can easily be recognized, however, and on the basis of their relationships with the other Texas species of the genus (especially *P. grandiflorus* Nutt., which without the tuberous root is scarcely distinguishable from *P. Geiseri;* and *P. multicaulis* DC., of the Rio Grande Plain and lower Gulf Coast, with corollas variously lemon yellow, light ochre, or white), it is treated as a species. Additional collections are cited below.

OKLAHOMA. PONTOTOC CO.: eastern edge of East Central State College campus, Ada, *G. Thomas Robbins 2506*, May 21, 1947. TEXAS. BASTROP CO.: 8 miles southeast of Elgin, *Shinners 7268*, April 18, 1945. BURLESON CO.: 13¾ miles northeast of Lyons, *Cory 51635*, April 21, 1946. BURNET CO.: 10 miles southeast of Marble Falls, *Shinners 7238*, April 17, 1945. COOKE CO.: about ½ mile south of Red River on Highway 77, *Whitehouse 15824*, May 24, 1946. DENTON CO.: 10 miles north of Denton, *Cory 57323*, May 12, 1950. ERATH CO.: 5 miles northeast of Stephenville, *Shinners 11067*, May 12, 1950. ERATH CO.: 5 miles northeast of Stephenville, *Shinners 11067*, May 1, 1949. FREESTONE CO.: 11 miles northwest of Fairfield, *Shinners 7772*, May 17, 1945. GALVESTON CO.: Texas City, *B. L. Turner 1766*, April 6, 1950. HAMILTON CO.: Hico, *Cory 53778*, May 28, 1947. HAYS CO.: 2½ miles south of San Marcos, *Cory 55418*, April 3, 1949. HUNT CO.: 3 miles southwest of Caddo Mills, *Shinners 7452*, May 3, 1945. KAUFMAN CO.: 7 miles west of Terrell, *Shinners 7546*, May 4, 1945. KERR CO.: 4 miles southwest of Kerrville, *Cory 51772*, April 28, 1946. MEDINA CO.: 3 miles west of Castroville, *Shinners 7287*, April 19, 1945. NAVARRO CO.: 2 miles southeast of Richland, *Shinners 7778*, May 17, 1945. REAL CO.: 22 miles north of Leakey, *Shinners 7334*, April 20, 1945. ROCKWALL CO.: east side of Rockwall, *Shinners 7450*, May 3, 1945. SOMERVELL CO.: 2.7 miles northeast of Glen Rose, *Shinners 9178*, April 27, 1947. TARRANT CO.: Bluebird Ave., Oakhurst, Fort Worth, *Cory 54395*, May 8, 1948. WISE CO.: 1.5 miles west-southwest of Chico, *Shinners 12326*, April 30, 1950.

Notes on the Turbellarian, Procotyla fluviatilis Leidy[1]

John Maxwell Anderson[2]

The observations here briefly presented should help solve a question in the literature, regarding the cocoon of *Procotyla fluviatilis.* The results also indicate that the breeding season of this species may be longer than heretofore reported. A few additional observations on the young worms, and on food habits of the adult are also included.

Last winter, I collected nine mature individuals of *Procotyla* under stones in shallow water at the East Providence (R.I.) reservoir. At that time (Feb. 11, 1950), the air-temperature was approximately -5° C, and the water-temperature near 10° C. The specimens were placed in a dimly-lighted room at about 20° C. One week later I noted that ten

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cocoons had been deposited on the sides of the culture dish. Four additional cocoons appeared within another week, after the culture had been removed to a lighted and somewhat warmer room.

The cocoons were approximately one millimeter in diameter — variation in size depends, apparently, on the size of the adult which deposits the cocoons. These at first are colorless, and remain so as long as the adult lies over them. During the next few hours the cocoons darken to a mahogany color. Each is enclosed in a mass of colorless mucus, and is attached to the substratum by a short, thick pedicel which is only an extension of this layer of slime. In no case could I note a definite thin, tough, darkened stalk continuous with the cocoon itself (such as is typical of the cocoons of *Dugesia* and *Curtisia*.)

Morgan (1930) described the cocoon of *Dendrocoelum lacteum* (shown by Hyman, 1928, to be synonymous with *Procotyla fluviatilis* Leidy, 1858) as being "about the size of a mustard seed, shiny, chestnut brown, and raised on a tiny stalk." Kenk (1944) questioned the accuracy of this last statement, and said that so far stalked cocoons had been seen only in species of *Dugesia* and *Curtisia*. My observations show that the cocoon of *Procotyla* is indeed raised on a tiny stalk, but that this "stalk" is not equivalent to that typical of cocoons found in the Family Planariidae.

The first hatching of my lot of cocoons occurred on Feb. 25; this cocoon released six juveniles. Each of these was unpigmented like the adult, except for a single pair of eyespots (the adult has *more* than two eyespots — usually about six.) Locomotion in the young worms is much like that of the adult; it involves either smooth gliding, or an alternate grasping and releasing of the substratum with the posterior margins of the body and the apical adhesive organ (which is well developed at the time of hatching.)

Rupture of the largest cocoon released 12 juveniles; the average for all of my cocoons was about nine. Attempts to rear the young were unsuccessful; they could not be induced to feed, although offered bits of liver and a variety of microcrustacea. Adults accept preferentially living food, and may best be maintained on a diet of aquatic isopods, such as *Asellus*. If sufficiently starved, however, they will feed on the

fat-body of pinched-open *Tenebrio* larvae. In normal feeding, a single worm can immobilize an *Asellus* larva much larger than itself, penetrate the exoskeleton with its proboscis, and in less than an hour suck out all the soft parts within.

According to Hyman (op. c.), the reproductive season of *P. fluviatilis* (which reproduces only sexually) extends, at Chicago, from September through December; and she assumes a similar breeding season throughout the range of this species in the northeastern part of the United States. My observations show that mature individuals with functional reproductive organs can be collected in Rhode Island as late as the middle of February.

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Note

AN ADDITIONAL RECORD OF THE SALAMANDER AMPHIUMA IN TEXAS ——Brown, 1950, (*Annotated Checklist of the Reptiles and Amphibians of Texas*) lists *Amphiuma tridactylum* Cuvier from Bowie, Hardin, Harris, Marion, Nacogdoches, and Sabine counties, Texas. There is now deposited in the Southern Methodist University collection an *A. tridactylum*, (SMU 264), collected 7 mi. nw. of Clarksville, Red River Co., Texas, Aug. 13, 1950 by Charles Albright. The specimen, taken during the late afternoon, was hiding beneath a board at the edge of a lake. A description is as follows: male; costal grooves, 62; 3 toes on each foot; length of second approximately twice length of third, third approximately twice length of first on each foot; front legs 8.5 mm. in length, rear legs 13.0 mm. in length; tail length, 101 mm., total length, 495 mm. Color (in formalin) is dark-brown above, light-grey below, with the separation of the two colors sharply defined as a lateral line which extends from a point above the insertion of the front leg equal to the length of the front leg to the point of insertion of the rear leg. ——LAWRENCE CURTIS, Student, Southern Methodist University, Dallas.

EFFECT OF TEMPERATURE-CHANGE UPON EGG-PRODUCTION IN LYMNAEA PALUSTRIS (Müller.)——Numerous experiments made by me on the effect of temperature-change on snails, demonstrated that such changes have a marked effect upon the number of egg-masses deposited within a given time. Pulmonate snails collected from icy lakes and streams during the winter months, and transferred to water at room temperatures (21°—30° C.), began egg deposition very shortly after the transfer. When the same species was subjected to temperature changes in the opposite direction (room-temperature to low temperature, 5.5°C.), egg-laying almost stopped completely after a period of a few days.

In order to determine the specific effect of change of temperature on the egg-laying of *Lymnaea palustris* (Müller) the following experiment was performed.

On July 7, 1932, (at the University of Michigan Biological Station, Cheboygan, Mich.), I took 48 *L. palustris* (shell height, 24 to 30 mm.) from a marshy region to the laboratory. At the time the snails were