Vernon, Va., I got 7 adults, male and female, under one log. The females were larger than the males, and had a pronounced tendency for the cross-bands to break up into 2 longitudinal stripes (the same tendency has been noticed in females of *opacum* from elsewhere). The males had the lips of the cloaca everted and swollen.

Some of the females laid eggs in the collecting bucket. The next day I got several others near there, including a female in her nest with over 100 eggs. The eggs were entirely unconnected and were rather dusty. I kept the eggs from the several females in damp debris. Developments proceeded somewhat slowly until on October 2, they were put into 3 crystallizing dishes containing, (1) sand; (2) sand and water, the eggs being placed out of water; (3) water.

Those in the water began to hatch on October 15. When born they had fore-limb buds and balancers. Those eggs kept in dry sand until October 15, and put in water on that date hatched in 24 hours.

Eggs kept until November in sand saturated with water, did not hatch, but when put into water, hatched in 24 hours. Thus the entire egg must be surrounded with water for it to hatch. There is apparent here a very delicate adjustment to Coastal Plain conditions of flood and drouth.

Conclusions: It seems apparent from observations covering nearly the entire range of the animal, that *Ambystoma opacum* breeds in the fall. Fertilization is internal, takes place on land, and there is presumably a copulation. The eggs are separate from each other, and are laid in hollows in the ground excavated by the mother, who remains with the eggs, lying on top of them. The nests are in places such that they will be flooded during the winter. The eggs can stand a long desication and such eggs hatch almost immediately upon being put into water. The new born larvae have balancers and forelimbs. The larvae transform in the following spring at a length of about 3 inches.

EMMETT R. DUNN,
Northampton, Mass.

DIADOPHIS AMABILIS IN MISSOURI.

Cope recognized four forms of *Diadophis amabilis* distinguished by coloration. The specimen under consideration conformed in every way to the variety *Diadophis amabilis amabilis*. Cope listed his specimens of this variety as collected in California and Louisiana, while he gave the probable distribution of the species as Pacific, Central or Sonoran.

Ditmars recognizes only one variety, *pulchellus*, which inhabits Oregon and California. He gives the distribution of *Diadophis amabilis* as Texas westward to the Pacific, northward to Washington, and Sonora, Mexico.

It is interesting then that this species was found in Macon, Missouri, October 4, 1916, coiled near the roots of some matted grass. It measured 24 centimeters in length and had the vivid coloration of a young snake. The scales were arranged in 15 rows and superior labials numbered 7. The dark spots on the orange of the ventral surface were irregularly

placed thus distinguishing it from *Diadophis punctatus* and the circlet of color about the neck and the underside of the tail were a brilliant coral red.

G. Van Wagenen,
Iowa City, Iowa.

Edited by J. T. Nichols, American Museum of Natural History
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AN UNUSUAL CATCH OF THE YOUNG OF MAINE WHITEFISH.

(*Coregonus labradoricus.*)

During March, numerous specimens of immature whitefish were taken with smelts in seines at Winterport, Walo County, Maine, in the tidal portion of the Penobscot River. The fish were not recognized by the fishermen and the fact was reported to Mr. James D. De Rocher, Superintendent of the U. S. Fisheries Station at East Orland, who secured three specimens and sent them to the Bureau of Fisheries for identification. Mr. De Rocher stated that in this place the water is only moderately brackish, but inasmuch as in Maine this fish is an inhabitant of the deeper lakes, and usually appears in streams only during the breeding season, and notwithstanding the fact that in the far north adult whitefishes enter salt water, it is believed that the present record is of interest. The origin of these young fish, which are only from 6 to 6½ inches in total length, is worthy of record. They had been feeding upon some small aquatic larva of insects.

W: C. Kendall,
U. S. Bureau of Fisheries.

NOTES ON GLOSSAMIA AND RELATED GENERA OF CARDINAL FISHES.

The genus *Glossamia* as Mr. Allan R. McCulloch (Records Australian Museum, February 20, 1917), has shown, is based on *Apogon aprion* Richardson, a species quite distinct from the American species called *Glossamia pandionis* Goode & Bean.

Glossamia has few and short gill rakers, 6 developed, and also a small patch of teeth on the tongue. In the typical species the scales are small, 40 to 43. In a second species, *Glossamia gilli* (Steindachner), with which species the type of *Mionurus* Krefft (*M. lunatus*), is identical, the scales are larger, 26 to 31. In both the nape is depressed giving an S-shaped contour to the region before the dorsal fin.

The genus called *Glossamia* by Goode and Bean (Oceanic Ichthyology, 1895, 231), may be known as *Xystramia* Jordan, new genus, from its long and numerous gill rakers (about 14). Its type is *Glossamia pandionis* Goode & Bean.

The genera of small Apogonids having the preopercle entire on both limbs have been much confused by authors, not least by the present author. They may be thus compared:

a. Preopercle with both limbs entire; anal fin short, its rays about II, 8, no canines.

b. Palatines with teeth.

c. Lateral line complete or very nearly so.

d. Body much compressed and elevated; dorsal spines produced; gill rakers long, slender, 6+21; scales large; caudal forked, (*Mionurus* Jordan & Seale, Fishes Samoa, 1906, 247, not of Krefft, 1867), (type *Apogon graeffi* Gunther); ZORAMIA Jordan, new genus.

dd. Body not much compressed and elevated; spinous dorsal low; caudal rounded or truncate.

e. Gill rakers few and small; (about 6), profile before dorsal S-shaped; scales rather small; tongue with small teeth (type *Apogon aprion* Richardson); GLOSSAMIA Gill.

ee. Gill rakers numerous, slender (12 to 14); profile nearly even from snout to dorsal.

f. Scales small (about 45); (type *Glossamia pandionis* Goode & Bean); XYSTRAMIA Jordan.

ff. Scales large, about 25 (type *Apogonichthys perdix* Bleeker); APOGONICHTHYS Bleeker.

cc. Lateral line incomplete; scales large; caudal rounded; (type *Fowleria brachygramma* Jenkins); FOA Jordan & Evermann.

bb. Palatines without teeth; scales large; caudal rounded; gill rakers few, short; opercle with a large black spot; (type *Apogon auritus* Cuv. & Val.); FOWLERIA Jordan & Evermann.

One of the species hitherto referred to *Amia* or *Apogon, Apogon fuscus* Quoy & Gaimard from Guam and Samoa, differs from the type of the genus in the long and rounded caudal fin, attached to a long caudal peduncle as long as head. It has large scales and six dorsal spines. It may be regarded as the type of a distinct genus, NECTAMIA Jordan, allied to *Apogonichthys*. In *Apogon* (*Amia*) proper and in the subgenus *Ostorhynchus* (seven dorsal spines) the caudal fin is forked or at least lunate. The Japanese species, *niger marginatus, unicolor* and *lineatus* have the caudal subtruncate, but in other regards these more nearly resemble *Apogon*, the caudal being short, its peduncle much shorter than head.

Apogon evermanni Jordan and Snyder from Hawaii with very small scales (54) forked caudal and six dorsal spines should be placed in the genus *Lepidamia* Gill, type *Apogon kalosoma* Bleeker.

DAVID STARR JORDAN,
Stanford University, Cal.

ACIPENSER FULVESCENS RAFINESQUE, THE GREAT LAKE STURGEON.

The Great Lake Sturgeon has been named many times by Le Sueur, Agassiz, Dumeril and other naturalists, but the earliest name of all those applied to it seems to have been subsequently overlooked. The species is currently known as *Acipenser rubicundus* Le Sueur, 1818, but that name must give place to *Acipenser fulvescens* Rafinesque, proposed in the American Monthly Magazine for August, 1817 (Vol. I, p, 288). The passage may be reprinted:

"A paper, entitled 'Addition to the Observations on the Sturgeons of North America,' from Mr. Rafinesque, was read before the Society [Literary and Philosophical Society of New York]. In this Memoir Mr. R. stated severally the discoveries of M. Le Suer, whose new species belong particularly to the genera salmo, cyprinus, silurus, anguilla, bodianus, perca, clupea, &c. Mr. R. gave it as his opinion that the lake sturgeon is a perfectly distinct species, to which the name of accipenser fulvescens could be given, as it is entirely of a dark fulvus color. It reaches six feet in length, has a very obtuse and short snout, a falcated dorsal fin, a smooth skin, five rows of shields; the lateral rows composed of a great number of small shields, upwards of forty, &c.

"The small sturgeon of Lake Erie, according to the author, remains yet to be described. He supposes that several small species may also be found in lakes Michigan, Huron, Superior and Winnipeg, but require the eyes of able observers. 'I have no doubt,' says Mr. R. 'That twenty species, at least, of this genus, inhabit North America, on the east and western lakes and rivers, and that as many dwell in the eastern continent.' "

Carl L. Hubbs,
Chicago, Ill.

PIPA AMERICANA REDISCOVERED ON TRINIDAD.

On May 17, 1916, the Amphibian collection at the Reptile House, New York Zoological Park, received a specimen of *Pipa americana,* the Surinam Toad, from Trinidad, B. W. I. It was caught in the interior of the island by one of Mr. R. R. Mole's collectors. Mr. Mole, who is well known as a herpetologist and collector, had for some time past made efforts to procure this unique toad on Trinidad, whence he had an old record of the species, but until 1916 had not met with success. Two specimens were secured, one was sent to the British Museum and the other came to New York. When it arrived, it was among the debris of the earthen vessel in which it had been shipped, with some sphagum moss, inside of a wooden box. During transit the pot had been smashed, and it is remarkable that the toad, which is a strictly aquatic creature, should have survived in an absolutely dry state until New York was reached. Upon being placed in a large aquarium planted with *Sagittaria,* it soon showed signs of scratches and bruises which were at first not evident on the dried and much wrinkled skin. The fleshy appendages at the tip of the snout and at the angles of the mouth, as well as the star-shaped ones on the ends of the fingers were gone—they had been rubbed off in the toad's efforts to escape from its too dry environment. In consequence of its injuries and the prolonged period of dryness, the toad died in a few days without having made an attempt to feed.

In a subsequent letter to the writer, Mr. Mole states that he caught two more, both females with young imbedded in the cells in the skin of the back. Later, one specimen "hatched out" eighty young ones, and the other had between fifty and sixty. Of this last batch, some were far more developed than others, but all still had the feathery tail. The first batch was more advanced, all the "toadlets" being

perfect and without tails. Several more specimens came to light later. Mr. Mole fed the adults on "frogs," presumably *Leptodactylus* sp., as there are no *Rana* in South America. A large specimen, about six inches head and body, will take four "frogs" at a meal, sometimes from one's hand. Mr. Mole has tried to feed them small fish,—as we have also done with specimens from British Guiana, at Bronx Park, —but they take nothing but frogs.

RICHARD F. DECKERT,
New York, N. Y.

NOTES ON *COLPOCHELYS KEMPI* GARMAN.

In examining a few of the turtles in the collection of the American Museum of Natural History, the writers recently found two specimens of the sea turtle *Colpochelys kempi* Garman, which appear worthy of note. This species ranges from the Gulf of Mexico along the Atlantic coast of the United States as far north as New Jersey. One of the present specimens is from Cape Hatteras, and the second bears no closer locality than "United States" (collected by Prince Maximilian von Wied). Both were labeled *Thalassochelys caretta* (L.).

The two specimens agree in the possession of the chief external characteristics which differentiate *C. kempi* from *Caretta caretta*. There are four inframarginals, of which the anterior is the largest; the inferior face of the marginals is proportionately much broader; and the parietals are much longer. Both have the prominent alveolar ridge of the upper jaw with the deep median notch, and the anterior median tooth of the lower jaw.

The larger specimen, A. M. N. H. No. 2205, from Cape Hatteras, presents a striking peculiarity of the carapace in having an interrupted keel, rising at the posterior edges of the first three neurals into prominent upturned spines, that of the second neural

(the highest) 8.5 mm. above the level of the keel. On the fourth and fifth neural, the keel approaches the normal shape. Traces of the lateral keels are visible on the second and third costals.

The smaller specimen, No. 4616, with traces of the "egg tooth" and of the umbilicus still present, appears to be the only young specimen of this species on record. Hay,* in 1908, mentions none smaller than 240 mm. It is much to be regretted that it is not accompanied by exact data. The upper jaw of this specimen is no more hooked than that of specimens of *C. caretta* of the same size, while that of No. 2205 is prominently hooked. The specimen has been compared with a series of seven young *Caretta caretta*. Hay, (loc. cit.), speaks of the alveolar ridges as less prominent in his smaller specimens, but they are sufficiently developed in this one to be very distinct from those of *C. caretta*. Hay also speaks of the proportionate breadth of the carapace as greater, though not distinctive; a comparison of the mean measurements of a series of both species might, however, show a valid difference in this character. The measurements of the present specimens, together with those of the young *C. caretta* for comparison, are tabulated below.

The "carapace and plastron" of *C. kempi* from the American Museum referred to by Hay (loc. cit.) were not found.

Colpochelys kempi Garman.

A.M.N.H. No.	(a) Length Carapace	(b) Breadth	(c) Length Plastron	b / a	c / a
2205	225 mm.	205	181	.91	.80
4616	47	41	38.5	.87	.81
Caretta caretta (L.)					
4607	47	38	35	.81	.74
4608	46	37	37	.80	.80
4609	47	39	36	.83	.76

*Proc. U. S. National Museum, Vol. 34, 1908, p. 185.

Caretta caretta (L.)—continued.

A.M.N.H. No.	(a) Length Carapace	(b) Breadth	(c) Length Plastron	b a	c a
4610	47	38	36	.81	.76
4611	47	39	35	.83	.74
4612	47	37	35	.79	.74
4613	48	37	37	.77	.77

KARL P. SCHMIDT,
EMMETT R. DUNN,
New York, N. Y.

FURTHER NOTES ON PSEUDEMYS AT PLYMOUTH, MASSACHUSETTS.

The two short articles in the December "COPEIA" having stimulated some new interest in this connection, I have to record the following new ponds in Plymouth County, Massachusetts, in which *Pseudemys rubriventris* has been observed: Great South Pond and Crooked Pond. The Island Pond mentioned in my notes is the one about one-half mile northeast of Gunners Exhange. Hallfield Pond, the existence of which Dr. Lucas doubted, is a small four-acre pond between Hoyt and Boot Ponds. *P. rubriventris* does not occur in Half-way Pond as far as I know. It is a curious fact that in the ponds where this turtle is found, it seems to be the most common species. It is also of interest that the "Plymouth Sabbatia" and other plants, as well as certain insects, notably dragon flies, which are distributed over the same local areas as this species of turtle, are all southern forms of life.

HAROLD L. BABCOCK,
Boston, Mass.

Edited by J. T. NICHOLS, American Museum of Natural History
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A FEW REPTILES AND FISHES FROM BATANGA, WEST AFRICA.

A small lot of the more important food-fishes and some reptiles were obtained in this part of the Cameroons some years ago by the Rev. R. H. Nassau, and sent to Princeton University. Recently they were placed in my hands by Mr. C. F. Silvester, for determination.

Fishes.

Hexanematichthys latiscutatus (Günther), "Hume" or "H-me." *Carana africanus* (Steindachner), "Epakapaka." *Vomer setapinnis* (Mitchill). *Pomadasis jubelini* (Valenciennes), "Nyawa" or "Nijawe." *Pseudotolithus typus* Bleeker, "Une" or "Uve." *Periopthalmus koelreuteri* (Pallas).

Reptiles.

Dendraspis viridis (Hallowell), "Okenja." *Dendraspis jamesonii* (Schlegel). *Hapsidophrys lineata* Fischer. *Mabuya perrotetii* (Duméril and Bibron). *Varanus niloticus* (Linn.). *Agama colonorum, Daudin. Chamaeleo dilepis,* Leach. *Crocodilus niloticus,* Linn.

Henry W. Fowler,
Philadelphia, Pa.

A SECOND RECORD FOR THE COULTER'S WHITEFISH.

(*Coregonus coulteri* Eigenmann.)

In the *American Naturalist,* November, 1892, p. 961, Eigenmann described a small species of whitefish from the Kicking Horse River, one of the head streams of the Columbia River in British Columbia. This species, which is said not to exceed 8 inches in length, appears to have been recorded from no other locality up to the present time.

In the collection of the Bureau of Fisheries there are 6 specimens of this species in a poorly preserved condition, which were received from Mr. James Oliver, Chignik, Alaska. They were collected in Second Lake and the stream connecting it with First Lake, about November 1, 1912. This species is said to resemble *Coregonus williamsoni,* but with larger scales. It also differs in a much blunter muzzle, fewer gill rakers, much smaller adult size, and in other respects.

The following tables show the principal characters as far as they could be determined, the proportions being given in percentages:

Total length in m.m.	158	150	146	152	144	149
Length to base of caudal	145	142	136	140	136	140

PER CENT. OF LENGTH TO BASE OF CAUDAL.

Sex	♀	♂	♀	♀	♂	♂
Distance from tip of snout to nape	16.	17.8	17.9	16.2	16.2	15.5
Distance from nape to front of dorsal	28.4	27.5	27.3	31.7	28.4	28.6
Length of dorsal base	10.2	12.4	10.9	10.	9.3	10.8
Longest dorsal ray	13.2	14.7	14.8	13.9	14.6	13.1

Sex	♀	♂	♀	♀	♂	♂
Distance from posterior base of dorsal to front of adipose	24.8	25.5	25.	27.1	28.4	28.6
Length of base of adipose	4.7	4.6	3.9	3.1	4.	3.1
Distance from posterior adipose to origin of upper caudal lobe	13.8	12.4	12.5	13.9	10.5	12.7
Distance from tip of snout to base of pectoral fin	20.4	21.7	21.	19.3	21.9	22.4
Length of pectoral	15.3	17.	16.4	14.7	15.4	13.9
Distance from base of pectoral to base of ventral	30.6	30.2	28.9	32.5	30.8	31.7
Length of ventral	13.8	13.9	14.	12.4	13.8	12.4
Distance from base of ventral to front of anal	23.3	23.2	23.4	22.4	21.9	23.2
Length of base of anal	10.2	10.	10.1	9.6	11.3	9.3
Longest ray of anal	13.8	13.1	13.2	12.	13.	10.8
Least depth of caudal peduncle	6.5	6.9	6.2	6.5	6.9	6.2
Length of head	21.1	21.7	21.8	22.4	21.9	20.9

PER CENT. OF LENGTH OF HEAD.

Sex	♀	♂	♀	♀	♂	♂
Distance from tip of snout to posterior edge of preopercle	70.	75.	75.	68.9	70.3	74.
Interorbital width	23.3	25.	25.	24.1	25.9	25.9

Sex	♀	♂	♀	♀	♂	♂
Long diameter of eye	25.	25.	28.5	24.1	25.9	25.9
Distance from tip of snout to front of eye	25.	25.	25.	24.1	24.	22.2
Length of maxillary bone	23.3	23.2	25.	20.6	22.2	25.9
Length of mandible	36.6	35.7	33.9	32.7	35.1	35.1
Number of fully developed dorsal rays	9.	9.	9.	9.	9.	9.
Number of fully developed anal rays	10.	10.	10.	10.	11.	11.
Number of pectoral rays	15.	15.	15.	16.	15.	15.
Number of ventral rays	10.	10.	10.	10.	10.	10.
Number of branchiostegal rays, each side	8/8	8/8	8/8	7/7	7/8	?/7
Number of gillrakers, each side	4+8	4+8	4+9	4+8	5+9	?
	4+8	4+8	4+9	5+9	5+9	?
Number of scales	6-62-6		6-62-6	6-62	7-63-5	
Number of vertebrae			50.			

W. C. Kendall,
U. S. Bureau of Fisheries.

A NOTE ON THE HIBERNATION OF *KINOSTERNON PENNSYLVANICUM.*

The manner of hibernation of our native mud-turtles comes so seldom under the observation of naturalists that the following note may be of interest.

March 25, 1917, was one of the first warm, bright days of spring in this vicinity. At 10:30 a. m., while working along the border of one of the Potomac marshes two miles below Alexandria, Va., we picked up a specimen of *Kinosternon pennsylvanicum* (Bosc) in a small thicket of *Smilax*. Casual examination showed that the animal had but recently come out of its place of hibernation. Its carapace and limbs were encrusted with freshly dried earth, and the turtle seemed more sluggish than usual in its reactions while being handled. This excited our curiosity, and a short search revealed an opening beneath some dead leaves, only eight or ten inches from the spot where the turtle was discovered. After clearing away the thorny entangling stems of green-briar, we were able to make a careful examination of the hole, and found that it had unquestionably been used as a place of hibernation.

The location chosen was about 50 yards distant from the marsh, in a shallow, furrowlike depression leading down through a gently sloping field. Broomsedge covered most of the field, and a varied growth of shrubs and low trees was scattered through it. The excavation was near the center of a low but dense growth of *Smilax* four or five feet in width, so that it was protected on all sides from the approach of predatory animals. The soil here was a sandy loam, through which the tough roots of green-briar grew in interlacing lines. The earth was friable and easily thrust aside save where the root growths prevented. The opening through which the turtle had emerged was roughly elliptical in outline. It was broad enough to admit the turtle easily with its legs extended. The burrow descended at an angle of about 45 degrees, and was approximately 9½ inches deep. The pitch of descent decreased toward the lower end, and at the bottom the excavation was slightly widened, as if the turtle might have rested with its body at right angles to the burrow. The

main part of the burrow was open, though drifting leaves held by the *Smilax* stems had covered the entrance. In the lower part, however, was a mass of earth containing a considerable amount of water, so that it formed a stiff mud paste, which was very cold to the touch. So far as we could tell, the turtle had lain encased in this mud during its hibernation. The tunnel walls were dry.

Several fresh shells of *Aromochelys odoratus* and one or two of *Kinosternon pennsylvanicum* were seen lying about in wooded areas bordering this same marsh. Thus the emergence of these turtles from hibernation had been of interest to others. The shells had been eaten out and left lying on logs, stumps, or the ground. Apparently this was the work of crows. American Crows were feeding here in abundance, and with them were a few Fish Crows.

The turtle that we had found was taken home and placed in a basin of water. For several minutes it made no movement save to emit a series of bubbles from its nostrills, or to close and open an eye. Then it proceeded to extend and retract its neck slowly. At the same time it drew water into its mouth, and apparently drank. The jaws were opened and closed slowly. In a short time movement of the jaws ceased, but the turtle continued to draw water into the mouth and then expel it, the outdriven current setting up eddies that agitated the silt on the bottom of the basin. In a few more minutes the turtle became more alert and swam and walked about, thrusting its head to the surface.

When the turtle was first found, its skin was dry and wrinkled. The animal was able to retract its head and tail and to close both lobes of the plastron completely. By the following morning the skin about its legs was smooth and swollen, and it was unable to withdraw completely into its shell, owing to absorption of water.

On this morning (March 26) the turtle was killed and an examination of the viscera was made. It was found that the stomach contained a small amount of whitish mucus, part of which was mixed with earth. The small intestine was contracted and entirely empty. The upper third had thickened walls and was much larger in diameter than the lower portion. The linings of the intestinal canal for the space of an inch above the point of entrance of the hepatic duct was stained a deep brownish orange. This apparently was due to bile. The gall bladder was filled, and the bile, very dark green in color, was thickened to the point of viscidity, so that portions of it could be drawn over the enameled surface of the dissecting tray with a probe. Below the hepatic duct, the walls of the intestine were pale. An orange tint appeared four inches above the cæcal expansion and increased in intensity to the point of junction of large and small intestines. The cæcum was empty. In the rectum were four rounded masses of firm, hardened mucus, each as large as a pellet of number 8 shot. The cloaca was empty and completely contracted. The animal seemed to be normal in flesh, and small masses of orange-yellow fat persisted along the dorsal wall of the body cavity and in the region of the pelvic arch. Apparently metabolism had been in abeyance during the period of hibernation.

ALEXANDER WETMORE,
FRANCIS HARPER,
Washington, D. C.

SPADE-FOOT TOAD AT MASTIC, LONG ISLAND.

The morning of June 17, 1916, after heavy warm rain the preceding night there were singing Spade-foot Toads in a woodland pool beside a road. At mid-day one was seen to cross the road and hop away from the pool into the woods. Its colors matched the leaf-carpet wonderfully. Others remained all day.

One was captured in the pool and liberated the following day. It is remarkable how completely it was able to hide in a closely cut green lawn in bright sunlight by crouching at the bases of the grass. When liberated in the woods it disappeared backwards under the leaves, and remained with just the nose showing at the bottom of its entrance. On June 25, it was found again in this same spot under the fallen leaves in a shallow burrow in the ground, its nose showing. When disturbed it turned sideways, thus withdrawing completely and filling the mouth of the depression with sandy soil. July 3, on scraping away the dead leaves, there was no sign of the toad, but a spot of loose soil detected was investigated disclosing it at a depth of about 1½ inches. This was the last seen of that particular individual, as on July 9, there remained only a neat steeply-slanting burrow, about 3 inches deep, empty.

A steady rain commencing the night before, continued through July 23, on which afternoon Spade-foot Toads were singing in a pool in pasture land near stands of trees. During a temporary silence cattle came close to the pool, only to gallop away in alarm when the noise recommenced. Investigation disclosed singing Spade-foots also in the woodland pool occupied several weeks earlier, and a greater number in woods now flooded just across the road.

Points of interest in these data are concealing coloration in the woods, skill at hiding, recurrence in the same pool with favorable conditions after 36 days (see Overton, COPEIA, Nos. 20 and 24), and an individual's remaining 15 days in one spot just under the fallen woodland leaves.

J. T. NICHOLS,
New York, N. Y.

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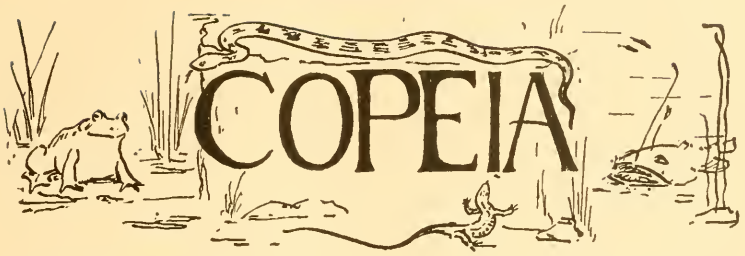

Published to advance the Science of cold-blooded vertebrates

ON THE DIFFERENTIAL CHARACTERS BETWEEN MUSTELUS HENLEI AND MUSTELUS CALIFORNICUS.

Mustelus henlei (Gill) is not commonly recognized on our coast, being passed over as *Mustelus californicus* which it strikingly resembles.

The fact that these two forms have been considered under separate genera, is perhaps somewhat responsible for their being confused by collectors. One naturally looks for greater differences than those that exist between these two, in species belonging to separate genera. Should the future, however, show that the young of *Mustelus henlei* is without the so-called placenta, it must perforce be considered generically different from *Mustelus californicus*.

The character of the teeth has been considered of sufficient weight for referring these species to different genera, but the dental differences between them are so small that a lens is necessary to distinguish them. The slight basal denticle in *Mustelus henlei* is not present on all of the teeth, and sometimes there is a slight blunt suggestion of this denticle in *Mustelus californicus*.

The distinguishing characters between these species is here pointed out hoping that the easy recognition and separation of the species may lead to a bet-

ter knowledge of their distribution and comparative abundance. At present we know only that *Mustelus californicus* is reported from San Francisco to the Gulf of California, but whether both species are included in this range, or whether *Mustelus henlei* is the commoner form in the northern part of it is uncertain.

Garman (Mem. Mus. Comp. Zool. XXXVI), distinguishes *Mustelus henlei* and presents a very good plate of it, but he does not separate it very well from *Mustelus californicus*.

I recently rather hastily examined Gill's type at the National Museum—a young specimen nine and a half inches in length, with the umbilical scar rather fresh, and compared it with the young of *Mustelus californicus* of similar size. I concluded that they were very doubtfully separable. Since then, however, I have had occasion to examine all of the adult specimens at Stanford University that I had supposed were referrable to *Mustelus californicus*, and have found both of these species represented and rather easily separated.

In *Mustelus henlei* the base of the anal is even with, or only slightly posterior to, the base of the second dorsal. In *Mustelus californicus* the anal is behind the second dorsal, a distance nearly or quite equal to the long diameter of the eye.

In *Mustelus henlei* the dorsal is more anteriorly placed. The distance from its origin to the last gill opening is equal to the length of the snout, while in *Mustelus californicus* this distance is equal to two-thirds or three-fourths of the length of the head.

In *Mustelus henlei* the tips of the pectorals when laid close to the body reach at least to opposite the middle of the dorsal base, while in *Mustelus californicus* they scarcely reach to under the anterior fourth of the dorsal base.

In *Mustelus henlei* the sides of the mandible are slightly convex; in *Mustelus californicus* they are concave.

One may appreciate with the naked eye that the teeth of *Mustelus henlei* are somewhat sharper. With the aid of a lens, a slight basal cup may be seen on each side of most of the middle upper teeth, and on the outer side of the lateral upper teeth. These are scarcely developed on the lower teeth. In *Mustelus californicus* the teeth are smooth, blunt, and not at all cusped.

In *Mustelus henlei* each scale on the side of the body has a projecting spine at the tip, while at each side of it is a small basal spine. That is, the scale is tricuspid. In *Mustelus californicus* the edge of the scale is entire. A strong lens is necessary to show these characters.

Mustelus lunulatus, with which *Mustelus californicus* intermingles along the Lower California coast, has the fins much as in *Mustelus henlei*, and the teeth and mandible contour as in *Mustelus californicus*. It may be known from them at once by the lower lobe of the caudal projecting in a rather sharp angle. In the other two species the posterior edge of the caudal below the notch is regularly concave without the lower lobe being produced.

My material was:

Mustelus henlei. Three specimens from San Francisco, 15 to 26 inches long.

Mustelus californicus. Six specimens from 23 to 32 inches long. Four of them from San Diego, one from Ensenada, Lower California, and one from Magdalena Bay, L. C.

Mustelus lunulatus. Three specimens from 19 to 25 inches in length. One from Mazatlan, Mexico, and two from Panama.

EDWIN CHAPIN STARKS,
Stanford University, Cal.

AMPHIBIANS AND REPTILES OF LEHIGH COUNTY, PENNSYLVANIA.

We offer the following list with localities at which we met with the various species during the past seven years or so. No special attempt was made to gather all the material we encountered, and unfortunately in the case of most well-known or common species, particular localities were seldom recorded. Doubtless several other forms will be discovered eventually within our limits.

A few records have appeared in several of the State Bulletins of the Department of Agriculture by the former State Zoologist, H. A. Surface, such species being indicated below by the asterisk.

The rattlesnake, *Crotalus horridus* Linnaeus, does not appear in any of the books with reference to Lehigh County, though formerly it was abundant.

Ambystoma maculatum (Shaw). Mountainville.

Ambystoma jeffersonianum (Green). Mountainville.

Hemidactylium scutatum Tschudi. Summit Lawn.

Plethodon erythronotus (Green). Allentown, Mountainville, Slatedale, Laury's.

Plethodon glutinosus (Green). Summit Lawn.

**Gyrinophilus porphyriticus* (Green). Allentown, Aineyville, Summit Lawn.

**Spelerpes bislineatus* (Green). Allentown, Aineyville, Summit Lawn, Slatedale.

Spelerpes longicauda (Green). Allentown.

**Spelerpes ruber* (Daudin). Allentown, Aineyville, Summit Lawn, Vera Cruz.

**Desmognathus fusca* (Rafinesque). Allentown, Aineyville, Summit Lawn, Emaus, Slatedale.

Diemictylus viridescens (Rafinesque). Allentown, Mountainville, Emaus, Slatedale.

Bufo americanus Holbrook. Allentown, Lanark, Emaus, Slatedale, New Tripoli.

Acris gryllus crepitans (Baird). Hosensack.

Hyla pickeringii (Holbrook). Allentown, Mountainville, Slatedale.

**Hyla versicolor* Le Conte. Allentown, Mountainville, Lanark.

Rana pipiens Schreber. County Home, Coopersburg.

Rana catesbiana Shaw. Aineyville, Mountainville, Lanark, Slatedale.

Rana clamata Daudin. Mountainville, Lanark.

Rana palustris Le Conte. Allentown, Aineyville, Lanark, Emaus.

Rana sylvatica Le Conte. Aineyville, Emaus, Lehigh Gap, New Tripoli.

**Natrix sipedon* (Linnaeus). Allentown, Lanark, Guthsville.

Elaphe obsoletus (Say). Friedensville, Lanark.

Storeia dekayi (Holbrook). Allentown.

Liopeltis vernalis (Harlan). Slatedale.

**Diadophis punctatus* (Linnaeus). Slatedale.

**Coluber constrictor* Linnaeus. Rittersville, Lanark.

Thamnophis sirtalis (Linnaeus). Allentown, Lanark.

**Lampropeltis doliatus triangulus* (Daudin). Aineyville, Shimerville.

Agkistrodon contortrix (Linnaeus). Allentown.

Chelydra serpentina (Linnaeus). County Home, Lanark.

Kinosternon pensylvanicum (Gmelin). Guthsville.

Sternothoerus odoratus (Latreille). Allentown, Lanark, Limeport, Hosensack.

Chrysemys picta (Schneider). County Home, Lanark.

Clemmys muhlenbergii (Schoepff). Emaus, Macungie.

Clemmys insculpta (Le Conte). Mountainville, Macungie, Lehigh Gap.

Clemmys guttata (Schneider). Allentown, Lanark, Hosensack, Lehigh Gap, New Tripoli.

Terrapene carolina (Linnaeus). Mountainville, Shimerville, New Tripoli.

E. S. AND W. I. MATTERN,
Allentown, Pa.

STRAY NOTES ON TERRAPENE CAROLINA.

Dr. F. A. Lucas of the American Museum of Natural History has called the writer's attention to an account by Edmund G. Koch, Williamsport, Pa., in *Forest and Stream* for August 3, 1907, p. 170, of a Box Turtle marked in 1866, 76, 90 and still living in 1907, proving for that individual a length of life over 41 years. Probably, this is exceptional longevity for the species in its natural state. Last summer (1916), an old turtle came under the writer's observation at Mastic, Long Island, which had been initialed and dated 84, 96 and 99. This would give the turtle an age of over 32 years. It was obviously much older than the ordinary run of full grown turtles, its shell being smooth, the growth-rings on the scales which are generally noticeable, practically obliterated by wear. It was small for an adult, the plastron 4⅝ inches long. Excellent photographs of this specimen are on file in the American Museum of Natural History, New York. The writer has seen another old Box Turtle of moderate size (plastron 5¼ inches), taken at Mastic, 1914, marked W. F. 92, which would give it an age of at least 22 years. Mr. William Flowd of Mastic whose initials also ac-

company the 84 on the 32-year turtle, marked a number of them at that period, and agrees that there is every reason to believe in the authenticity of the dating on both. Another pretty surely authentic one taen recently, July 1, 1917, was marked C. R. [Charles Ross] 04, making it over 13 years old. This last had the growth-rings on the scales about half obliterated. It evidently had not grown since marked, and was a small individual with the plastron 4¾ inches.

The Box Turtle is numerous at Mastic, and during the past three or four years a number have been marked with the idea that the ability to recognize individuals might bring out interesting points concerning growth or habits. Very few have been found a second time.

One which was picked up July 15, 1916, perhaps one-half mile from the house, and liberated at the house on the following day, was found again on June 9, 1917, near its original locality.

One found and liberated near the house on July 9, 1916, was found in the same locality on July 5, 1917.

On June 18, 1916, one was taken on a bay meadow about one mile from the house, an unusually wet locality for the species, and liberated at the house. September 4th of the same year, it was found swimming along the bay side of the same meadow close under the bank.

Perhaps some reader of Copeia can furnish further information as to whether individual Box Turtles have definite narrow territories which they frequent and to which they will return. The above instances are so few that they may be due to coincidence. The *Forest and Stream* article already referred to speaks of the faithfulness of an old turtle to one narrow locality.

As regards this species' habit of eating mushrooms, Latham says (Copeia No. 34), that at Orient *Russula obscurus* is devoured almost exclusively.

On June 25, 1916, a Box Turtle was taken at the edge of a Mastic wood road beside a large *Boletus scaber* of which it had eaten a considerable portion of the side. This particular *Boletus* is said to be an excellent table species.

Fifty-three more or less full-grown Box Turtles which have been measured at Mastic had plastron length.

4½	to	4⅝	inches	2
4¾	"	4⅞	"	10
5	"	5⅛	"	10
5¼	"	5⅜	"	15
5½	"	5⅝	"	13
5¾	"	5⅞	"	3

J. T. Nichols,
New York, N. Y.

Edited by J. T. Nichols, American Museum of Natural History

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DESTRUCTION OF LOG PERCH EGGS BY SUCKERS.

While collecting eggs of the log perch, *Percina caprodes*, (Rafinesque), at Douglas Lake, Michigan, during the second week of July, schools of suckers, *Catostomus commersonii* (Lacepede), were observed raiding the spawning grounds of the log perch. These suckers quietly entered the schools of log perch which were spawning in the shallow water near shore, and crowded the spawning fish aside to eat their recently laid eggs. The suckers were shy and retired to deep water when disturbed, returning again to the spawning grounds as soon as opportunity offered. They were seen in and near the schools of log perch throughout the day, for nearly two weeks.

Twenty of these suckers were captured about 9:30 A. M., while feeding among the log perch. Five were killed at once. The remaining 15 were placed in a live-car some distance from the spawning grounds and killed at intervals during the next 24 hours. The entire alimentary canal of each suckers was examined immediately after each fish was killed, and the number of log perch eggs noted. The data are tabulated below:

No.	Body length	Sex	Time in live-car	Eggs in ali. canal	Sand in ali. canal
	mm.				cc.
1	290	male	0	452	11.00
2	300	"	0	1,243	9.00
3	290	"	0	607	8.50
4	285	"	0	475	6.00
5	305	female	0	745	9.50
6	305	"	1 hr. 30 min.	704	4.50
7	265	male	1 hr. 45 min.	1,475	7.00
8	280	"	2 hrs.	246	3.00
9	290	"	3 hrs. 45 min.	649	8.00
10	280	"	3 hrs. 45 min.	222	5.00
11	270	"	4 hrs.	389	2.00
12	280	female	4 hrs.	23	2.50
13	310	male	4 hrs. 30 min.	64	0.75
14	315	"	5 hrs.	333	6.00
15	230	"	5 hrs.	390	2.00

Temperature of water in live-car 19° C.

From the table it may be seen that the average number of eggs in each alimentary canal was 500, and that two individuals each contained over 1,200 eggs. These figures do not include the partially digested and crushed eggs, as only whole eggs and recently-ruptured eggs were counted. The intestinal contents of all of the 15 suckers examined, however, included oily masses of partially digested eggs. This average of 500 eggs per sucker is also probably lowered through the loss of eggs crushed or digested while the fish were in the live-car, as but one-third of the 15 averaged were killed immediately after their capture on the spawning grounds. Aside from the eggs of *Percina caprodes*, the alimentary canals of these suckers contained little or no organic material, but fine sand was always mixed with the eggs. This fine sand undoubtedly was swallowed with the eggs, a portion of it at least attached to them, as the eggs of the log perch are covered with a coat of sand and debris shortly after leaving the body of the female. The average volume of sand in each alimentary canal was about five times the average volume of unbroken eggs present, as one cubic centimeter of log perch eggs contains about 440 eggs.

The remaining five suckers were killed after 24 hours of isolation in the live-car. No whole eggs were found in the alimentary canals of these fish, and only small masses of oil and sand were present in the posterior portions of the intestines. The absence of eggs in the alimentary canals of these five fish, collected while feeding with the other 15, considered with the fact that the alimentary canals of the other 15 contained an average of 500 eggs each, suggests the possible consumption of at least 500 log perch eggs every 24 hours by each sucker following the schools of log perch. The actual destruction of eggs by each sucker is probably greater, however, as the broken eggs remain uncounted. The percentage of the total number of eggs produced by the female log perch of these schools, destroyed by the suckers was not ascertained. Several female log perch taken at random yielded about 100 mature eggs each, although the ovaries of these fish contained large numbers of immature eggs.

While considering the destruction of the log perch eggs by suckers it may be noted that the log perch themselves crowd about spawning individuals of their own species and devour the recently-laid eggs. Ten male log perch collected with the suckers were examined and from eight to 20 eggs were found in the stomach of each one.

M. M. Ellis,
G. C. Roe,
Boulder, Colorado.

NOTES ON THE BREEDING AND INCUBATION PERIODS OF THE IOWA DARTER, *ETHEOSTOMA IOWAE* JORDAN AND MEEK.

While collecting embryological material during the spring of 1917 the eggs of the Iowa Darter, *Etheostoma iowae*, were obtained, fertilized and carried through the hatching period.

This darter is abundant in some of the foothill streams near Boulder, Colorado. Males in full breeding colors, with milt flowing freely when touched, and females with mature ova which could be discharged with slight pressure, were found as early as April 22 and as late as June 1, in Dry Creek, a small stream a few miles east of Boulder. These breeding fish were taken in water from three to four feet deep. The temperature of the water varied from 12°C. to 15°C., and its alkalinity equaled a 1-800 normal solution of Potassium Hydroxid. The darters were especially fond of pools where the bottom of the stream was covered with a heavy slime and masses of rotting vegetation, which had to be removed before the fish could be captured. When disturbed, the darters, which could be seen resting on top of this slime, burrowed into the soft debris by a series of quick movements of the pectortal and ventral fins. This preference for the deep pools at this time seemed to be correlated with the breeding activities of this species, as *Etheostoma iowae* was found usually under pebbles in swiftly running water and in shallow riffles during the fall, winter and early spring.

The incubation period of the eggs of *Etheostoma iowae* kept in running water at 13°C. to 16°C. in the laboratory, was comparatively short, occupying from 18 to 26 days. The germ ring was clearly visible by the twentieth hour after fertilization, and the majority of the eggs of one large series hatched within 30 minutes of each other on the twenty-fourth day. The newly-hatched darter was 3.4 millimeters in length.

Bertram B. Jaffa,
Boulder, Colorado.

THE BREEDING HABITS OF THE VIVIPARUS PERCH, CYMATOGASTER.

The family Embiotocidae includes a number of interesting percoid fishes. They have all developed

viviparity to a high degree of perfection, the young being born in an almost adult condition. Very little has been written of their habits, and apparently nothing at all of their copulation. So it was with much satifsaction that I observed, under very favorable circumstances, the breeding habits of *Cymatogaster aggregatus*. The date of the observation was July 5, 1916; the locality was in the shallow channel forming the outlet and inlet of an estero near Goleta in Santa Barbara County, California.

Attention was first directed to a slight disturbance about twenty feet offshore, where two "Shiners" were swimming with their backs just out of the water. Very soon the pair were joined by about 6 others, which, judging from their small size, were likely males. The original pair swam slowly towards shore, their caudal regions in close proximity. The largest of the supernumerary fishes immediately preceded the pair, while the others followed a short distance behind. Occasionally the male turned partly over onto his side. After the fishes had proceeded thus shoreward about 6 feet, there ensued a commotion, of which the details were not observed, and then all but the first pair swiftly made for deeper water offshore.

The pair, now alone, then proceeded against the tide in a semi-circular course of about five feet, frequently pausing while the male, turning upon his side, applied his anal region to that of his mate. Finally reaching the shelter of a stone in about a foot of water, the pair halted and copulation ensued. With their heads in the same direction and their anal regions in contact, the pair remained quite motionless for a few seconds, seeming to balance in the water. The male then turned over to a nearly horizontal position, the female much less. For several seconds the male moved rather slowly about half an inch back and forth, paused, then resumed the vibratory move-

ment for a few seconds, and finally darted off, without warning into deeper water.

The female remained quite motionless in the shelter of the stone, and was readily captured in a seine. Its oviduct was loosely extruded for about 5 mm., and from it there projected the tail of the single remaining young. This young fish was about of the same size as numerous others seined nearby, most abundantly over the bottom where strewn by kelp washed in by the tide.

This observation confirms other evidence that the period between copulation and the bearing of the young is one year.

The life color of this breeding female may be of interest. The gold color appears in the usual two bars across the middle of the brilliantly silver sides, which are tinged with gold posteriorly; there is also a smaller bar before these, and a trace of one along the margin of the branchial aperture. There is a blotch before the pectoral fin, and another small blotch which is located behind and below the pectoral, and is followed by a streak extending nearly across the trunk.

Carl L. Hubbs,
Chicago, Ill.

NOTES ON THREE COMMON NEW JERSEY TURTLES.

These notes are taken essentially word for word from my notebook.

Mating of Box Turtles and of Wood Turtles. I have twice found turtles apparently either mating or just after or about to begin mating, though on neither occasion could I see any connection other than that one was sitting squarely on the other's back. Evidently, however, it was neither time a case of casually sprawling over each other like Painted Turtles on a crowded sunning-log. The Box Turtles

(*Terrapene carolina*), were on land in the woods bordering the bank of Crosswicks Creek below Crosswicks, Burlington County, May 9, 1915. I noted particularly that the plastrons of both were decidedly concave and to the same degree. The Wood Turtles (*Clemmys insculpta*), were resting on the bottom of a little brook in the Washington Valley above North Plainfield, Somerset County, May 14, 1916. The brook at that point flows through open fields more or less bushy. The turtles made off when disturbed, one going up stream and one down.

Egg-Laying of a Painted Turtle. On July 4, 1916, a I found a *Chrysemis picta* at Runyon, Middlesex County, just within the frings of short grass, *Arenaria,* etc., on the far side (from the pond) of an open space in the woods on the north side. She had dug a hole at least four inches deep (perhaps much more), and was laying eggs. I saw her lay three, at brief intervals. She would poke each one down among the others and pack it in with one or the other hind foot. After laying the last, she shoveled the sand back over them with her hind feet (which, normally so far apart, were brought to meet and even overlap), stamping and pushing it down, awkwardly, but so painstakingly and efficiently that when she had finished the spot was indistinguishable. The hole was less wide than deep, and the top eggs were under about an inch or two of sand. During the whole operation, the turtle's head (about half out), and body remained practically motionless, and I believe that she never saw her eggs, unless while I was away briefly she turned around expressly to look at them. All I have described (took place between five and six in the afternoon), she did while I stood close over her where she must have seen me. The animal had come about 120 yards from the pond, first through dense bushy growth (*Chamaedaphne*, etc.), then all the way across the open space where her track, fairly straight, was plainly visible. After cov-

ering her eggs she sat quiet, apparently resting before starting the long walk back to the pond.

CHARLES H. ROGERS,
New York, N. Y.

POISONOUS SNAKES IN THE JUNGLE.

It is quiet commonly maintained that poisonous snakes are very abundant in the tropics. After experiencing several months intensive collecting in Central American jungles, and after discussing the matter with other collectors who have likewise worked in the tropics, it is the writer's belief that poisonous snakes are not nearly so common as is generally supposed. The *species* are fairly well represented, but the actual number of specimens is comparatively less than in the case of the harmless forms. We employed natives to collect for us and few, if any, brought in any poisonous examples. They maintained that the venomous snakes were super-abundant and considered all annulated snakes (*Polydontophis annulatus, Coronella micropholis, Urotheca elapoides, Oxyrhopus* sps., and others), to be coral snakes, and all darkly colored, spotted snakes (*Xenodon, Leptodira, Petalognathus,* etc.), to be species of *Lachesis*. Many times were we given perfectly harmless forms which were considered by the natives to be either Elapine or Crotaline species. Hence, their usual statement of poisonous snakes being very abundant.

It is therefor advisable that the collector going into the usual tropical jungles should not entertain too high expectations in his quest for a large percentage of poisonous snakes, for he is very liable to have his hopes suddenly shattered.

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CERTAIN MARINE TROPICAL FISHES AS FOOD.

By J. T. Nichols[1] and L. L. Mowbray.[2]

The senior writer made a visit to Porto Rico in 1914, in the course of a scientific survey of the island conducted by the New York Academy of Sciences in co-operation with the insular government. This visit convinced him that the fisheries resources of the island are by no means utilized to the extent of which they are capable. Compared with those he was familiar with elsewhere, in Cuba, Bermudas, at Key West, and in the Hawaiian Islands, they are little developed. Porto Rican fisheries will doubtless expand with time, mostly along those lines where a beginning has already been made. Whereas, the notes herewith brought together may have little economic value for Porto Rico, they have been assembled for such value or interest as they may have there.

The junior writer has the greatest familiarity with the capture and utilization of tropical fishes, especially in the Bermudas, and has furnished most of the data on that subject; whereas, the senior writer, having greater facilities for consulting the literature, is, in general, responsible for references and the remainder of this paper. Both writers have studied tropical marine fishes in various waters since their first meeting in Bermuda, fourteen years ago. The fish fauna of Bermuda bears a rather close resemblance to that of Porto Rico, and Porto Rico can doubtless learn from Bermuda things of value in developing its fisheries.

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[1] Of The American Museum of Natural History, New York.

[2] Of the New York Aquarium.

Ground Sharks (*Carcharhinus*).

These sharks are better food than is generally believed. The U. S. Bureau of Fisheries in Washington has recently been interested in introducing their hides to the market for use as leather, and can furnish interesting information on that subject.

In Bermuda, a hash is made from small ground sharks which is much appreciated by all classes. After the head, viscera, and fins have been removed, the shark is cut into chunks and boiled. Then, the water is drained off, the skin and bones removed, and the meat squeezed into a fine hash. The liver is boiled separately to obtain the oil. Chopped parsley, sage, and thyme are mixed with the meat and sufficient of the liver oil to prevent its burning when stirred over an even fire (about a gill of oil for 10 lbs. of meat), until medium dry. It is then served with boiled sweet potatoes. If the shark is in good condition, the liver is whitish or pinkish, and such individuals are selected for the table, those with small brown livers are rejected as not in such good condition, and because the liver will not furnish sufficient oil. Pork is sometimes used as a substitute for the liver oil, but is not as good.

These Bermuda sharks which average eight or ten lbs. in weight, are caught for the market in large quantities off shore in June, July, and August with hand lines, and sell for 12 cents apiece, dressed—which is, of course, much more reasonable than other kinds of fish.

The Edged Shark, *Carcharhinus limbatus*, "Cacongetta," is one of the commonest species in Porto Rico. It is five feet or more in length when full grown, has the teeth in the upper jaw rather narrow, similar to those in the lower. Its color is grayish, the fins boldly tipped with black. Concerning it, Evermann and Marsh in "Fishes of Porto Rico" say, "Used as food by the very poor." One of the writers has eaten a steak from a freshly caught specimen in Florida, fried in graham flower, and found it decidedly palatable, and not at all tough. The meat is beautifully white.

The colored population in the South relish shark as food, otherwise it is little eaten in the United States.

According to Dr. L. Hussakof, shark is extensively marketed in Naples, where it is served in the restaurants.

Hammer-head Shark. (*Sphyrna zygaena*) "Cornuda."

This shark which reaches a length of 15 feet or more is generally common in tropical seas. It is considered edible in the

Hawaiian Islands, where it is the shark most frequently seen in the markets (Cobb, Bull. XXIII, U. S. Bureau of Fisheries, 1903). Francis Day in "The Fishes of Malabar," India, (1865), says: "Its flesh is considered very nourishing and is extensively salted."

Saw-fish (*Pristis*), "Pez Sierra".

We do not know of the saw-fish being utilized in America. In Malabar, India, according to Day (Fishes of Malabar, 1865): "The flesh is as much esteemed as that of the sharks. The fins are prepared and sent to China; oil is extracted from the livers, whilst the skins are useful for sword belts or for smoothing down wood."

Whip-ray (*Actobatis narinari*). "Obispo." "Chucho."

Day in "The Fishes of Malabar," India, (1865), says of this species: "Eaten by the natives. Is captured to upwards of six feet in width and the flesh is salted."

Tarpon (*Tarpon atlanticus*).

Though in general sought exclusively for sport, the tarpon is eaten in some parts of Florida.

Needle-fish (*Tylosurus*), "Agujon".

Various species of Needle-fish are found in all seas, but are most abundant in the tropics. The larger species have green bones, which sometimes cause them to be avoided, although they are good food. The European form is commonly exposed for sale in the Copenhagen market. A large kind which occurs in the Hawaiian Islands is a foodfish of importance. Bermuda Needle-fish are caught in seines, or sometimes on light hand lines with a float, and often eaten fried.

Half-beak (*Hemirhamphus brasiliensis*), "Balaju".

In Malabar, India, the roe of a related species is highly prized by Europeans for curry (Day, "Fishes of Malabar," 1865).

Mullet (*Mugil*), "Liza".

In Bermuda, the mullet is commonly served in a stew or chowder with potatoes and cubes of pork. They are taken in

greatest abundance in October and November, at which time, they are with roe, and the roes are prepared in the following manner: Several are spread upon a white pine board about two feet long and ten inches wide with sufficient space between them to allow for spreading. A similar board is placed upon them, and as they dry and harden, the weight on the upper board is gradually increased so as not to break the membrane in which the eggs are contained. It takes two or three days to press the roes properly. After pressing they are hung up to dry in the sun. They dry to a leathery consistency and a rich golden brown color, and will keep indefinitely. Roes thus prepared sell for 60 cents to a dollar a pound.

Before being eaten, this dried mullet roe is boiled for a few minutes or steamed, and served with melted butter and a little lemon. This is a very rich dish and considered a great delicacy.

In the Hawaiian Islands, the mullet is an important food fish, and since legendary times there, the market supply has been augmented and conserved by fish ponds which are described fully in "The Commercial Fisheries of the Hawaiian Islands," by John S. Cobb, Bull. XXIII, U. S. Bureau of Fisheries, 1903, p. 746. To quote from that article: "The ponds are found principally in the bays indenting the shores of the islands, the common method of construction having been to build a wall of lava rock across the narrowest part of the entrance to a small bay or bight of land and use the inclosed space for the pond * * * In the sea ponds, the walls are about 5 feet in width and are built somewhat loosely, in order that the water may percolate freely * * * The sea ponds generally have sluice gates which can be raised or lowered, or else which open and close like a door * * *' The gate is opened when the tide is coming in and closed when it turns. There is usually a small runway, built of two parallel rows of loosely piled stones, from the gate to about 10 feet into the pond. Since the fish congregate in this runway as the tide is going out, it is very easy to dip out the supply needed for market. Seines and gill nets are also used in taking fish from the ponds, a method which is easy, owing to the shallowness of the ponds. Besides, the fish which come in through the open gates at certain seasons of the year, the owner usually has men engaged in catching young ama-ama [mullet] in the open sea and bays, and transporting them alive to these enclosures, where they are kept until they attain a marketable size, and longer, frequently, if the prices quoted in the market are not satisfactory. It costs almost nothing to keep them as they find their own food in the sea ponds. It is supposed that they eat a fine moss which is quite common there."

Cutlass Fish (*Trichiurus lepturus*), "Machete".

Related species of cutlass fishes are eaten in Malabar, India, (Day, "Fishes of Malabar," 1865).

Queen Trigger Fish (*Balistes vetula*).

This species is skinned and eaten stewed in Bermuda, where it goes by the name of Queen Turbot, and the skin is used for scrubbing.

Trunk Fish (*Lactophrys*), "Chapin". "Toro."

In Bermuda, these fishes are baked in the shell after the viscera have been removed and the fish stuffed as one would stuff a chicken. They are then eaten from the shell with a small fork.

Swell Fishes (*Tetraodontidae*), "Tambor." "Tamboril."

These fishes are not fit for food, many of them being deadly poisonous, and the poison is not destroyed by cooking. The muscle of some, if not all, may be eaten, if the viscera, and especially the roe and liver are carefully removed, but the gain is in no way worth the risk. Bermuda fishermen claim that if offered to a cat they will be eaten and the cat will die or at least be made very ill.

On Poisonous Fish and Fish Poisoning.

Various tropical fishes have the reputation of being at times poisonous. We quote below at length remarks on this subject by L. L. Mowbray in the New York Zoological Society Bulletin, Nov., 1916, pages 1422-1423:

"Much has been said and written about the poisonous fishes of tropical and sub-tropical seas. It is a known fact that among people eating the same species at the same time, even caught in the same locality, some have been poisoned, while others have not. Among fishes eaten by man, the species considered most likely to be dangerous as food during the season from May to October, are the barracuda, two species of kingfish, three species of jack, red rockfish, and tiger rockfish.

"The barracuda (*Sphyraena picuda*), is a pike-like fish inhabiting both shallow and deep water, and is often seen hiding behind the Gorgonias, waiting for its prey.

"The mulleto kingfish (*Scomberomorus regalis*), and the common kingfish (*S. cavalla*), are swift and active, and are among the best of food fishes.

"The jacks (*Caranx hippos, C. ruber,* and *C. crysos*), are swift-swimming surface fishes, usually traveling in large schools. Their food consists of the anchovy, pilcher, hog mouth fry, and squid and crabs that live among the Gulf-weed.

"The red rockfish (*Mycteroperca venenosa apua*), and the tiger rockfish or gag (*M. tigris*), live on rocky coral bottoms and often in very deep water. Their food consists of small bottom fishes and crustacea. Both species are captured by hand lines and in traps.

"All of these fishes are carnivorous, preying upon various species of fishes and invertebrates. There is no evidence whatever that they feed at any season upon forms which would render their flesh unwholesome.

"While in the Turk Islands I questioned many fishermen concerning the fishes that were poisonous, the effects of the poison, and at what seasons the fish were most dangerous. Without exception their reports tallied. All agreed that there were two forms of the disease; that the fish from the north side of the Islands were the most dangerous, those from the south side not being so likely to prove poisonous. This seems incredible, as the island of Grand Turk, most densely populated of this group of islands, is only one and a half miles wide, by six miles long, and lies in trade winds and the Bahama current, which move all surface food at a considerable rate to the westward. I consulted Dr. Geogaghan, then the Medical Officer of the Colony, who kindly gave me a description of the symptoms, which he had personally experienced in both forms of the disease.

"Dr. Geogaghan said: 'To my knowledge the common poisonous fish are barracuda, jack and mulleto kingfish. In certain places, for some reason or other, the barracuda is more likely to be poisonous than if caught elsewhere.

" 'There are two distinct kinds of poisoning from these fishes. The ordinary type is similar to ptomaine, being in the nature of a simple gastroenteritis of an irritative sort. It is characterized by acute spasmodic pain in the stomach, diarrhœa, and vomiting, coming on from ten to twenty hours after eating the fish, and subsiding readily under treatment. There is occasionally headache, usually fever (101 to 102 degrees F.), and a rapid pulse (90 to 100). Generally speaking, it is an acute gastroenteritis.

" 'The other form is in the nature of a toxemia. I have never seen a case following on the eating of jack, but cannot

be certain on this point. The symptoms are slow to subside, sometimes lasting for months. It starts from two to six days after eating the fish, very seldom less than two, and usually three or four. There is repeated pain of a dull resistant type over the region of the panereas; constipation; slow aching pains in the joints, especially in the knees and back, without any physical signs; pain behind the eyes and headache, acute irritation of the bladder with frequent burning and tickling sensation.

"'The joint pains are called "bone-pains" here, and are similar to the pains of influenza, though more particularly associated with the joints. There is an intense feeling of lassitude and debility and subnormal temperature.

"'Naturally clinical cases vary in severity. Occasionally the two forms of poisoning are combined, one following the other. I look on the first as a simple irritative disturbance of the intestine which throws off the irritant in the usual way. The second is a real poisoning of the system. I have had both myself, and it was many months before I was rid of the joint-pains of the second.'

"The Turk Island species described herein are also among the principal food fishes of Key West and the Bermudas, excepting the kingfish, which is seldom taken at Bermuda, and poisoning is unknown in these localities.

"After observing the conditions and the manner in which the fish are handled, I have reached the conclusion that the reason they are poisonous, in one region and not in another, is that in Bermuda and Key West almost all fishing boats have live-wells, and therefore usually bring their fish to market alive, while in the Turk Islands and Bahamas the fish are killed and allowed to remain in the sun until the shore is reached—sometimes five or six hours after they are caught.

"All of the fishes considered poisonous are of soft flesh and rich in gastric juices, and are therefore the most likely to decay quickly; and, when eaten in a partially decayed conditon, cause *ptomaine poisoning*. Naturally, some are more poisonous than others. Those caught in the morning are exposed to the sun's rays much longer, and are therefore much more decomposed.

"The fishes, when examined externally and internally, appeared to be in the finest condition when caught, and I could detect no difference between them and those of Bermuda or Key West. I have seen specimens of Grand Turk Island with the scales standing almost on edge through the decomposing of the flesh, which, forming gases, expanded the fish. These fish are frequently sold from house to house, though caught the day before and in a half putrid condition. It is probable that if,

when caught, the fish were eviscerated and bled,[1] a case of poisoning would be a rarity."

In any tropical climate, proper marketing is an essential factor in fisheries development. We quote a cogent sentence or two from Bulletin No. 1, of the Madras Fisheries Bureau, 1915, pp. 212 to 215. "We must make the best use of what we now catch before proceeding to catch yet larger masses. Of all general foods, fish is most liable to taint, and most poisonous when tainted. * * *

"Hence effort is now being directed in the experimental stations started by the Madras Government to various obvious and simple reforms: Firstly, to the introduction of live cars and live chests, or pens, so that fish can be brought alive to shore and kept in good condition till required; this was a universal custom even in temperate climates till the introduction of cheap ice, and still is in many cases * * * Secondly, fish not kept alive *must be cleaned and washed at sea* and properly stowed; this brings them to shore with a much decreased chance of taint, even if several hours intervene."

[1] A good method of bleeding is to sever the tail while the fish is alive, thus opening the blood vessels on either side of it.

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CHANGES IN NAMES OF AMERICAN FISHES

A recent survey of the names applied to the genera of fishes shows the necessity of a number of changes from the names adopted by Jordan and Evermann, Fishes of North and Middle America, 1898. Among those which most concern students of American Ichthyology are the following:

Anchoviella Fowler replaces *Stolephorus* Lacepède as the name of the great body of tropical anchovies. The type of *Stolephorus,* as first restricted, was not an anchovy, but a round herring of Japan.

Bagre Cuvier, by tautonomy, replaces *Felichthys* and *Ailurichthys* for the Gaff top-sail cat-fish, *Bagre felis* (L.)

Bodianus Bloch, by tautonomy, replaces *Harpe* Lacepède, while *Cephalopholis* Bloch & Schneider replaces *Bodianus* and *Enneacentrus.*

Chelon Röse replaces *Chaenomugil.*

Corvina Cuvier stands for the group called *Pseudosciaena. Cheilotrema* and *Callaus* may be genera distinct from *Corvina.*

Clupanodon Lacepède should be restricted to the Asiatic genus called *Konosirus.* The true sardines (*S. pilchardus* of Europe, and *S. cærulea* of California), belong to the genus *Sardina* Antapa. Those sardines with unstriated opercle, (*S. aurita* and *S. anchovia-pseudohispanica*), comprise the genus *Sardinella,* called *Sardinia* by Poey. The Scaled Sar-

dines, *maculosa, macrophthalma,* etc., constitute the genus *Harengula,* well separated from *Sardina* and *Sardinella* by their firm flesh and adherent scales.

The type of *Ethcostoma* should be *E. blennioides.* The name should replace *Diplesion,* while the genus called *Etheostoma* by Jordan and Evermann should stand as *Poecilichthys.* Some of the subgenera in this group should stand as distinct genera.

The genus called *Centrarchus* should stand as *Eucentrarchus* Gill and the family of Sun-fishes and Black Bass, as Micropteridae.

The name *Gerres* Cuvier should replace *Xystæma,* while the genus called *Gerres* by Jordan and Evermann becomes *Diapterus.* The family stands as Eucinostomidae as there is an earlier family Geridae, among insects.

Histrio Fischer replaces *Pterophryne.*

Leucichthys Dybowski replaces *Argyrosomus* (preoccupied) for the Lake Herrings and Ciscoes. Several new species of these have been described by Jordan and Evermann, from the Great Lakes.

The Trout Perch of the Lakes should stand as *Percopsis omiscomaycus* Walbaum, instead of *Percopsis guttatus.* The Lake Sturgeon as *Acipenser fulvescens* Rafinesque, instead of *Acipenser rubicundus* Le Sueur as Mr. Hubbs has noted. The American eel is *Anguilla rostrata* (Le Sueur, Sept., 1817), instead of *A. chrisypa* Rafinesque (Dec., 1817). The date of *rostrata* is incorrectly given by Jordan & Evermann.

Membras Bonaparte replaces *Kirtlandia.*

Micrometrus Gibbons replaces *Abeona.*

Phycis Röse replaces *Emphycus* and *Urophycis.*

Polynemus L. replaces *Polydactylus.*

The generic name *Catulus* is preoccupied in insects. The genus of sharks so named becomes *Scylliorhinus.*

Siphostoma Rafinesque becomes again *Syngnathus,* and *Lucius* Rafinesque reverts to *Esox,* while

Esox Rafinesque becomes again *Belone* Cuvier. *Glossamia pandionis* becomes *Xystramia pandionis.*

There are no species of *Leucos* in America, the species so-called being referable to *Myloleucus* Cope and *Hesperoleucus* Snyder. There are, according to Prof. Cockerell, no true species of *Leuciscus* in America or Japan. The American species, so-called, stand for the present as *Richardsonius* Gerard, though some of the included sections (*Clinostomus, Phoxinus, Hemitremia, Siboma*), may prove to be of generic value. *Cheilonemus* Baird replaces *Leucosomus,* preoccupied. *Cremnobates* Günther replaces *Auchenopterus,* preoccupied. *Cynicoglossus* Bonaparte replaces *Microstomus,* preoccupied. *Eudulus* Fowler replaces *Dules. Evermannellus* Fowler replaces *Odontostomus. Haloporphyrus* Günther replaces *Lepidion. Notoscopelus* Günther replaces *Macrostoma. Quassilabia* Jordan and Brayton replaces *Lagochilus. Scaphirhynchops* Gill replaces *Scaphirhynchus. Stenesthes* Jordan replaces *Stenotomus,* preoccupied. The Scup becomes thus *Stenesthes chrysops. Xiphister* Jordan and Gilbert replaces *Xiphidion.*

Carcharhinus commersoni Blainville should probably stand, instead of *C. lamia. Isurus tigris* (Atwood) replaces *Isurus dekayi, Isurus oxyrhynchus* European species not yet known from our coast. *Lamna nasus* (Bonnaterre), has priority over *Lamna cornubica* (Gmelin). *Mustelus* Valmont, 1764, or of Linck (1790), must stand for the smooth "Dog Sharks," which may for the present, pending investigation be left in one genus. *Mustelus* Valmont is equivalent to *Cynias* Gill, *Mustelus* Linck to *Pleuracromylon.* The species are *Mustelus asterias* (Valmont) or *Cynias canis* (Mitchill) and *Mustelus* or *Pleuracromylon mustelus* (L.)

The name *Raja diaphanes* Mitchill replaces *Raja ocellata* (preoccupied) *Raja scabrata* Garman replaces *Raja radiata* (not found in America) and

Raja stabuliforis Garman replaces *Raja laevis,* regarded as preoccupied. *Raja granulata* Gill is a valid species.

The name *Mobula* replaces *Aodon,* unidentifiable.

The group of suckers called *Hypentelium* constitutes a valid genus. The species of this group called *Catostomus rhothœcus* by Dr. Thoburn seems to constitute a new genus, which we may name *Thoburnia* Jordan and Snyder, in honor of Wilbur Thoburn, professor of bionomics in Stanford University, a young man whose life came to an untimely end and who is remembered by his students not only as a gifted naturalist, but as a powerful moral influence in the lives of all associated with him. *Thoburnia* is distinguishable from *Hypentelium* by the very small head, the skull not concave between the eyes.

Xyrauchen texanus (Abbott) replaces *X. cypho.*

Among the Hexagrammos-like fishes, several distinct families must be recognized each with but a genus or two. These are Anoplopomatidae, Erilepidae, Hexagrammidae, Ophiodontidae, Zaniolepidae and Oxylebiidae. *Erilepis zonifer* grows to a large size, upwards of a hundred pounds in Japan and in Alaska, where it is occasionally taken. The black bars disappear with age. The "Fat Priest" of Japan, *Ebisus sagamius* Jordan and Snyder, is the adult of this species, of which the young was called *Erilepis zonifer. Zaniolepis frenatus* Eigenmann is generically different from *Zaniolepis latipinnis,* having the head much larger and more strongly armed, the supraorbital cirrus large, and the second dorsal spine not specially elevated, shorter than the second and shorter than head. This species may be made the type of a new genus, *Xantocles. Zaniolepis* from *xanion,* a wool card or comb and *lepis* scale, should have been spelled with an initial X.

Under the ruling of the International Commission of Zoological Nomenclature, the generic names

of Gronow (1763), with polynomial species have been accepted. This ruling would also apparently validate the generic names revived from Klein in the dictionary called the "Gesellschaft Schauplatz," 1775-1781. Certain names of Valmont de Bomare, 1768, may be eligible and certain subgeneric names in Arabic of Forskål, 1775. If these should be adopted *Amia* Gronow would replace *Apogon*. *Amiatus* Rafinesque would replace *Amia L.* (1766). *Brama* Klein would replace *Abramis* and *Lepodus* Rafinesque *Brama* Schneider for the Sea Bream. *Callyodon* Gronow would replace *Scarus*. *Cestracion* Klein replaces *Sphyrna*. *Galeus* Valmont or *Cynocephalus* Klein replaces *Prionace*. Cyclogaster Gronow replaces *Liparis*. *Enchelyopus* Gronow, *Zoarces*. *Hepatus* Gronow, replaces *Teuthis* L. *Dasybatus* Klein replaces *Dasyatis*. *Rhina* Klein supersedes *Squatina*. *Rhombus* Klein replaces *Bothus*, while *Peprilus* Cuvier, replaces *Rhombus* Lacepède for the genus of Harvest-fishes. *Poronotus* and *Palometa* are probably both distinct from *Rhombus*.

The Thresher Shark (*Alopias vulpinus* Bonnaterre, *A. vulpes* Gmelin), was named *Vulpecula marina* by Valmont in 1768. Garman adopts this name but it may not be officially considered eligible.

It is possible that these generic names may not be finally accepted, and it will be safe not to use any of them not validated by acceptance of later authors, until their eligibility is finally determined. The authors concerned are mainly Gronow, Klein, Valmont de Bomare and Patrick Browne.

David Starr Jordan,
Stanford University, Cal.

HUNTING LIZARDS WITH A "BEAN-SHOOTER."

The writer has before him a shipment of reptiles from the West, including a really choice lot of

lizards—nearly every one of them captured by means of a beanshooter. The recollection evokes a gleeful chuckle. It seems worth telling.

Freely admitting considerable experience with this boy's weapon in days gone by, credit for its resurrection and practical adoption must be given to my friend, Mr. William T. Davis, the naturalist of Staten Island. At one of the entomological meetings he exhibited his beanshooter together with charges of fine shot. He then told of how he had laid low the dazzling dragon-fly as it sailed over the pond and had brought abruptly to an end the noisome song of the Cicada in branches high. It was a thrilling account —full of the element of sport.

On a trip to southern Utah this summer my equipment included a beanshooter, also a supply of No. 4 and 8 shot. The beanshooter was made the same as I used as a boy: a stout, forked handle cut from a privet hedge, two rubber bands 5″ long x 5/8″ wide, a soft, square piece of leather, folded, trimmed and sewed at the bottom so that it formed a shallow, rounded pocket, and the whole tied together with shoestring. In execution this weapon proved so effective that I employed it to the exclusion of all other methods whenever the chances of capturing a specimen by hand seemed in doubt. My procedure would be as follows: loading the flipper with 30 to 40 of No. 8 shot or with 20 to 30 of No. 4, according to size of the lizard in sight, I approached with caution, avoiding dry sticks and loose stones, and, when within 10 to 15 feet, I would shoot, always aiming at the head. The shot produced temporary stunning, sometimes accompanied by a slight flow of blood, but rarely by mutilation. No time could be lost in picking up specimens for they often revived before they could be placed in a bag. At 10 feet I felt almost sure of my game; at 15 feet I could count on bagging 4 out of 5.

Except when the lizards were startled, I found little difficulty in getting within shooting distance of even the speediest of them. This I ascribe to their bump of curiosity, developed apparently to a high degree. Thus, on another occasion, I recall capturing with a net a number of *Crotaphytus* while their attention was fixed upon the antics—a sort of war dance—performed by a companion. The material before me is represented largely by species of *Callisaurus, Crotaphytus, Uta, Sceloporus, Cnemidophorus,* etc.

The small bore shotgun or pistol, while a reliable weapon, has the disadvantage of causing more or less mutilation. In a hot and dry climate badly injured or dead specimens discolor and shrivel quickly, often before they can be brought to camp. Best suited for every purpose of study is material brought in alive. If they are not intended for osteological preparations I have obtained the most satisfactory results from specimens killed in formalin 4%. In this medium reptiles retain their natural proportion and color much better than if placed into alcohol at once. I make no incisions, but instead use a small veterinary syringe with a set of hypodermic needles. This leaves no outward marks where injections have been made. An injection through the vent usually suffices for lizards. Snakes require additional injections below the ventral scales. Collapsed regions are easily restored by means of the syringe during the process of curing. After 3 to 4 hours specimens may be transferred to alcohol 70% or, if intended for color study at a future date, to formalin 2%.

GEO. P. ENGELHARDT,
Brooklyn, N. Y.

HABITS OF A YOUNG BOX TORTOISE.

The Box Tortoise (*Terrapene carolina*), is almost entirely terestrial in its habits, although exceptions have been recorded recently by contributors to

Copeia. As the young of this species are rarely discovered, the actions of one found by the writer have been watched with interest. This turtle was picked up on a sandy country road in June. It had a carapace length of 50 mm. and weighed ¾ oz. Portions of the keel were distinctly present. When placed in its box, it at once made for the water where it remains almost continually, coming out for an hour or two on bright, hot mornings, to sun itself on some moss. Its favorite diet consists of angle worms, which it devours with avidity, but unlike other Emydidae it rushes out of the water with its prey instead of feeding in the water with head submerged. In this habit it resembles the true land tortoises, toward which the Box Tortoises seem to be evolving. The aquatic life of young Box Tortoises may account for their being so infrequently observed.

H. L. Babcock,
Boston, Mass.

ANOTHER NEW JERSEY KING SNAKE.

This spring, about June 10th, upon rather a damp windy day, Mr. Outram Bangs and I motored from Rumson to Lakehurst, New Jersey. During a short halt made necessary by a punctured tire we strolled for some distance along a brook which divided a large open meadow. We had gone but a short way when we found a fine adult King Snake [*Lampropeltis getulus* (L.)] sunning on the south side of a large log. The snake is still alive at the Museum of Comparative Zoology at Cambridge. Since Fowler does not record any specimen from just this locality, and as the species is very rare in New Jersey, it seems worth while to place this captive upon record.

T. Barbour,
Cambridge, Mass.

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COULTER'S WHITEFISH.

In a recent article on *Coregonus coulteri* (Copeia No. 45), Dr. Kendall overlooks an obscure second record of the occurrence of the species in the Columbia basin (Proc. U. S. Nat. Mus. XXXVI, p. 430). The specimens there referred to were collected by the writer at Diamond Lake, Stevens Co., Wash., in June, 1894. It was observed at the time that kingfishers were catching a slender, silvery fish from near the surface of the lake, and by firing at the birds with a rifle, they were on several occasions made to drop the fish within reach. These were Coulter's whitefish. None was seen in the shallow water near shore, there was no boat at hand, and consequently nothing more was learned of the species. Some of these fishes, measuring 127 millimeters in length, were about as large as the birds could well manage. These specimens and likewise some of those taken by Dr. Eigenmann appear to be fishes of the year, and it is possible that the adults of the species may reach a much larger size. Indeed it is not improbable that the species may be a deep water form of some food value. The Bureau of Fisheries has lately learned of the presence of several undescribed species of whitefish in western waters. Some of these are good food fishes, and it is possible that their range may be profitably extended by artificial means. An

investigation of these species has been started, and it is no doubt worth while that it should be extended.

J. O. Snyder,
Stanford University, Calif.

SHUFELDT'S NEW MUD MINNOW.

In the July number of *Aquatic Life* Dr. R. W. Shufeldt boldly adds another synonym to *Umbra pygmæa*. One is obliged to read his entire article, which is unnecessarily voluminous, to the end, where the new name *Umbra pygmæa bilineata* is found. As Shufeldt neglects to select a type, a custom almost universal in these days among naturalists, we shall be obliged to help him out by indicating No. 16, 896, U. S. N. M. from "Trib. of Chesapeake Bay" as such. Apparently this new form is suggested chiefly on its supposed color characters. It is alleged to differ in having but 2 wide dark lengthwise broad bands, while in *U. pygmæa* there are ten, a dozen, or more, narrow dark lengthwise lines. On a previous page, however, Shufeldt admits that "the fish changes its coloration to a wonderful degree when placed in alcohol and other preservative fluids," and also that the living fishes vary widely in color. I found that our living mud minnow exhibits great extremes in variety of color, not only such patterns as Shufeldt mentions, but all sorts of intermediate designs. Also some examples may appear nearly uniform blackish, and others grayish or whitish, though I have not yet found an albino. Now these varieties may even occur in the same stream, pool or mud-hole. Some of these forms are doubtless affected by the condition of the water, as in the cedar-stained streams of our coastal regions fishes are always darker, or even nearly black.

Besides the type Dr. Shufeldt mentioned he examined many examples in the United States National Museum from Eastern Maryland, Laurel (Md.), Chain Bridge (D. C.), and Long Island (Lake Pat-

chogue), N. Y. From this one is inclined to consider these as the localities for his new form, though such are not so stated. I have examined and largely collected a very large series of examples from: New Jersey (Batsto R., Wading R., Mantua Creek, Cedar Swamp Creek, Trenton, New Lisbon, Grenloch, Friendship, Sumner, Cape May Court House, Great Sound Creek, Porchtown, Repaupo, Coopers, Millville Lake, Sluice Creek, Burlington Island, Fishing Creek, Elmer, Lake Hopatcong, Upper Goshen Creek, Pancoast Run, Pitman, McPherson's Branch, Brookdale, Alloway, Cedarville, Shepard's Mill, Clementon, Green Creek); Pennsylvania (Bristol, Scott's Creek, Penn Valley, Guinea Creek, Tullytown Brook, Common Creek, Tinicum Island, Moores, Chester, Bridgewater, Torresdale, Holmesburg, Laurel Bend, David's Well, Rocky Woods, Emilie, Oxford Valley, Langhorne, Glen Lake, Woodbourne, Philadelphia, Schuykill R.); Delaware (Rehoboth, Bellevue Creek, Bombay Hook, Newcastle, Delaware City, Brown's Branch, Laurel, Lewes); Maryland (Bacon Hill, Big Bohemia Creek, Elk Neck, Aydelotte Branch, Dike Creek); Virginia (Locustville Branch and lower James River). My examples show the 2 or 3 simple dorsal rays and 12 or 13 branched, rarely 14, and the anal with 4 simple rays and 6 or 7 branched, rarely 5 or 8. The scales vary 28 to 35 in a median lateral series to the caudal base, with 3 to 5 more on the latter. Transversely are 12 to 15 scales between the dorsal and ventral origins, and before the dorsal 23 to 30. The proportions of the head, body-depth, etc., vary greatly, but chiefly with age. The eye was found contained 3-2/5 to 5 times in the head, and the young of course with it larger than the adult. There is absolutely nothing in Shufeldt's exposition of the structural characters not covered by my series.

My copied figure, from Jordan and Evermann, is 7 inches long "which is much larger than the fish

ever grows to be" according to Shufeldt. Now this statement needs further verification, as I have seen and examined an occasional example 6 inches long, and it is quite possible one may even exceed 7 inches. In my experience the average size is from 3 to 4 inches. Further Shufeldt says of the figure, "it gives 38 scales instead of 35, and 12 dorsal rays instead of 13; it has too many anal rays." This is entirely misleading, and the artist who made the figure was probably accurate. In truth the figure shows 3 simple and 10 branched dorsal rays and 2 simple and 6 branched anal rays. One also gathers a false impression that the scales would be 35, but I find variants with 40, and do not doubt they may even exceed this.

These notes were made with the idea of placing before ichthyologists an obscure account of a supposed new form of one of our well-known fishes, as it appears upon comparison with some of the facts as brought out with adequate material.

Henry W. Fowler,
Philadelphia, Pa.

SYSTEMATIC NOTE ON LOWER CALIFORNIA LIZARDS.

A collection of reptiles, made in Lower California in 1911 by an expedition under the auspices of the American Museum of Natural History and the United States Bureau of Fisheries (Charles H. Townsend, leader, on the U. S. S. Albatross), reveals some interesting records for this peninsula. Among these *Crotaphytus copeii* Yarrow, 1882 (*Proc. U. S. Nat. Mus.* Vol. 5, p. 441), has not been considered valid, Cope, Van Denburgh and Ruthven all relegating it to the synonymy of *Crotaphytus wislizenii* Baird and Gerard. Stejneger has not expressed an opinion regarding its status, the only mention being a noncommittal sentence in his differentiation of the new short-headed species of the Pacific Region, *Crotaphytus silus* (*N. A. Fauna*, No. 3, p.

105): "Nor is it [*C. silus*] the same as *C. copeii* Yarrow, from which the new form [*C. silus*] differs in the same manner as it does from *C. wislizenii*,"—that is, in being short-headed, while both *C. copeii* and *C. wislizenii* are long-headed. *Crotaphytus* specimens in the American Museum collections from Tiburon Island in the Gulf of California, and Cerros Island on the Pacific side, are distinctly *C. copeii*, agreeing with Yarrow's type from La Paz (a single specimen, No. 12663 in the U. S. Nat. Mus.) in being a longer and relatively larger-headed form than any other species of the *Crotaphytus wislizenii* group known.

A second good species which has been supposed not valid is *Callisaurus crinitus* Cope, 1888 (Amer. Nat., Vol. 30, p. 1049). Cope described this from a single specimen, U. S. Nat. Mus. 14895, type locality Ballenas Bay in central Lower California on the Pacific side. The American Museum collections contain one full-grown specimen from Abreojos Point, the northern point of Ballenas Bay, and seven full-grown specimens from San Bartolome Bay on the Pacific side, one hundred miles north of the type locality. *Callisaurus crinitus* is large in size like *C. ventralis*, and is peculiar in possessing prominent digital fringes, structurally like those in *Uma notata* Baird. These fringes give an additional indication of close relationship between the two genera. It was Cope's opinion when he first described *C. crinitus* that its discovery made a union of *Uma* and *Callisaurus* necessary. It is true that these fringes on the toes were perhaps the strongest single character differentiating *Uma* and *Callisaurus*, but the sum total of differences still remains too great to admit of the union.

Among interesting records in the American Museum material from the Cape Region is *Callisaurus draconoides* Blainville, which has had a history of many years' confusion with *C. ventralis* and of

masquerading under a trinomial, but which is so distinctly different from *C. ventralis* that there could have been no intergradation for many ages past. *Uta thalassina* Cope, another record from the Cape Region, is interesting because of possible differences of opinion regarding its generic rank (*Petrosaurus*, new genus suggested by Boulenger, 1885). The discovery in 1914 of *Uta mearnsi* Stejneger, from the summit of the Coast Range of the Mexican border, really settled the question, as stated by Stejneger at that time (*Proc. U. S. Nat. Mus.*, 1894, p. 369). When we compare this species with the large Cape Region form on the one hand, and with the small typical *Uta* on the other, we find it a close link in size, in scutellation (except for the tail), and even in color pattern. Therefore, *Uta thalassina* must be retained among the *Utas* despite the fact that the scutellation of its tail is unlike that of any other *Uta* known, and more like that of a *Crotaphytus*.

M. C. Dickerson,
New York, N. Y.

ANOTHER LONG ISLAND RECORD FOR *AMBYSTOMA JEFFERSONIANUM* (GREEN).

Three specimens of this salamander were found on August 26, 1917, under old boards along the margin of a small, round pond about ¼ mile north of the Hither Plain Life Saving Station at Montauk. All are young, two measuring 2¾″ and one 3½″ in length. Undoubtedly they have developed from larvae of the same season. The largest specimen is heavily marked with bright blue spots of varying size on tail, legs and along the sides of body and head. On the back and underside the spots are more faint and sparse. The ground color is blackish brown. The tail is oval, flattened toward the point. On the smaller specimens the spots are faint and the tail is flatter throughout its length.

The only other Long Island record for *A. jeffersonianum* was obtained at a point about 5 miles east of the present location (see COPEIA No. 8).

GEORGE P. ENGELHARDT,
Brooklyn, N. Y.

A ONE-LEGGED CRICKET FROG.

On September 23, Cricket Frogs (*Acris gryllus crepitans*), were found abundant along the margins of ponds in the sand dunes between Miller, Indiana and Lake Michigan. The tadpoles of this species were seen in the pond, as were also a few transforming individuals.

One of these Cricket Frogs (head and body 16 mm.), unfortunately not noted until after it had died in a collecting bag, presents a malformation which seems worthy of description. The right leg is absent, and no scar is evident to indicate its recent loss by injury; the skin is normal in both texture and coloration over the area from which the leg should spring. The skin of the abdomen is notably wrinkled toward the missing member. Indeed the whole body posteriorly is twisted toward the right side, so that the left leg, which is of the usual proportions, is forced into a position in which it could fairly effectively perform the normal function of both legs.

The pelvic region, on dissection, shows some interesting features. As just mentioned it is curved toward the right. There is absolutely no trace of a right femur, nor even of the acetabulum and labrum cartilagineum, which are normally well developed in this species. The right face of the pelvis is smooth, and the right arm of the ilium is weak and cartilaginous. The dextral sciatic plexus and nerve are also atrophied.

Whether this monstrosity is the result of a mutation, or of a very early injury can not be stated.

CARL L. HUBBS,
Chicago, Ill.

NOTE ON A ONE-LEGGED FROG.

On October 12, 1915, I caught a young, one-legged pickerel frog (*Rana palustris*) at the border of a lake south of Smithtown, Long Island, N. Y. The head and body of the specimen measured not more than one and one-half inches, and one hind leg (I forgot whether the right or left), was gone completely from the pelvic joint, the skin of the hip showing practically no scar.

This frog lived in a vivarium with several examples of *Ambystoma tigrinum, Hyla andersoni,* other amphibians, and snails, for nine months. At the time of its capture, it had already co-ordinated its asymmetrical organism to such an extent that it could swim straight ahead; by April, 1916, I observed it jumping for food so efficiently as not to suffer by comparison with normal frogs. During the autumn, and again in the spring, we fed it chopped earthworms, house-flies, etc., but for many weeks in the winter it had practically nothing to eat. It took most of its food from tweezers, always grasping it with its jaws rather than capturing by projection of the tongue. It usually accepted only four or five morsels at one feeding.

By May, 1916, it had grown perceptibly, and had assumed very bright coloring, the richest of "copper glaze" fringing its jaws and running along the ridges of its back. At this season it fed altogether on crickets, which were simply set free in the vivarium. The frog, in spite of its lop-sided source of propulsion, leaped with fatal precision for distances up to 12 or 14 inches, and devoured the unfortunate crickets at leisure. The process of swallowing a large victim was almost snake-like in its deliberation.

In July, 1916, I freed the frog at Garden City, Long Island.

R. C. Murphy,
Brooklyn, N. Y.

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THE PINE SNAKE IN VIRGINIA.

Records for the Pine Snake, *Pituophis melanoleucas* (Daudin), outside of Florida and New Jersey are few and far between. In fact the only ones I have been able to find are the one in Brimley's North Carolina list from Swain Co., N. C., and a specimen in the National Museum from Blount Co., Tenn. Both of these localities are in the Big Smoky Mountains.

It is of interest then that a dead specimen about 3′ 6″ long was found on August 19, on the road across the "Spur" between Nimrod Hall and Milboro Springs, in Bath Co., Va.

This locality is in the Alleghany Mountains and the altitude is about 1,000 feet. The road at this point was bordered on each side by a rather steep slope covered with laurel and rhododendron.

This snake is fairly well known in Virginia as the "bull snake." It does not seem to occur outside of the mountains as all of the many stories of this snake, reputed to reach a length of twelve feet, have their scene in the western tier of counties.

EMMETT R. DUNN,
Northampton, Mass.

Ratio of Length, Girth and Weight in the Perch.

The accompanying table shows the length, girth and weight ounces of 79 perch (*Perca flavascens*), caught in Stony Creek Pond, Coreys, Franklin Co., N. Y., August, 1917. The table indicates that the

Length	Girth	Weight	Length	Girth	Weight
11 1/8	7 1/8	12	8 5/8	5 1/4	4 3/4
9 3/4	6	7 1/2+	8 3/4	5 1/4	4 3/4
9 3/4	6 1/8	7 1/2	8 5/8	5 3/8	5
9 1/2	6	6 3/4	8 3/4	5 1/4	4 3/4
9 1/2	5 7/8	6	8 3/4	5 1/4	4 3/4
9 1/4	5 3/8	5 3/4	8 5/8	5 3/8	5
9 1/4	6 1/8	6 1/2	8 1/2	5	4 1/2
9 1/4	5 7/8	6 1/4	8 1/2	4 3/8	3
9 1/4	5 1/2	5 1/2	8 1/2	5	4
9 1/8	5 3/4	5 3/4	8 5/16	5	4
9 1/8	5 3/8	5	8 1/4	4 7/8	4 1/4
9 1/8	5 3/4	5 1/2	8 1/4	5	4
8 7/8	5 1/2	5 3/4	8 1/4	5 1/4	4
8 7/8	5 1/4	5	8 1/8	4 7/8	3 3/4
8 3/4	5 1/4	4 3/4	8 1/8	4 3/4	3 1/2
8 5/8	5 3/8	5	8 1/8	4 5/8	3 1/4
8 1/2	5	4 1/2	8 1/8	5	4
8 1/2	5	4	8 1/8	4 3/4	3 1/2
8 1/2	4 3/8	3	8	5	3 3/4
8 7/8	5 1/2	5 3/4	8	4 3/4	3 3/4
8 7/8	5 1/4	5	8	4 5/8	3 1/4

variation in weight of perch of the same length is never more than one ounce. Also a rough approximation of the weight ounces may be obtained in this species by multiplying the girth squared by the length inches and dividing by 50.

C. W. MEAD,
New York, N. Y.

Length	Girth	Weight	Length	Girth	Weight
8	5 3/8	4 1/4	5 3/4	3 1/2	1 1/4
8	4 5/8	3 1/4	5 3/8	2 7/8	3/4
7 7/8	5	3 1/2 +	5 1/4	2 7/8	3/4
7 5/8	4 3/4	3 1/4	5 1/8	2 3/4	3/4
7 1/2	4 1/4	2 3/4	5 1/8	2 7/8	3/4
7 3/8	4 5/8	3	5	2 3/4	3/4
7 1/4	3 7/8	2 1/4 +	5	2 7/8	3/4
7 1/8	4 3/8	2 1/2	4 5/8	2 5/8	1/2
7	4 1/8	2 1/2	4 5/8	3	1/2 +
6 7/8	3 7/8	2	4 1/2	2 5/8	1/2 +
6 5/8	4	2	4 3/8	2 1/2	1/2
6 1/2	3 3/4	2	4 3/8	2 1/4	1/2
6 3/8	3 5/8	1 3/4	4 1/8	2 5/16	1/2
6 1/4	3 1/4	1 1/4	4	2 3/8	1/2
6 1/4	3 5/16	1 1/2 +	4	2 1/4	1/2
6 1/8	3 1/2	1 1/2	3 5/8	2 1/16	1/3
6	3 3/8	1 1/2			
6	3 3/8	1 1/2			
6	3 1/2	1 1/2			
5 7/8	3 1/4	1 1/4			
5 7/8	3 1/4	1 1/4			

LEAPING OF A HEMIRAMPHID.

The synentognathous fishes comprise various elongated marine forms, and the remarkable flying fishes which make long excursions through the air supported by their greatly enlarged pectoral fins. It is interesting that the habit of leaping in the air is common throughout the group and therefore, may reasonably be supposed to have been possessed by the ancestors of the flying fishes before the fin development which has made it pre-eminent among these. * Or in other words, habit has preceded correlated structure in this case. The half-beaks are the modern synentognathi which apparently approach most closely to the ancestors of the flying fish.

On April 1, off Sandy Key near Cape Sable, Florida, there was an unusually favorable opportunity for the writer to watch the leap of a half-beak and a short quotation from his field notes of that date seems worth recording: "A Half-beak (probably *Hemiramphus*) of perhaps 9 in., skipped over the surface down wind with great speed. Initially it may have been more or less on its side, but towards the end of the leap (which probably exceeded 30 yards) it was right side up, its little anterior pectorals extended at right angles, and it appeared to maintain its impetus by skulling with the tail at intervals as it touched the surface." A surprisingly flying-fish-like performance.

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New York, N. Y.

* See Copeia, 1915, No. 19, p. 12-13.

THE JUMPING ABILITY OF PLETHODON AND ITS POSSIBLE BEARING UPON THE ORIGIN OF SALTATION IN THE ANCESTORS OF THE ANURA.

On the evening of August 18, 1917, at Snowville, N. H., I picked up a gray-backed *Plethodon cinereus* 71 mm. in total length. It was caught crossing a sandy road just before dusk. While I held it on one open hand, it surprised me by *jumping* to the sleeve of my other arm. I experimented further by holding my open right hand at varying distances from the salamander on the left hand. In its efforts to escape, the creature always scurried straight ahead, in the direction in which it had been pointed, and when it reached the edge of my palm, it leaped across the open space to the other hand, repeatedly clearing a distance of fully twice its length. In this manner I kept it jumping rapidly for perhaps two dozen times before it became sufficiently fatigued to quiet down.

The fact that this salamander is a leaper may possibly be known, but I had never before observed it. I had always considered the terrestrial urodeles as exclusively creeping animals, probably because I had hitherto found them chiefly in the daytime, during their inactive hours. This *Plethodon* was just starting out on its nocturnal wanderings, and was no doubt at its liveliest. I now understand how members of the species cross deep ruts in roads, and how they surmount such obstacles as logs and fallen boughs in the boggy woods that they inhabit. The discovery also throws light on the way that they capture Bibionid flies, winged ants, Collembola, and other active insects, remains of which I have found in the stomachs of *Plethodon cinereus*, taken under dead logs in the early morning. I had often wondered how a sluggish salamander—a lowly creature which I had supposed to move like a stranded mudpuppy—could feed upon flying or jumping insects.

I now infer that it lies in wait and leaps at its prey like a cat at a sparrow.

When I look at the diminutive legs of this salamander—legs hardly thicker than a pin, and devoid of modernized, condylarthrous joints—I marvel that they should be able to propel the squat, snaky body for a distance of twice its length through the air. It seems mechanically incredible, even though the saltatory impulse doubtless come more from the myocommata rather than from the minute muscles of the limbs.

With all of this in mind, why could not some of the temnospondylous Stegocephalians, such as the Permian *Cacops,* or *Dissorophus,* or the African Triassic *Brachyops,* have begun the jumping habit? And may not the ancestors of the frogs and toads have been excellent leapers even before they lost their loose-hung bodies and permanent tails? None of them, surely, had less of a "jumping build" than *Plethodon.* Furthermore, if the direct, as well as the collateral ancestors of the Anura were large creatures, it is easy to believe that decrease in size and weight would be a necessary concomitant to improved saltatory power during the tailed epoch. *Plethodon* approximates a crocodilian in build; if it were as large and heavy it probably could not jump.

All kown Anura, even as far back as the Jurassic, are extremely modernized, and are separated by a wide evolutionary gap from the Palaeozoic amphibians. My intention is merely to suggest that such a form as *Cacops* may well have been a leaper; and to draw an analogy between the modern urodeles, in which the saltatory habit is doubtless an incipient land-living development, and the primitive temnospondyls, which, as recently suggested,[1] may possibly be the forbears of the leaping frogs and toads.

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Brooklyn, N. Y.

[1] Gregory, W. K., *The American Naturalist,* Vol. 51, 1917, p. 317.

NOTES ON THE BREEDING OF THE AMERICAN TOAD.

I had the opportunity on June 5, 1917, to observe the breeding of the American Toad. The place was a small artificial pool, about four by six feet. A steady rain fell throughout the evening. Mr. Richard G. Turner and I first approached the singing male at 9:00 P. M. It was quite dark at the time. At first we could not advance towards the toad within thirty feet without the trill's instantly ceasing. We used the most stealthy manner of approach. Then we tried hiding behind a tree, but the first step would be detected and the trill stopped at once until we withdrew. About ten o'clock we discovered that our steps were not followed by silence, and to our amazement we walked up to the pool and threw on a small electric search light, all the while the trill continuing. The male was sitting on the edge of the pool, the throat membrane fully extended and the trill throbbing in our ears. Five feet away was the large female rapidly hopping towards the male. From this time on, the toads seemed to take no notice of our motions. Indeed, again and again we reached down and touched or tightly held the inflated membrane as the male sang. Even this made no difference to the toad.

The performance that went on was repeated as long as we stayed. It was as follows: When the male began to trill, the effect on the female was instantaneous. Whether she was in the water or on the land, she would make frantic efforts to reach the male. But the second the trill stopped she was all indifference, and often in a few moments would hop off in another direction. But as the trills came every few minutes, she would finally in one of her drives reach the male while he was in the midst of a trill. He would not seem to notice her until she was within an inch of him; then he would scramble on her back,

and sometimes there finish the trill. If on land, the female would at once start for the water. A few moments after reaching the water, the male would lose his hold and be tossed off. Then the performance would start all over again, the male usually climbing first out of the water. He would take absolutely no notice of the female if he was not trilling when she was placed next to him. Thus, the interesting feature was that the trill is the apparent stimulus for both sexes. We left the pool about eleven o'clock, but the trills were heard far into the night.

We did not actually see the operation of spawning, but a little later hundreds of tiny tadpoles were observed in the pool.

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