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Macrochelys Temminckii

In Florida

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By E. Ross Allen and Wilfred T. Neill

The alligator snapping turtle, Macrochelys temminckii (Troost), is one of the most interesting of all North American chelonians, but remarkably little has been published concerning it. Thus it seems desirable to summarize our observations on the form.

FLORIDA RANGE. The species is found in the rivers of northwestern Florida, and thence southward along the Gulf Coast to the Suwannee River and its tributary, the Santa Fe. We have seen specimens from the Chipola River in Gulf and Calhoun counties; the Apalachicola River in these two counties; the Ocklawaha River in Liberty and Wakulla counties; the Suwannee River in Dixie and Levy counties; and the Santa Fe River in Suwannee and Bradford counties. The form has also been recorded from Alachua County (Van Hyning, 1933: 7) and Jackson County (Carr, 1940: 99).

In addition, the form is known from the Flint River (a tributary of the Apalachicola) in Decatur County, Georgia; and also from the headwaters of the Suwannee River in Okefenokee Swamp, Charlton and Ware counties, Georgia. The species is of definite occurrence on the eastern side of Okefenokee Swamp, and thus there would seem to be no reason why it should not reach the St. Mary's River or even the Satilla. As yet, however, there is no convincing evidence of the presence of the form in any stream of the Atlantic drainage.

Adults of Macrochelys are uncommon in small or clear streams, apparently preferring deep, dark rivers. None could be found in any of the smaller rivers of the Gulf Coast north of the Suwannee, or in any river south of the Suwannee. Juvenile specimens of Macrochelys are occasionally found in creeks and smaller streams. A typical habit of the alligator snapping turtle is shown in an accompanying illustration (Fig. 1).

COLLECTING TECHNIQUES. Through experimentation the senior author developed a successful method of collecting living Macrochelys. It was found that the best catches could be made in the Spring of the year, when the water was fairly clear and at low level. The best time of day was late afternoon, when the turtles were to be found on the river bottoms near the banks, under sunken logs, buried in the mud, or in cavities of the bank. At such times, the collector, equipped with water goggles or, better, a face mask, swims downstream, on or near the surface, followed by a companion in a canoe. Likely-looking hiding places, such as caves or logs, are investigated, and sharp lookout is kept for turtle snouts protruding from the mud. When a large specimen is located, its tail is noosed with the end of a long cord. The collector then swims to the canoe, keeping the cord from tangling in any submerged branches, logs, etc. The turtle is next jelled into the canoe and tied securely.

On one occasion, a large turtle, thus captured, bit a chunk of spruce wood out of the canoe gunwale; some are so belligerent that it

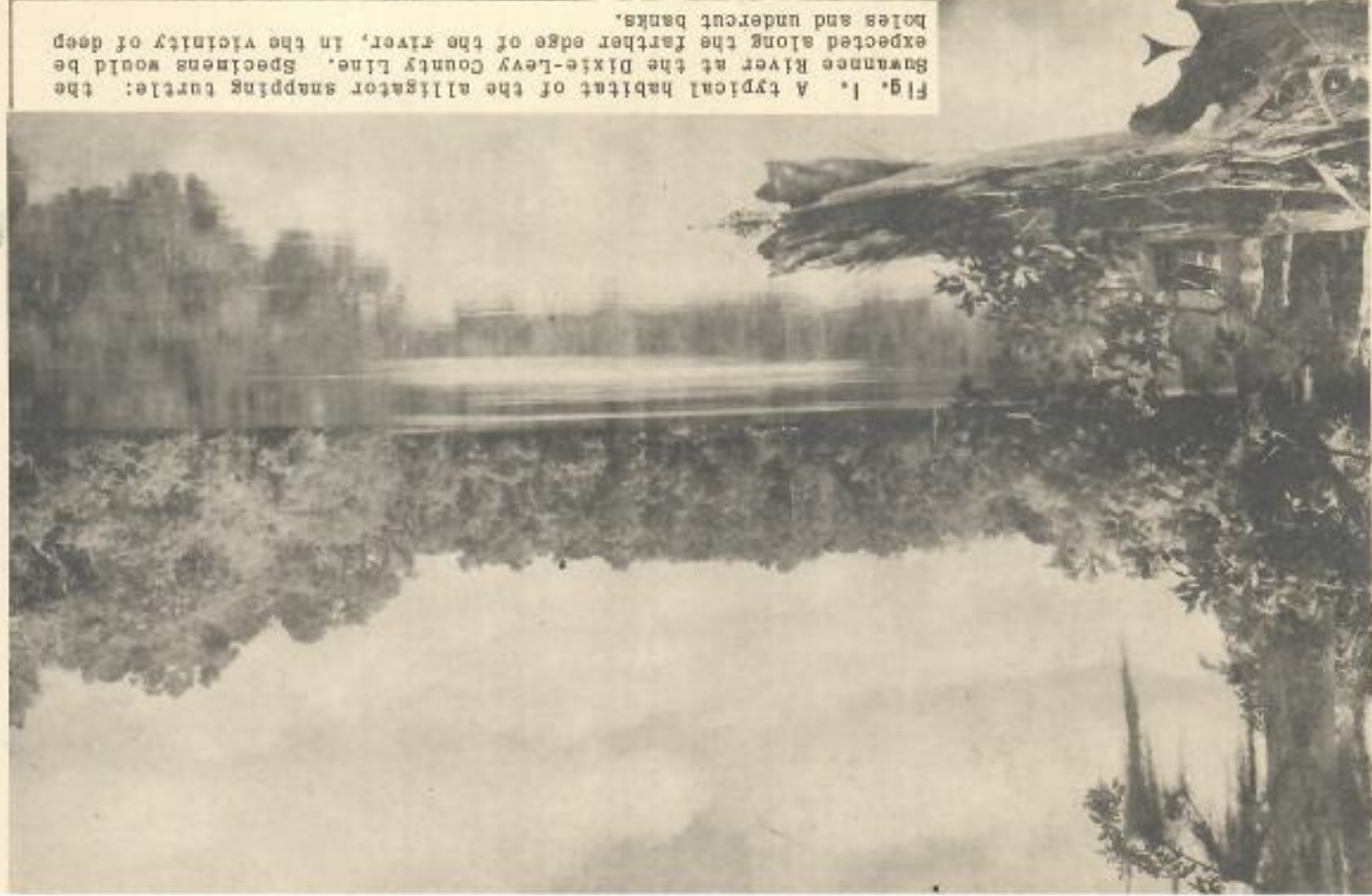


Fig. 1. A typical habitat of the alligator snapping turtle: the Guannee River at the Dixie-Levy County Line. Specimens would be expected along the farther edge of the river, in the vicinity of deep holes and undercut banks.

is safer to pull them into shallow water and tie them before putting them in the canoe. The freshly-caught turtles must be kept separate, for in their anger they bite and sometimes even kill one another.

The above technique has proven quite useful for collecting large Macrochelys. Thus, in 1938, the senior author, using water goggles, secured 5 adults of *M. temminckii* in 3 collecting trips. In 1936, he began using the face mask (which provides better underwater visibility) and collected 19 Macrochelys in 3 trips. These and other collecting trips always resulted in the capture of great numbers of testudinid, kinosternid, and trionychid turtles, as well as large Macrochelys.

A second collecting technique was learned from river fishermen. Fresh meat was put out on a line tied to an overhanging tree limb, the bait touching the bottom in 3 or 4 feet of water. After dark, the lines were visited by boat; the beam of a head-lamp would often disclose a turtle feeding on the meat. The turtle would then be hooked under the carapace with a strong gaff-hook and pulled up until its tail could be seized by hand. By this method as many as 7 large specimens were taken in a night.

THE "LURE". It is well known that the mouth of Macrochelys temminckii bears a small, moveable appendage which supposedly serves to lure fish into the turtle's jaws. The oft-repeated statement that the appendage is "worm-like" or "larva-like" has obscured the fact that the structure is actually bifurcate, with an anterior and a slightly smaller posterior portion. The two portions arise from a rounded, muscular base, behind which are many smaller papillae. In young examples, each portion of the lure may bear a small extra branch, as shown in the accompanying sketch of the head of a specimen 3 inches in carapace length (Fig. 2). In large examples, each portion of the lure is smooth, without branches or papillae. The appendage of a specimen 9 inches in carapace length is shown in Fig. 4.

When the turtle is at rest, *l. gr.*, not "fishing", the lure is whitish or pale gray in color; but when the lure is set in motion, it becomes pinkish, presumably being suffused with blood.

Pope states that no one has been fortunate enough to see Macrochelys actually luring fish with its appendage (1939: 68). However, we have often observed this phenomenon at the Reptile Institute, as the following account indicates.

Several baby Macrochelys, 3 to 4 inches in carapace length, were kept in an aquarium and supplied with live fish. The young turtles would hide between rocks in a corner of the aquarium, and open the mouth widely. The muscular base of the lure would then pull down, first on one side and then on the other, imparting a wiggling motion to the two portions of the appendage. Sometimes the turtles would thus "fish" for hours without success, but often a *Mollinia* or a *Gambusia* would swim into the open jaws and bite at the "bait". The turtle's jaws would immediately snap shut on the fish, which was next manipulated into position and then swallowed whole. Larger fish, caught in this fashion, were held in the turtle's jaws and torn apart by the front feet. It was noted that the turtle, while "fishing", moved its eyes from time to time, obviously watching the movements of its potential prey. Sometimes the fish would gather beneath the turtle's head, as though beneath an overhanging rock, and then the turtle would carefully alter its position, turning the head sideways so

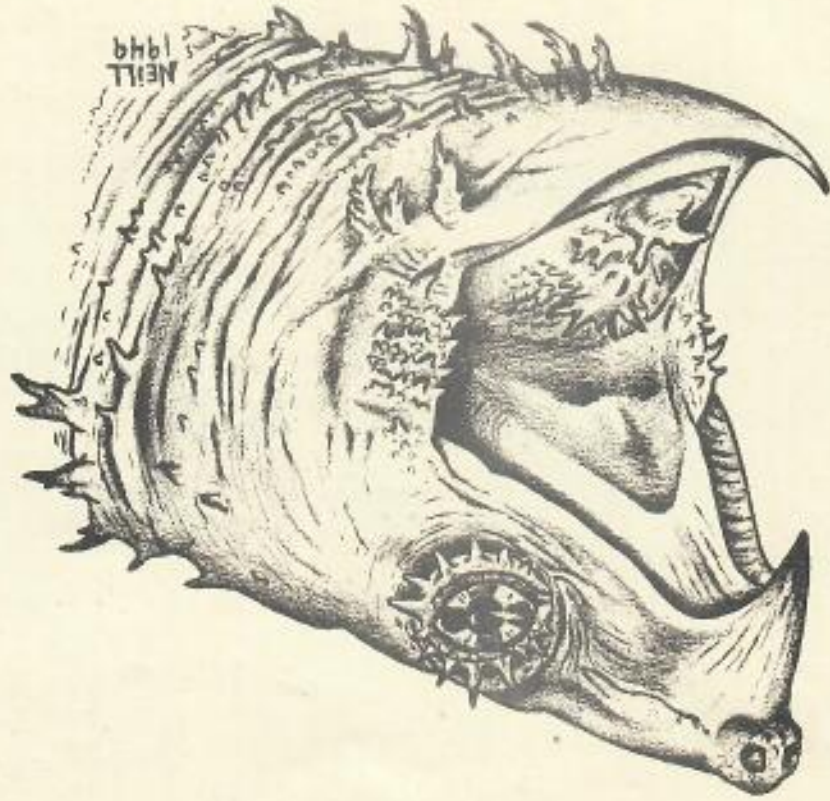


Fig. 2. Head of a juvenile alligator snapping turtle. The carapace length of this specimen was 3 inches.

that the "bait" would be visible to the fishes. Sometimes small fish such as *Gambusia* would nibble at the algae which covered the turtle's back, but the reptile never made a move at such times. Figure 3 shows a *Macrochelys* "fishing".

On one occasion two *Mollisiana* investigated a turtle's bait simultaneously, and the turtle instantly snapped at them. One fish was trapped in the turtle's mouth, the other was caught between the reptile's jaws. As the turtle opened its mouth to bite again at the fish between its jaws, the second fish darted out of its captor's mouth, apparently unharmed.

It was interesting to note that, when a new catch of fish was placed in the turtles' tank, many would be captured by the reptiles during the first day; but thereafter the fish would be wary, staying at the other end of the aquarium from the turtles. At such times, a turtle would often move toward the fish and try to hide near them.

Two baby *Macrochelys*, fed only on live fish, lived for 3 years and then were accidentally killed by a sudden cold spell one winter.

A young Florida snapper, *Chelydra serpentina osceola*, was for a time kept with the baby *Macrochelys*. When live fish were placed in the tank, the *Chelydra* would pursue them, usually catching them all before the *Macrochelys* could entice any into its mouth. Dead fish, placed in the tank, were usually discovered first by the Florida snapper, also. The alligator snappers would eventually discover and consume dead fish if not forced to compete with *Chelydra*.

Mr. Oliver Allen, brother of the senior author, once discovered a baby *Macrochelys* of about 7 inches carapace length, in a shallow creek roughly 100 yards from a river. The turtle's appendage was in active motion, and several fish, swimming near by, were apparently interested but did not try to take the "bait". This observation was made at night, near Biloxi, Mississippi. On several occasions we have observed captive *Macrochelys* "fishing" at night.

FOOD. From the foregoing account, it is evident that smaller specimens of *Macrochelys*, at least, will feed upon fish. An adult alligator snapper, now of 93 pounds weight, for years on exhibit at the Reptile Institute, has accepted fish of all kinds, beef, pork, frogs, snakes, snails, worms, mussels, and various aquatic grasses. Captive specimens have been seen to stalk, catch, and eat other species of turtles, including *Deirochelys*, *Kinosternon*, *Sternotherus*, and *Pseudemys* spp. Specimens were also noted trying to lure musk and mud turtles into their jaws. On one occasion a large *Macrochelys* killed but did not eat a smaller example of its own kind. Crayfish were accepted by the smaller specimens.

Specimens from the Suwannee River, during the first few days of captivity, voided in their excrement numerous fragments of snail and mussel shells.

BREEDING. Several captive pairs of these turtles breed yearly at the Reptile Institute, during the months of February, March, and April. The courting male follows the female, persistently trying to crawl up on her carapace. After mounting the female, the male moves his body slightly to the right, pushing his tail downward beneath the female's tail. The female cooperates by pulling her tail upward and to one side. Contact lasts from 5 to 25 minutes.



Fig. 3. Captive alligator snapping turtles in an aquarium. Several small fish have just been introduced; the uppermost turtle has splashed them, and is trying to lure them into its jaws. The worm-like appendage in the turtle's mouth shows very light against the darker lining of the lower jaw. (Photo by Bruce Mozart, Silver Springs, Florida.)

The female *Macrochelys* digs a nest by using the hind feet alternately, lifting the sand up and out of the hole, and depositing it to one side. After oviposition, the female scrapes dirt back into the hole, packing it down firmly and then crawling over the hole to smooth the surface. The shape and dimensions of a typical nest are shown in an accompanying sketch (Fig. 5).

Apparently nest-building always takes place during the daylight hours. The nesting of wild specimens was not observed; the foregoing remarks are based on the habits of captive examples in large pens. In these pens the females always laid their eggs as far from the water as possible, in the sand at the edges of the inclosures.

A large captive female *Macrochelys* made a nest and laid 29 eggs on June 3, 1942. The nesting hole was about 20 inches deep. On September 11, 1942, the first baby turtle appeared on the surface. Ten more appeared later in the day; and thereafter the hatchlings emerged at the rate of 2 or 3 a day through September 19, when the last one appeared. All the baby turtles made their way to a pool of water in the pen.

A pair of large captive adults copulated February 28, 1946. The female deposited 44 eggs on April 21, 1946. Three eggs were broken during the laying process, 8 were packed with wet sand at the bottom of the nest, and one was laid to one side of the nest. Twenty-five were in the main cavity, and 7 at the opening of the nest. (This nest is the one shown in Fig. 5.) The eggs were nearly or quite spherical in shape. Oddly enough, the 8 eggs laid in the bottom of the nest were larger than the others, the diameter ranging from 41.4 to 44.4 mm., while the remainder ranged from 38.4 to 40.9 mm. These measurements were made 7 days after the eggs had been deposited. The larger eggs were also somewhat softer than the others.

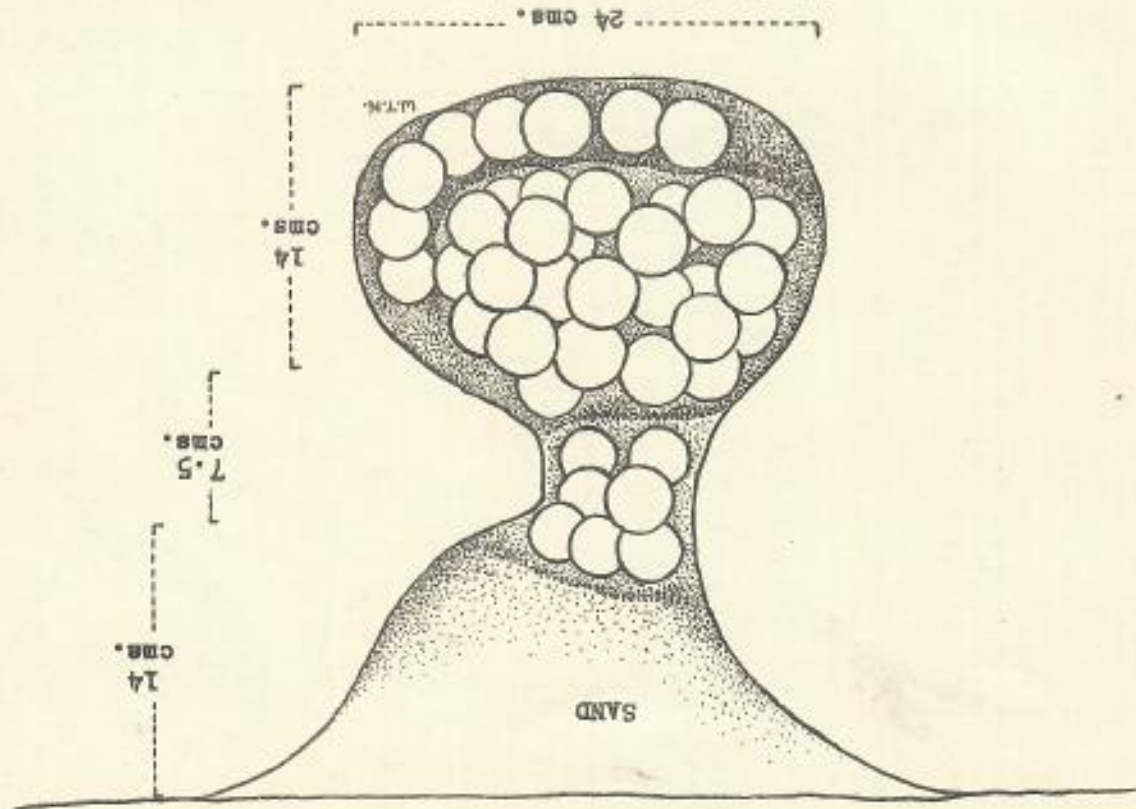
A female *Macrochelys*, measuring 19 inches in carapace width and 36 inches from snout to tip of tail, made a nest and laid 17 eggs on May 2, 1944. The egg nearest the surface of the ground was at a depth of 8 inches; the remainder were at a depth of about 14 inches.

A large female alligator snapper laid 16 eggs on June 15, 1943; another laid 22 eggs on June 13, 1944; and a third deposited 19 eggs on April 28, 1945.

GROWTH. In the previous discussion of breeding, reference was made to a clutch of 29 eggs, which were laid on June 3, 1942, and which hatched between September 11 and September 19, 1942. The hatchlings varied little in size. A typical one measured 44 mm. in carapace length, 32 mm. in plastron length, and 104 mm. from the anterior margin of the carapace to the tip of the tail. The specimen weighed 23.2 gms. This turtle was kept alive until January 9, 1949, when it died during a sudden cold spell. At the time of its death, the carapace length was 85 mm., the plastron length 57 mm., and the length from the anterior margin of the carapace to the tip of the tail 147 mm. The weight was 141.3 gms. Alligator snappers in the wild probably grow much faster than this captive specimen, which was doubtless living under adverse conditions.

Another specimen, hatched in captivity, at the age of 5 years gave the following measurements (in mm.): Carapace length 90, carapace width 75, plastron length 64, tail length 89, head width 29. A second 5-year old example, captive-raised, gave the following figures:

Fig. 5. Nest of an alligator snapping turtle, in semi-diagrammatic lateral view. The constricted neck of the nesting hole measured 7 cms. by 12 cms.; the expanded bottom of the hole measured 16 cms. by 24 cms. The nest was constructed by a captive specimen.



snappers are apt to sit passively with open mouth, lunging out only at objects that approach the head closely. A specimen that is lifted from the ground, or otherwise molested, not only spasms widely, but from time to time everts the mouth of the glottal opening for a few seconds, disclosing the bright white lining of the respiratory tract, in sharp contrast with the dark mouth parts. The effect is surprising, and probably serves as a warning mechanism.

Examples of Macrochelys, when molested, give off an odor, which is, however, neither as strong nor as unpleasant as that of Chelydra. In addition, alligator snappers, lifted from the ground, may squirt a copious stream of clear liquid from the cloacal opening. This latter action is more often noticed on winter days, when the turtles are somewhat benumbed and incapable of "striking" readily.

THE CARAPACE. Various photographs of Macrochelys, such as those of Ditmars (1936: pl. 114), Schwardt (1938: figs. 50-51), Halton (1931: pls. 34-35, labeled Chelydra), and Pope (O.P. cil.: fig. 16) portray specimens with smooth dorsal scutes. However, in most specimens, large or small, that we have collected, the carapace is covered with a dense growth of filamentous algae. It is interesting to note that this algal growth always supports a copious crustacean fauna, including cladocerans, copepods, ostracods, and amphipods. A single smooth specimen, an adult weighing 65 pounds, was taken in Bradford County; it was collected in a lake whose waters were apparently so dark as to inhibit the growth of algae.

Two Macrochelys, each with a carapace length of about 9 inches, were kept for several months in an outdoor aquarium, where they soon became covered with an unusually thick growth of filamentous green algae. This growth covered not only the carapace but most of the soft parts of the turtle as well. In spite of the density of the growth, however, the area about the nostrils and the region around each eye were completely bare of algae. Obviously it is of advantage to the turtle to keep the eyes and nostrils free of algae; it is uncertain as to how this is accomplished. The turtles were never observed to claw at these areas, or to rub them against objects; such behavior, in any event, would scarcely explain the absolute lack of algae about the eyes and nostrils.

Wright and Funkhouser record the finding of a Macrochelys scute, "the cephalic scale of one of the costal series", in a swimming hole on Billy's Island in Okefenokee Swamp (1915: 111). This account might suggest that the alligator snapper periodically sheds the scutes of the carapace, as do many species of turtles. Such, however, is apparently not the case. Captive Macrochelys in the pens at the Reptile Institute are always densely covered with algae, and never display clean scutes as do certain other species of turtles. The attendants at the Institute never find shed scutes of Macrochelys in the pens. However, it is not unusual for an alligator snapper to shed a few small flecks or patches of the horny dorsal scutes, particularly if the carapace has been injured.

RESPIRATION. It is surprising to find that these aquatic turtles can not remain submerged for any great length of time; i. e., as compared with many other species of turtles. At water temperatures of 70 to 75 degrees Fahrenheit, the turtles can remain submerged for periods of 40 to 50 minutes. They show definite signs of distress if forced to remain under water even for this length of time.

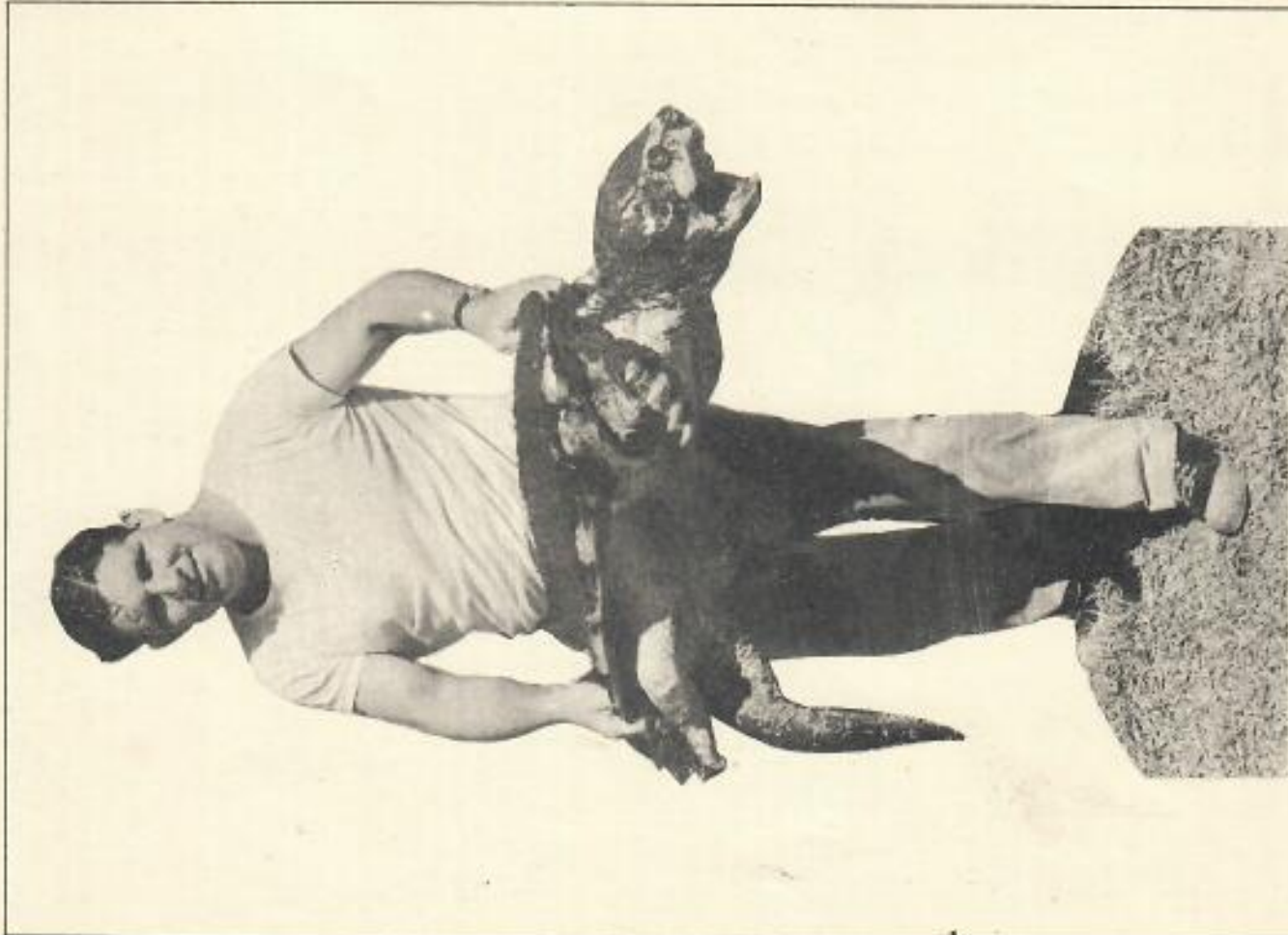


Fig. 6. The senior author demonstrating the best method of carrying a large alligator snapping turtle. The turtle in the picture weighs 93 pounds. (Photograph by Bruce Mozart, Silver Springs, Florida.)

Submerged specimens evidently carry on pharyngeal respiration. When alligator snappers are placed in a glass aquarium, it may be seen that the mouth slowly opens and closes, while the throat pulsates slightly. The addition of dye or silt to the water will reveal the presence of a current swirling about the turtle's mouth. A medium-sized specimen, placed in a 5-gallon aquarium, is unable to scramble up the glass sides, and therefore can not reach the surface if the aquarium is more than half full of water. After 15 or 20 minutes submergence under such conditions, the turtle stretches the neck upward as far as possible, in an obvious effort to get air. Unable to do so, the reptile begins to open and close the mouth more rapidly and vigorously, at last actually gulping water in evident distress.

It seems probable that pharyngeal respiration may be of more value to the turtles in their normal habitat of flowing water, which is usually well aerated.

BEHAVIOR IN CAPTIVITY. The species is fairly hardy in captivity; specimens have lived for many years at the Reptile Institute. Although wild examples prefer deep rivers, captive adults will live in shallow running water, 15 inches deep, if an abundance of food is provided. Unglazed concrete causes sores on the plastron and soles; pool bottoms are best covered with wood.

Captive examples become fairly tame, and do not snap like wild ones. A specimen now weighing 93 pounds, on exhibit at the Reptile Institute, is handled every hour during the day, and its mouth opened to show the appendage. In spite of this treatment, the turtle is fairly gentle, feeding regularly and breeding annually.

On one occasion, a 65-pound specimen was placed in a tank that had been for several years the home of the 93-pounder mentioned above. The latter had been living in peace with a number of small *Macrochelys* and a host of other turtles of many species; but he resented the big intruder, and a fight soon ensued. The 93-pounder was the aggressor. The smaller turtle apparently wishing only to escape. The larger *Macrochelys* bit the smaller one several times on the margin of the shell and on the left front leg. The smaller made no effort to bite in return, trying only to escape from the corner of the tank where he had been maneuvered by his opponent. The bigger turtle then bit the smaller one on the top of the carapace, the former's jaws engaging the ridges of the latter's shell. The 93-pounder next gave a surge, lifting his opponent off the tank bottom and turning him plastron upward. Thus inverted, the smaller *Macrochelys* thrashed its limbs about, but was unable to break loose from the grip of the 93-pounder's jaws. At this point the combatants were separated by an attendant. The smaller turtle was examined; it had suffered no obvious injury.

Captive alligator snappers feed daily on meat or fish, and will accept food from an attendant's hand. They have also learned to come for food at the signal of a regular tapping on a water pipe or on the edge of the pool. They refuse to eat when the air temperature falls below 65 degrees Fahrenheit.

It is difficult to carry a large alligator snapper by the tail, for the heavy creature must be held well away from one's legs. Furthermore, large specimens, carried in this manner, may later die from injuries to the tail vertebrae. Fortunately, however, large *Macrochelys* may be carried conveniently in another fashion. One hand

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grasps the anterior margin of the turtle's carapace, just above the creature's head, while the other seizes the posterior margin of the carapace just above the tail. The turtle can then be lifted by its shell. A Macrochelys, thus carried, is unable to twist the neck enough to reach one's hand; and, of course, the hands are well out of the way of the turtle's heavy claws. The simplicity of this method is indicated in an accompanying photograph (Fig. 6). It should be mentioned that a Chelidra can not be safely carried in this fashion; the hand grasping the anterior margin of the carapace is very apt to be bitten.

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