PART II.

THE USEFUL AQUATIC REPTILES AND BATRACHIANS

OF THE

UNITED STATES.

BY

FREDERICK W. TRUE.

ANALYSIS.

	Page.
E.—THE ALLIGATOR AND THE CROCODILE:	
33. The Alligator and the Crocodile	141
F.—TORTOISES, TURTLES, AND TERRAPINS:	
34. The Marine Turtles in general	147
35. The Loggerhead Turtle	147
36. The Hawk's-bill Turtles	149
37. The Green Turtles	150
38. The Soft-shelled Tortoises	152
39. The Snapping Turtles	153
40. The Musk Tortoises	154
41. The Fresh-water Terrapins	155
42. The Diamond-back or Salt-water Terrapin	156
43. The Pond Tortoises	157
44. The Box Tortoises	158
G.—THE AMPHIBIANS:	
45. The Bull-frog	159

E.—THE ALLIGATOR AND THE CROCODILE.

33. THE ALLIGATOR AND THE CROCODILE.

THE NORTH AMERICAN ALLIGATOR AND CROCODILE.—We have in the United States two reptiles of the Crocodile family, one a true Crocodile, *Crocodilus acutus*, Cuv., and the other the well-known Alligator *Alligator mississippiensis*, Daudin.[1] The former animal is of rare occurrence, only a few specimens having been captured in the United States, and it can, therefore, scarcely claim attention from a commercial standpoint.[2] I shall confine my remarks to the Alligator.

ORIGIN OF THE NAME "ALLIGATOR."—The origin of the name "Alligator" is involved somewhat in obscurity, but several theories have been entertained regarding it. "Some," says Holbrook,[3] "have supposed it derived from the word 'Legateer' or 'Allegater,' a name by which the young Crocodile is distinguished in some parts of India. Cuvier says it is much more probable that it is a corruption of the Portuguese 'Lagarto,' derived from the Latin '*Lacerta*,' as Hawkins writes it 'Alagartos,' and Sloan, in his 'History of Jamaica,' spells it 'Allagator.'"

The matter was undoubtedly set right by Cuvier. In the writings of all the very early English explorers which I have been able to consult the terms "Crocodile" and "Cayman" are generally used in alluding to the Alligator. Under the name "Cayman" it would seem that the Alligator and the true Cayman of South America have been confounded. In Sir Walter Raleigh's account of his travels in 1595, however, he used the name "Lagartos" for the Alligator. He says:

"Vpon this riuer there were great store of fowle, and of many sorts: we saw in it diuers sorts of strange fishes, and of maruellous bignes; but for lagartos it exceeded, for there were thousands of those vgly serpents; and the people call it for the abundance of them, The riuer of Lagartos, in their language."[4]

The name Alligator, with its present orthography, seems to have been adopted about 1730.

GEOGRAPHICAL DISTRIBUTION.—The geographical range of the Alligator has not been very accurately defined. Holbrook[5] fixes the northern limit on the Atlantic coast at the mouth of the Neuse River, North Carolina, although at the present day it is doubtful whether any specimens could be found so far north. It occurs in increasing numbers southward, and is comparatively abundant on the northeast coast of the Gulf of Mexico. It ascends the Mississippi River as far as the mouth of the Red River. In regard to the western limit of its range, Cope states that "it

---

[1] A recent writer, the place of publishing of whose article I have forgotten, raises the question of the occurrence of two species of Alligator in the South. No herpetologist, however, so far as I am aware, has made such a distinction, and I cannot, therefore, give the matter more than a passing notice here.

[2] I have been able to gather but few references to instances of the actual capture of *C. acutus* in Florida. Wyman, I believe, first pointed out its existence in that state, in 1869, basing his remarks on the features of a skull sent from the Miami River by Mr. William H. Hunt. (See Amer. Journal of Sci. & Arts, xlix, 1870, pp. 105–106.)

Another specimen, this time a full-grown animal, was obtained by Mr. H. A. Ward, of Rochester, New York, in Biscayne Bay, Florida. This specimen is now in the National Museum.

Still another Crocodile was said to have been captured in North Lake, Florida, in 1875, by a Mr. William Butler, but whether this specimen was ever sent to a museum, or was identified by a professional herpetologist, I am unable to say. (See Forest and Stream, iv, 1878, p. 167.) Two other writers, Mr. C. J. Maynard, of Newtonville, Mass., and a gentleman concealed under the pseudonym "Wanderer," claim to have seen the Crocodile in Florida, the former in 1867. (See Forest and Stream, xiii, 1880, p. 867.)

[3] HOLBROOK: North American Herpetology, ii, 1842, p. 61.

[4] RALEIGH: The Discoverie of the large, rich, and beautifull empire of Guiana. <Hakluyt's Collection of Voyages, iv, 1811, p. 137.

[5] *Op. cit.*

is common in the waters of the Guadalupe drainage, and is occasionally seen in the San Antonio *River, within the limits of the city of San Antonio,"*[1] *and Professor Baird has recorded a specimen* from Brownsville, Tex., on the Rio Grande.[2] From thence its range extends southward into South America.

ABUNDANCE.—The Alligator is growing less and less abundant, particularly on the Atlantic coast, and on the west coast of Florida, owing to the increase of population and the reckless manner in which it has been hunted and destroyed. Many persons have engaged in slaughtering these creatures merely for the sport which is supposed to be derived from so doing, no use having been made of the carcasses.

SIZE.—The Alligator is the largest living reptile occurring within the United States, and is approached in size only by the marine turtles. Holbrook records having seen one which was thirteen and a half feet long,[3] while Bartram, in his narrative of travels in Florida, affirms that they attain a length of twenty to twenty-three feet in that region.[4] The latter statement, however, must be taken with some caution; if true, it would seem that the Alligator does not now attain his former wonted proportions. From a note in "Forest and Stream," of 1876, we learn that "the largest alligator killed in Florida for many years was shot last spring [1876] by Dr. De Marmon, of Kingsbridge, N. Y. The animal measured 12 feet 6 inches in length when spread on the dock. It was 6 feet 10 inches round the body, 5 feet 10 inches around the jaws, and weighed about 700 pounds. The head, which is now in the doctor's possession, is 30 inches long. It was killed on the Homosassa River, about two miles from Alfred Jones's grove."[5] The average length would appear to be about ten feet.

FOOD AND MANNER OF OBTAINING IT.—The food of Alligators consists almost exclusively of fish and such small land or semi-aquatic animals as it is able to secure. It would appear that they are also expert fly-catchers. The quaint allusion of Exquemelin to this subject is too interesting to be omitted. "The *Caymanes*," he says, "are ordinarily busied in hunting and catching of flies, which they eagerly devour. The occasion is, because close unto their skin, they have certain little scales, which smell with a sweet sent, something like unto musk. This aromatick odour is coveted by the flies, and here they come to repose themselves and sting. Thus they both persecute each other continually, with an incredible hatred, and antipathy."[6]

The existence of this habit, I have recently been informed, has been frequently confirmed in Louisiana by reliable observers; but the gentleman who informed me was inclined to believe *that it is the saliva which attracts the flies into the gaping jaws of the Alligator. The manner* in which the reptile secures his fill of fishes is related by Dowler in a paper written in 1846, who founded his remarks on the statements of some, to him, credible observers. He writes as follows:

"Many authors assert that Alligators cannot swallow under water. In offering some facts to disprove this assumption, the sagacity of these animals will be more or less illustrated. A gentleman, on two occasions, watched Alligators when catching sunfish, which were swimming in shoals in shallow water. The Alligator placed his long body at a suitable distance from the shore. As soon as the fish came between him and the land, he curved his body so that they could not pass; the tail was moored on land; the mouth was opened under water, and brought so close to

[1] COPE: On the Zoölogical Position of Texas. Bull. U. S. National Museum, No. 17, 1880, p. 13.
[2] GIRARD: Herpetology, U. S. and Mex. Boundary Survey, ii, pt. 2, p. 5.
[3] HOLBROOK: North American Herpetology, ii, 1842, p. 56.
[4] BARTRAM: Travels through East and West Florida, 1791, p. 128.
[5] Forest and Stream, vii, 1876, p. 84.
[6] EXQUEMELIN: Buccaneers of America. English translation, 1684, p. 48.

the shore that the fish had no method of escaping but through the mouth, where they were entrapped. *Incidit in Scyllam, qui vult vitare Charybdim.*"[1]

PUGNACITY OF THE ALLIGATOR.—When we come to consider the possibility of the Alligator's ability to attack successfully large terrestrial animals, such as horses and cows, as well as men, we find ourselves in great doubt. The accumulated testimony of travelers and observers on this point can hardly be set aside, although several critical writers have done so, with ridicule. Whether it was that the earlier observers, misled by the forbidding appearance of the Alligator, were repeatedly imposed upon by fabulous stories, or whether they actually saw, at least in part, what they recorded, seems to me, I must confess, a very open question. To cite all the accounts of mishaps which are said to have occurred to man and beast through the aggressiveness of the Alligator, would be to fill many pages of this volume. I can only refer to one or two prominent examples.

Herrara gives the following account of the Alligator in the harbor near Porto Beto, at the Isthmus of Panama, on the occasion of Columbus's explorations there in 1502:

"In the Harbour there were extraordinary large Alligators, that went to sleep ashore, and smelt like Musk, being so ravenous, that if they find a Man asleep on the Land, they drag him away to devour him: tho' they are so timorous, that they fly, when attack'd. There are many of them in these Rivers that fall into the North Sea, but many more in those that empty themselves in the South Sea, and they are very like, if not the same as the Crocodiles of the River Nile."[2]

Raleigh, after his allusion to the "river of Lagartos," a tributary of the Orinoko, as already quoted, adds: "I had a negro a very proper yoong fellow, who leaping out of the galley to swim in the mouth of the river, was in all our sights taken and devoured with one of those lagartos."[3]

Herrara, again, relating what happened to the Spaniards in Central America in 1516, writes:

"At Panama an Alligator has been known to take a Man off from the Stearn of a Boat, and carry him away to the Rocks, where as he was tearing him in pieces he was kill'd by a Musket Shot: the Man being recover'd as the Monster was biting him off near the Groin was carried to the Hospital, where he liv'd long enough to receive the Rites of the Church."[4]

Velasquez seems also to have been impressed with the ferocity of the Alligator during his sojourn in Cuba. By Herrara he is made to say:

"On the South Side about the Middle there runs down into the Sea a mighty River, which the *Indians* call *Cauto*, the Banks of it are very agreeable, and in it are a vast Multitude of Alligators. Those who happen to be benighted near it, must be upon their Guard, for those Creatures then come out of the Water, walk about the Land, and if they can surprize a Man, they drag him into the Water, and devour him. They sometimes do so by such as venture to ford the River, and even by Horses. They are to be found all over the *Indies*, especially to the southward, but in *Cuba* only in this River."[5]

In the eighteenth century the writer who is most loud in the denunciation of the Alligator is Bartram. He has devoted several pages of his book to the relation of the habits of these animals, from which I will quote a few lines. Although he begins his account with a query as to how he shall do credit to what he observed without arousing the suspicion of his readers regarding his veracity, his description seems overdrawn:

"My apprehensions were highly alarmed after being a spectator of so dreadful a battle; it was obvious that every delay would but tend to increase my dangers and difficulties, as the sun was

[1] DOWLER, BENNET, M. D.: Contributions to the Natural History of the Alligator. New Orleans, 1846.
[2] HERRARA (STEVENS): Hist. Amer., i, 1725, p. 271.
[3] RALEIGH: *loc. cit.*, p. 137.
[4] HERRARA (STEVENS): Hist. Amer., ii, 1725, p. 100.
[5] HERRARA (STEVENS): Hist. Amer., ii, 1725, pp. 11, 12.

near setting, and the alligators gathered around my harbour, from all quarters; from these considerations I concluded to be expeditious in my trip to the lagoon, in order to take some fish. Not thinking it prudent to take my fusee with me, lest I might lose it overboard in case of a battle, which I had every reason to dread before my return, I therefore furnished myself with a club for my defence, went on board, and penetrating the first line of those which surrounded my harbour, they gave way; but being pursued by several very large ones, I kept strictly on the watch and paddled with all my might towards the entrance of the lagoon, hoping to be sheltered there from the multitude of my assailants; but ere I had half-way reached the place, I was attacked on all sides, several endeavoring to overset the canoe.

"My situation now became precarious to the last degree: two large ones attacked me closely, at the same instant, rushing up with their heads and part of their bodies above the water, roaring terribly and belching floods of water over me. They struck their jaws together so close to my ears as almost to stun me, and I expected every moment to be dragged out of the boat and instantly devoured, but I applied my weapons so effectually about me, though at random, that I was so successful as to beat them off a little."[1]

Writers of the present century also allude to cases of fatal attacks by Alligators; I may quote one instance. Wells, writing of Lake Nicaragua in 1857, says: "Large *tiberones* (sharks) have been captured in the lake; and a few months previous, a woman at Virgin Bay, washing on the banks, was seized and killed by an alligator."[2] Many other similar statements are on record. The mass of most recent writers and investigators, however, seem inclined to regard all tales of the Alligator's aggressiveness as idle fiction, and contend with one accord that he is sluggish, harmless, and even timid, and that the damage which he sometimes does with tail and jaws when wounded and tormented is due to aimless madness induced by pain, and not to any deliberate attempt at revenge.

The stomach of Alligators is often found to contain, in addition to its natural food, a number of rounded masses of hard material, large pebbles and other indigestible matter. Zoölogists are not agreed regarding the function of these objects, some supposing that they aid in reducing other matter taken into the stomach, and others that they serve to keep the stomach distended when the animal is in a state of hibernation in winter. It seems probable, however, that they are swallowed by mistake for better food, or are taken down with more nutritious matter when he feeds too greedily.

MODE OF LIFE.—Alligators are pre-eminently fitted for an aquatic or semi-aquatic life. In the water they seem perfectly at ease, and move about with great velocity, propelling themselves by powerful strokes of their broad paddle-like tails. The peculiarities of their internal structure, too, are such as fit them for remaining a considerable time beneath the surface. On land, however, the Alligator moves slowly and with evident difficulty on account of the weight of the body and the shortness of the legs. Nevertheless they come frequently to shore, being very fond of sunning themselves for hours on the sandy or muddy banks of the streams they inhabit. They are protected from assault while indulging in these siestas by their dull colors and their perfect immobility. Holbrook states that "such Alligators as dwell in ponds and streams out of the influence of tide-water, wander much further from the banks and are not unfrequently seen a mile or more from water."[3]

This statement is confirmed in the writings of other observers. "Following the lonely track

[1] BARTRAM: Travels in East and West Florida, 1791, p. 119.
[2] WELLS: Honduras, 1857, p. 35.
[3] HOLBROOK, *op. cit.*, p. 57.

which leads for thirty-three miles through Savannah's sand-hills and pine barrens from New Smyrna, Florida, to the St. John's River," writes a correspondent of "Forest and Stream," "we once came upon an alligator seven feet long, taking his siesta in the middle of the road. . . . Many alligators have I seen in Florida lakes and rivers, but never before met one on the high road. Probably the dry weather had drawn the reptile from its accustomed haunts in search of water."[1]

VOICE.—In spring and during the breeding season Alligators utter a cry, which has been likened to that of the bull-frog, but intensified, and to the noise of distant thunder. It is probably to this cry that Bartram frequently refers, as, for example, in the following sentences: "But what is yet most surprising to a stranger, is the incredible loud and terrifying roar which they are capable of making, especially in the spring season, their breeding time; it most resembles very heavy distant thunder, not only shaking the air and waters, but causing the earth to tremble; and when hundreds and thousands are roaring at the same time, you can scarcely be persuaded but that the whole globe is violently and dangerously agitated."[2] Most evident hyperbole!

HIBERNATION.—At the approach of winter the Alligators embed themselves in holes and pits on the banks of their favorite streams, and remain dormant until spring.

BREEDING HABITS.—When the breeding season arrives, early in spring, the female resorts to a sheltered spot on the bank of the stream, and constructs a small mound of mud and other materials, in which she deposits her eggs, one to two hundred in number. The eggs hatch in about thirty days, and the young Alligators immediately take to the water. Although I am loath to quote so much from one observer, I must refer again to the narrative of Bartram, for I find no other in which the nests of the Alligator are so fully described, with so great an appearance of accuracy. He writes:

"I now lost sight of my enemy again. Still keeping close along shore; on turning a point or projection of the river bank, at once I beheld a great number of hillocks or small pyramids, resembling hay cocks, ranged like an encampment along the banks, they stood fifteen or twenty yards distant from the water, on a high marsh about four feet perpendicular above the water; I knew them to be the nests of the Crocodile, having had a description of them before, and now expected a furious and general attack, as I saw several large Crocodiles swimming abreast of these buildings.

"These nests being so great a curiosity to me, I was determined at all events immediately to land and examine them. Accordingly I ran my bark on shore at one of their landing places, which was a sort of nick or little dock, from which ascended a sloping path or road up to the edge of the meadow, where their nests were; most of them were deserted, and the great thick whitish egg-shells lay broken and scattered upon the ground round about them.

"The nests or hillocks are of the form of an obtuse cone, four feet high and four or five feet in diameter at their bases; they are constructed with mud, grass, and herbage: at first they lay a floor of this kind of tempered mortar on the ground, upon which they deposit a layer of eggs, and upon this a stratum of mortar seven or eight inches in thickness, and then another layer of eggs, and in this manner one stratum upon another, nearly to the top: I believe they commonly lay from one to two hundred eggs in a nest: These are hatched I suppose by the heat of the sun, and perhaps the vegetable substances mixed with the earth, being acted upon by the sun, may cause a small degree of fermentation, and so increase the heat in those hillocks. The ground for several acres about these nests shewed evident marks of a continual resort of alligators:

[1] "S. C. C." [S. C. CLARKE] in Forest and Stream, xii, 1879, p. 307.
[2] BARTRAM: *op. cit.*, p. 129.

The grass was everywhere beaten down, hardly a blade or straw was left standing; whereas, all about, at a distance, it was five or six feet high, and as thick as it could grow together."[1]

ECONOMICAL VALUE.—The principal commercial products furnished by Alligators are leather, ivory, oil, and musk. The first two are by far the most important.

Alligator leather is quite impervious to water, and consequently a valuable material from which to manufacture shoes and boots. Besides serving for these purposes, however, it is frequently more carefully prepared and used in making articles which require a soft leather, such as satchels, card-cases, and the like, the oddity of its appearance being much admired. It has many cheap imitations. Hides of large size and good quality bring about eight dollars in the market.

The ivory is obtained from the teeth. These are carved into a variety of forms, such as whistles, buttons, and cane-handles, and also sold as jewelry. This industry is carried on principally in Florida.

Alligator oil, which is extracted from the fat of the animal, has been recommended for the cure of quite a variety of diseases.

The musk of the Alligator is obtained from glands situated in the lower jaw. It is not of the best quality, but serves as the basis of certain perfumes.

THE FISHERY.—In regard to the capture of Alligators in Florida for the products they furnish, and their consequent diminution, a writer in "Forest and Stream" states:

"Alligator hunting is growing less and less successful in Florida as the game diminishes in numbers. From being simply a pastime it has become a regular business, and thousands upon thousands of these creatures are now annually slaughtered for their hides and teeth. The former are converted into leather, and make a valuable commodity, while the teeth are manufactured into various articles of use and ornament. At the rate the alligator family is now disappearing, not many years will elapse before the supply will be wholly exhausted, and the capture of an alligator become an uncommon event in sporting life."[2]

MODE OF CAPTURE.—There is but one mode of capturing Alligators, so far as I am aware, namely, that of shooting them with the rifle. This is not so expeditious a method as would at first appear. The iron-like hide of the upper surface of the reptile's body, with its rugged bosses, secures him impunity against the ill-aimed shot. The eye is the most vulnerable spot, and it is through this organ that the rifle-ball penetrates into the vital region, the brain.

---

[1] BARTRAM: *op. cit.*, pp. 126, 127.

[2] "P. H. A." in Forest and Stream, vi, 1876, p. 264.

F.—TORTOISES, TURTLES, AND TERRAPINS.

INTRODUCTION.—The species of Tortoises which inhabit the territory of the United States and the adjacent seas are forty-two or forty-three in number. With the exception of the Musk Tortoises, all are more or less available for food and other economic uses. The number of species actually in demand, however, is small. It includes the Marine Turtles, two or three species of Soft-shell Turtles, the Snapping Turtle, three or four kinds of Terrapins, and the Gopher or Land Tortoise. Some are too small to be of any great value, and others are of too rare occurrence, at least within the limits of the United States.

For convenience of treatment, following in a certain way the classification of Duméril,[1] we may separate the Tortoises into three large groups, namely, (1) the Marine Turtles, (2) the Marsh Tortoises, and (3) the Land Tortoises.

34. THE MARINE TURTLES IN GENERAL.

MODE OF LIFE.—The Marine Turtles are especially adapted for their aquatic life. Their bodies, which are large and broad, have a specific gravity almost exactly equivalent to that of the water in which they are immersed, so that they are able to sustain themselves at the surface of the sea for any length of time without fatigue. Their feet are transformed into broad paddles, enabling them to swim freely and rapidly. The fore-feet are used in propelling the body, while the hind-feet serve as rudders. The motion of the fore-feet is very similar to that of a bird's wings, and, indeed, all their movements are more those of flying than of swimming. These Turtles never go on shore except to lay their eggs, and their movements at such times are slow and constrained.

DISTRIBUTION OF THE MARINE TURTLES.—The Marine Turtles are most abundant in tropical regions, and occur in considerable numbers only along the extreme southern portions of our coast. Specimens are occasionally seen as far north as Long Island Sound, and still more rarely in Massachusetts Bay and on the southern coast of Maine. I am further informed by Capt. Joseph W. Collins, a most reliable observer, that he has frequently seen Turtles, which he believed to be Green Turtles, about the fishing banks of Newfoundland. Such occurrences, however, must be considered accidental, and are unimportant from a commercial point of view.

SPECIES OF COMMERCIAL IMPORTANCE.—The species which are of commercial importance are, 1. The Loggerhead; 2. The Hawk's-bill Turtles of the east and west coasts; and, 3. The Green Turtles of the east and west coasts. In addition to these, a species known as the "Bastard," *Thalassochelys Kempii*, Garman, has been recently described. It occurs commonly in the Gulf of Mexico, but is not at all sought for. In contrast to the other species, it lays its eggs in the winter months, from December to February.

THE LEATHER TURTLE.—Another species which may be mentioned is the so-called "Leather Turtle," or "Luth," or "Trunk Turtle." It belongs to a different family from those enumerated above, is larger than they, and occurs sparingly all along our Atlantic coast, from Massachusetts Bay to Florida. It has no commercial value with us, so far as known, but in the West Indies a fat is procured from it which is used as a lubricator.

35. THE LOGGERHEAD TURTLE.

DISTRIBUTION OF THE LOGGERHEAD.—This Turtle is commonly known in the United States as the "Loggerhead," *Thalassochelys caretta*, (Linné) True, in allusion to its large and thick head.

[1] DUMÉRIL and BIBRON: Erpétologie générale.

It occurs along the Atlantic coast from Virginia to Guiana and Brazil, and is common everywhere in the Gulf of Mexico and among the West Indies. It is also found in the Mediterranean, where formerly it was very abundant, and specimens have been taken on the coasts of England and Scotland. Thus it appears that the Loggerhead inhabits generally somewhat more northerly localities than most other species of Marine Turtles.

SIZE OF THE LOGGERHEAD.—In size the Loggerhead is second only to the huge Leather Turtle, previously mentioned. A specimen of moderate size, captured in 1871, measured six feet in length, and nine feet across the back to the extremities of the fore-feet or "flippers." The head was eleven inches long and eight inches broad. Its weight was about 850 pounds. In the more southern localities the species sometimes attains a weight of 1,500 or 1,600 pounds. The specimens taken on our coast about Beaufort and Morehead City, N. C., which enter into commerce, are undoubtedly young animals. Their average weight, according to Mr. Earll, is not more than fifty pounds.

FOOD.—The Loggerhead is one of the most powerful of the Marine Turtles. It swims with very considerable speed and not ungracefully. It is frequently seen far from land, floating on the waves and apparently asleep or resting. Unlike most of the members of the group, it is generally considered carnivorous, feeding upon crabs, various shells, and fishes. It is said to be particularly fond of a large conch (*Strombus*), which it breaks with its powerful jaws and devours in great quantity.[1]

BREEDING HABITS OF THE LOGGERHEAD.—On our shores this Turtle breeds in April, May, and June, during which months the female comes to land and deposits its eggs in the sand, usually selecting a spot on the southern side of a shoal. She scoops out a shallow pit with her hind legs, and deposits a number of eggs, varying from 150 to 200. Having laid this large number, the Turtle covers them with sand and leaves them to be hatched by the heat of the sun. While these animals are engaged in this operation they seem unconscious of the presence of intruders, and from this fact, and because they are very helpless on land, they are frequently captured while so engaged. They breed sometimes as far north as Virginia, and commonly in Georgia, Florida, and the eastern Gulf States. The young make their way to the water as soon as hatched.

RATE OF GROWTH.—Like all other species of Turtles, the Loggerhead is probably very slow in coming to maturity, and many years must elapse before it is fully grown. One of the small Marsh Terrapins is said to be ten or eleven years old before it breeds,[2] and it would seem that in marine species, which are many times larger, the period must be much longer.

ECONOMIC VALUE.—The economic value of the Loggerhead, aside from that of its eggs, is very small. The flesh of the adult is leathery and oily, and smells very strongly of musk; it is, therefore, not generally eaten, although some pretend that they have partaken of it when fresh without nausea. Formerly it was salted in the West Indies and given to the slaves for food. Young Loggerheads are considered tolerably esculent and are eaten to a limited extent in the United States. They are captured from time to time on the coast of North Carolina, and sold in the markets of the interior cities.

A large amount of oil can be obtained from this Turtle, but its rank odor unfits it for use in cooking. It has been employed, however, to smear on the sides of vessels, which it is said to preserve from worms; and to soften certain kinds of leathers. Its scales, although larger than those of the Tortoise-shell Turtle, are very thin, and apt to be wrinkled and filled with impurities, and therefore are not used to any considerable extent in the arts.

The eggs of the Loggerhead are larger than those of other species, and are not inferior in flavor. They are highly esteemed as food, and also furnish a considerable quantity of oil.

---

[1] HOLBROOK: North American Herpetology, ii, 1842, p. 37.

[2] AGASSIZ: Contributions to the Natural History of the United States, ii, 1857, p. 496.

36. THE HAWK'S-BILL TURTLES.

NORTH AMERICAN SPECIES.—These two Turtles, the former inhabiting the Atlantic and the latter the Pacific Ocean, were for a long period erroneously considered identical. But though different, the distinctions which separate them are of a technical nature, and we can readily treat of them together. They are commonly known under the names "Hawk's-bill" and "Tortoise-shell" Turtles (*Eretmochelys*).

RANGE OF THE HAWK'S-BILL TURTLES.—The Atlantic species, *E. imbricata*, occurs on the southern coasts of Florida and of the States bordering on the Gulf of Mexico, and from thence its range extends southward over the Gulf, among the West Indies, northeastward to the Bermudas, and as far south as Guiana and Brazil. Holbrook records as an unusual occurrence the presence of a Turtle of this species on the shores of Carolina, whither, he says, it was probably driven by a heavy storm.[1] The Pacific species, *E. squamata*, occurs on our western coast, and is common also in the Chinese and Japanese waters, and in the Indian Ocean generally.

SIZE.—The Hawk's-bill is smaller than either the Loggerhead or the Green Turtle. It is generally considered that a Turtle must have a weight of about one hundred and sixty pounds before its "shell is of suitable thickness to be used in the arts, but it often attains to at least twice that weight, and sometimes even approaches in weight the Green Turtle."

FOOD AND HABITS.—The habits of the Hawk's-bill Turtle do not differ essentially from those of the Loggerhead. Its diet is strictly vegetable, but it is said to be much more fierce than the carnivorous but harmless Loggerhead. It bites severely, and occasions painful wounds, so that the fishermen have to be on their guard against its attacks. On our shores its breeding season extends from the latter part of April to the first of July. It usually selects a gravelly rather than a sandy beach in which to deposit its eggs.

ECONOMIC VALUE: GRADES OF "SHELL."—The Hawk's-bill Turtle is chiefly valued for the horn-like scales or plates which cover its bony shell. These form the "tortoise-shell" of commerce. The back of the Turtle is covered with three rows of plates, a central and two lateral rows. The central row contains five plates and each of the lateral rows four plates; in addition, the margin of the shell is occupied by twenty-five small plates. The plates of the three rows covering the back are known as "blades," and collectively as the "head" of shell. The small marginal plates are denominated "feet," or "noses." These, together with the thinner plates of the central row, are also sometimes known as "hoofs and claws." The plates which have the highest value are the two middle ones on each lateral row, since they have the greatest thickness and size. The colors of tortoise-shell which are preferred are mingled "golden yellow, reddish jasper, and white, or brown approaching black." A variety of shell in which a large amount of white occurs is also much esteemed, especially by the Chinese. Such shell is known as "white" head or "blonde" shell. Plates in which the patches of color are nearly of equal size, and occupy nearly the same position on both sides, are also highly valued. The largest Turtle does not furnish more than fifteen or sixteen pounds of tortoise-shell. "The best tortoise-shell comes from the Indian Archipelago, where Singapore is the principal port for its exportation. It is also sent from the West Indies, from the Gallapagos Islands, situated on the west coast of South America, and from Mauritius, Cape Verde, and Canary Islands."

The plates on the plastron, or under part of the shell, are golden yellow in color. Articles made from them are much admired in some localities. It is said that combs of this color are eagerly sought for by Spanish ladies, who will readily pay fifteen or twenty dollars for them.

[1] HOLBROOK: North American Herpetology, ii, 1842, p. 42.

THE HAWK'S-BILL AS FOOD.—The flesh of the Hawk's-bill Turtle is comparatively valueless; indeed, in the West Indies it is said that it possesses cathartic qualities in a high degree. The Turtle is occasionally brought to our markets from North Carolina. I have seen it in Washington several times recently, both in the markets and before certain restaurants of the city. *The eggs are not inferior to those of other Marine Turtles, and are valuable both as food and as* the source of a limpid and not ill-flavored oil, which is used in cookery and in the arts.

37. THE GREEN TURTLES.

NORTH AMERICAN SPECIES.—The two species of Green Turtle, the one, *C. mydas*, inhabiting the Atlantic and the other, *C. virgata*, the Pacific Ocean, like the two Hawk's-bill Turtles, are very similar in general aspect, and have been confounded by many observers. The Atlantic species, however, has been most often described and commented upon, and it is to that species that most of my remarks will refer.

NAMES.—As far as known, the Green Turtle has no other popular name in the United States *or in England. In France it is called the "Tortue Franche," in Portugal the "Tartaruga," and* in Brazil the "Jurucua."

DISTRIBUTION.—The Atlantic species occurs all along our coast, from Long Island Sound, where it has been taken several times, but is not common, to Florida and the coasts of the Gulf States. Captain Collins believes that he has seen this species on the northern fishing-banks. It is abundant in the West Indies, and is found as far south as Guiana and Brazil; is said to occur also along the west coast of Africa. I am informed by Mr. E. G. Blackford that the supply for New York market is brought principally from Indian River, Cedar Keys, and Key West, Florida. The Pacific species is "found along the whole southern coast of California," but its northern limit has not been ascertained. It is said to occur also in the Indian Ocean.

SIZE.—In size the Green Turtle ranks intermediate between the Loggerhead and the Tortoise-shell Turtles. Those taken on the coast of the Carolinas are very small, but the species increases in size southward. The specimens taken at the more northerly localities seem to be young or dwarfed individuals, as in the case of the Loggerhead. At Beaufort and Morehead City, as Mr. Earll ascertained, they weigh only about eight pounds; at Charleston, usually from five to fifteen pounds, the largest weighing twenty-five pounds; about Saint Augustine, the average size is twenty or twenty-five pounds; at Halifax River, thirty-five pounds; at Indian River, fifty or sixty pounds, specimens weighing as much as two hundred pounds being not infrequently taken; at Key West the weight is usually from forty to one hundred pounds; at Cedar Keys specimens weighing from six hundred to eight hundred pounds are sometimes taken, and rarely some weighing a thousand pounds. Thus it appears that there is gradual increase in size as we pass southward.[1]

FOOD AND FEEDING HABITS.—Holbrook makes the following statements in regard to the food of the Green Turtle: "The *Chelonia mydas* lives mostly in deep water, feeding on marine plants, especially one called turtle-grass (*Zostera marina*). This, according to Audubon, they cut near the roots, to procure the most tender and succulent part, which alone is eaten, while the rest of the plant floats to the surface, and is there collected in large fields, a sure indication that the feeding ground of the Green Turtle is near. In confinement, however, they eat readily enough purslain (*Portulaca oleracea*), and even grow fat on this nourishment."[2] A specimen taken at Noank, Connecticut, in August, 1874, was full of Irish moss (*Chondrus crispus*). After browsing for a

[1] This fact, which corresponds with what has been observed regarding some other animals, is of great interest from a zoölogical point of view.

[2] HOLBROOK: North American Hepetology, ii, 1842, p. 29.

time in these pasturages of sea-weed, the Turtles seek the mouths of rivers, where they apparently take great pleasure in bathing in the fresh water, which seems to be necessary to them from time to time. They are very timid on such occasions, and hasten away into deep water at the approach of man. In Florida, it "is said by turtle-fishers to enter the creeks which abound on that coast, and having eaten its fill of the sea-grass growing there, to roll together masses of it of the size of a man's head, which it cements with clay on which the grass grows, and then when the turn of the tide takes it out to sea, follows it, feeding upon it. When, therefore, the fishermen find any of these balls floating down from a creek, they at once spread a strong net across the mouth, and almost always secure a number of these Turtles."[1]

BREEDING OF GREEN TURTLES.—The Green Turtle breeds on the coasts of Florida and in the Bahamas and West Indies generally. On our coast its breeding season is from April to July. Holbrook gives also an excellent account of the breeding habits of this Turtle, and we cannot do better than quote his words. "In the months of April and May, great numbers seek for this purpose [the laying of eggs] the sandy shores of desolate islands, or the uninhabited banks of certain rivers, where they are least liable to interruption in their work of reproduction. The Tortugas Islands are a favorite haunt; these are four or five uninhabited sand banks, which are only visited by turtlers and wreckers. Between these islands are deep channels, so that the Turtles come at once to a good landing. They are not confined, however, to these islands, but are found abundantly on keys and inlets on the main. The female arrives by night. Slowly and cautiously she approaches the shore, and if undisturbed, crawls at once over the sand above high water mark; here with her fins she digs a hole one or two feet deep, in which she lays her eggs, between one and two hundred in number. These 'she arranges in the most careful manner, and then scoops the loose sand back over the eggs, and so levels and smooths the surface that few persons on seeing the spot could imagine that anything had been done to it.' This accomplished, she retreats speedily to the water, leaving the eggs to be hatched by the heat of the sun, which is generally accomplished in about three weeks.[2] Two or three times in the season does the female return to nearly the same spot and deposit nearly the same number of eggs, so that the amount annually would be four or five hundred."[3] The young make their way at once to the water, but many of them fall a prey to the various carnivorous birds which frequent the breeding grounds.

USES.—The flesh of the Green Turtle is considered an excellent article of diet, and forms the basis of the well-known "turtle soup." Two portions of the body have received special names in the language of cookery. These are "calipash," a name for the flesh which is attached to the upper shell of the Turtle, and is of a dull greenish color; and "calipee," the corresponding name for the flesh adhering to the lower shell, which is of a yellowish hue.

The animal is brought to the markets of New York, Philadelphia, Baltimore, and other cities regularly during the season, and large numbers are sold. The Pacific species, Professor Jordan informs me, is seen from time to time in the markets of San Francisco, being brought in occasionally by vessels coming from the south. The eggs of the Atlantic Green Turtle are eagerly sought for, both on our coast and in the West Indies, and are valuable both as food and on account of the oil they furnish. I am informed by a prominent manufacturer of soap that the article bearing the name of "turtle-oil" soap is in reality made from beef or other fats, and contains not the least modicum of turtle oil. The name is simply a "trade name"; no turtle oil has been imported into the United States for many years.

---

[1] KNIGHT: Proceedings Boston Society of Natural History, 1870, p. 16.
[2] Agassiz says the period cannot be less than seven weeks.
[3] HOLBROOK: *Op. cit.*, p. 29.

38. THE SOFT-SHELLED TORTOISES.

The marsh and river Tortoises constitute a large group, well represented in North America. It includes all the Tortoises which live in the marshes, fresh and salt, and in ponds and running streams. It may be conveniently divided into six sections, comprising (1) the Soft-shelled Tortoises; (2) the Snapping Turtles; (3) the Musk Tortoises; (4) the Fresh-water Terrapins; (5) the Salt-water Terrapin and Geographic Tortoises; (6) the Pond Tortoises.

RANGE OF THE SOFT-SHELLED TORTOISES.—The species of Soft-shelled Tortoises, *Trionychidæ*, inhabiting our country are six in number, and belong to two different genera, known scientifically as *Amyda* and *Aspidonectes*. Their combined range extends from Lake Champlain, the Lower Saint Lawrence, and the Upper Hudson on the east, westward through the great lakes and Northwestern States, to the Yellowstone and Musselshell Rivers; thence southward, east of the Rocky Mountains, to Eastern Texas; thence along the Gulf States to Florida, and from there northward, west of the Alleghanies, to the Upper Hudson.

"In the Northwestern States, two species occur together, belonging to two different genera, *Amyda mutica* and *Aspidonectes spinifer;* in the middle Western States one species, *Aspidonectes nuchalis;* in the South-Eastern and Southern States, two species, belonging to two different genera, *Platypeltis* [*Aspidonectes*] *ferox* and *Aspidonectes asper;*[1] and in the South-West, in Texas, one species, *Aspidonectes Emoryi.*"[2]

These Tortoises seem to be known everywhere in the country under the single name "Soft-shell Turtle." As the habits of all the species are very similar, it will be scarcely necessary to consider each separately. They vary in length from six or eight inches to two feet or even more, and their weight is from four or five pounds to fifteen or sixteen pounds. Probably the largest species is *A. spinifer*.

FOOD.—The food of the Soft-shell Turtles consists of small fishes, snails, and other small animals, and a variety of vegetable matter. It is said that some species do great damage in potato fields, situated near the streams they inhabit, since they are very fond of browsing on the stems. It is improbable, however, that they go very far from the water. They are most frequently seen on the margin of sluggish, shallow streams, their bodies buried in the mud, and only the tip of their long snout protruding, or crawling over the muddy bottom of the stream, or floating on its surface. The fact of their fierceness has been regarded with doubt by some authorities, but they will undoubtedly bite severely if provoked. They breed in June and July, seeking a dry sandy spot on the bank of the streams they inhabit, in which to deposit their eggs. The female leaves the water for this purpose, and returns to it immediately after the eggs are laid, leaving them to be hatched by the heat of the sun. The number of eggs is large, varying from thirty or forty to sixty or seventy.

ECONOMIC VALUE.—Soft-shell Turtles are commonly eaten in the regions where they occur, and are frequently seen in the markets. Their flesh furnishes a superior article of food, surpassing, it is said, in delicacy the flesh of the Green Turtle. The eggs also are considered very excellent. The Turtles are captured with hook and line, almost any bait being suitable, for they snap greedily at any kind of food. They are also shot with the rifle while sunning themselves or floating on the surface of the water. Mr. E. C. Pridgen, of Oakohay, Mississippi, informed me that the eggs are discovered by following the tracks of the animal to the nest, the location of which is recognized by the presence of a little depression of the earth.

[1] Both belong to the same genus, according to Cope. See COPE: Check-list, North American Batrachia and Reptilia, 1875, p. 51.

[2] AGASSIZ: Contributions to the Natural History of the United States, i, 1857, pp. 402, 403.

39. THE SNAPPING TURTLES.

NORTH AMERICAN SPECIES.—The Snapping Turtles, or *Chelydridæ*, of the United States are two in number, belonging to two different genera, *Chelydra* and *Macrochelys*. The more northern species, *Chelydra serpentina*, known everywhere throughout the United States as the "Snapping Turtle," is very widely distributed. It has been found as far north as Nova Scotia, and its range extends from that point southward to Florida and the Gulf States, and westward to the States immediately on the west bank of the Mississippi River. It has not been recorded from farther west than the limits given, but it is probable that it occurs even as far as the Sierra Nevadas. The southern species, *Macrochelys lacertina*, known as the "Alligator Turtle," or "Loggerhead,"[1] is found in western Georgia, and in all the States bordering on the Gulf, from Florida to Texas. It also occurs in Missouri, where it is said to receive the name "Caouane."

SIZE.—The northern species is considerably smaller than the southern; twenty or thirty pounds may be considered the maximum weight of the former, but the latter commonly attains a weight of fifty or sixty pounds, and frequently as much as one hundred. In both the strength of the jaws is very great. I have myself seen an "Alligator Snapper," of perhaps forty pounds weight, bite the handle of a broom quite in two when enraged.

Both species inhabit running streams and stagnant, muddy ponds and lakes, but they apparently prefer the latter.[2] They are sometimes seen at a considerable distance from the water, walking with a constrained and limping gait, very similar to that of the Alligator. At such times they are probably in search of food or of a suitable place for the deposit of their eggs. Their food consists of various animal matter, fishes, frogs, and shells, and lastly of ducks and other water fowl, which they draw under water to be devoured at leisure.

BREEDING SEASON AND HABITS.—The breeding season of the Snapping Turtle is in June, in the North from the 10th to the 25th (*Chelydra serpentina*). In preparing to deposit its eggs, it "excavates at first directly downward, and then laterally, so that the widest part of the hole, in which the eggs are deposited, is on one side of the external opening of the nest. Hence a stick thrust straight into the mouth of the nest would not touch the eggs, which are laid in the lateral dilation of the excavation.

"The fact that these animals oftentimes dig several holes before selecting one for deposit, shows that they exercise a discrimination with regard to the fitness or unfitness of these several spots for the encouragement and rapid development of their young. When engaged in digging or laying, notwithstanding their habitual shyness at other times, they seem utterly unconscious of any intruder, but proceed in their occupation till it is finished, and then trampling down and smoothing over the earth, so that when dry the place of the nest may not be noticeable, leave the spot and disappear among their usual haunts."[3] The place of deposit is usually at a short distance from the water in a sandy bank. The number of eggs varies from twenty to forty, or even more.

Regarding the breeding habits of the Alligator Turtle little is exactly known, but they are probably similar to those of the Snapping Turtle.

ECONOMIC VALUE.—Both the Snapping Turtle and the Alligator Turtle are esteemed as food, and are commonly eaten by the people in the localities where they occur. The former is generally considered inferior to the Soft-shell Turtles, or the Green Turtle, while it is claimed by some, although it seems hardly probable, that the flesh of the latter is even more delicate than that of the Green Turtle. In old animals, at any rate, the smell of musk is very strong and disagreeable.

[1] This is not to be confounded with the marine Loggerhead.

[2] During the summer of 1877 two specimens of Snapping Turtle were caught in the salt waters of Provincetown Bay, Cape Cod, Massachusetts.

[3] AGASSIZ: Contributions to the Natural History of the United States, ii, 1857, pp. 500, 501.

The Snapping Turtle is regularly seen in spring in the markets of Washington, dressed for cooking, that is, having the under part of the shell and the entrails removed. The eggs of both species are comparatively small, but delicate, and are eaten in many localities. They may be found by probing in the sand with a small rod, in places indicated by the tracks of the animal.

A large proportion of the commercial supply of the Snapping Turtle, as the observations of Capt. J. W. Collins show, is derived from Delaware.

Storer remarks that in many localities in the interior of Massachusetts the oil of the Snapping Turtle is carefully preserved on account of its supposed curative properties for bruises and strains, when externally applied.[1] The carapace is used by the Indians as a rattle and ornament.

40. THE MUSK TORTOISES.

CHARACTERISTICS OF THE MUSK TORTOISES.—It is perhaps scarcely necessary to mention the Musk Tortoises, or *Cinosternidæ*, in this connection. They are of small size, and possess a very strong and rank scent of musk, which makes them entirely unavailable as a source of food supply. Indeed, the exceeding rankness of the odor of one species, *Aromochelys odorata*, has gained for it the very expressive appellation of "Stink-pot." They are very troublesome to fishermen, in placid waters, often swallowing the bait so quietly as to produce no agitation of the float, so that their presence for some time is unperceived. They are often seen devouring dead and decaying animals in streams, and therefore undoubtedly prove efficacious as scavengers. In fact, it has been surmised that one cause of the prevalence of yellow fever in the Southern States is to be found in the wholesale destruction of various Tortoises which feed on the refuse vegetable and animal matter which collects in the rivers, some for food and others because supposedly obnoxious.

DISTRIBUTION.—Of the six species of Musk Tortoises inhabiting the United States, three are found only in Arizona and the Sonoran region generally, one in the Southern States, except lower Florida and Texas, and the remaining three in the Eastern and Southern States, and the central States westward to the extremities of the tributaries of the Mississippi.

41. THE FRESH-WATER TERRAPINS.

TERRAPINS AND POND TORTOISES.—In the group of Terrapins and Pond Tortoises are comprised about one-half of all the Tortoises inhabiting the United States. The members of the group vary greatly in habits and size and in other relations. Exclusive of the Marine Turtles, they furnish the greater proportion of the reptilian food of the country. All the species are available for food; that is to say, none of them have disagreeable qualities such as the Musk Tortoises, for instance, possess, but some are too small and others of too rare occurrence to furnish any considerable supply.

The *Emydidæ* of the United States have been divided among six genera,[2] based on certain differences of their structure, and since the division is a convenient one for the present purpose, we will adopt it and treat of the species of each genus together.

THE FRESH-WATER TERRAPINS.—The habitat of the members of this group is decidedly southern, for they are rarely seen north of the forty-first parallel of latitude. They live in moist and marshy localities and in running water, their structure being well adapted for semi-aquatic and aquatic life. Some are vegetable feeders, while others are carnivorous. The genus includes seven North American species. Of these the most important is the "Red-bellied Terrapin," *Pseudemys rugosa*. The animal is also known under the names "Potter," "Red-fender," and

[1] STORER: Report on the Fishes, Reptiles, and Birds of Massachusetts, 1839, p. 213.
[2] COPE: Check-list of North American Batrachia and Reptilia, 1875, pp. 52, 53.

"Slider." Its range seems to be limited to the Delaware River, the Susquehanna River, and other streams emptying into Chesapeake Bay. It is common in the vicinity of Washington, and is frequently seen in the markets in considerable numbers. It is a large species; the shell is usually ten or eleven inches in length. As has been already stated, the Red-bellied Terrapin is regularly seen in the markets, and as it is more abundant and less esteemed than the "Diamond-back Terrapin," it is usually much lower in price. It is commonly substituted in certain proportion for the "Diamond-back" in making terrapin stew.

Aside from its somewhat slow growth there is apparently no reason why this Terrapin should not be introduced into waters both north and south of its present range. It furnishes a very considerable amount of nutritious food at no expense to the producer.

THE MOBILIANER.—Another important species is that known as the "Mobilianer," *Pseudemys mobiliensis*. This is perhaps the largest representative of the genus or of the whole group in the United States. The shell is often from 14 to 16 inches in length. It is found more or less abundantly in all the Gulf States, from extreme Western Florida to the Rio Grande of Texas. Its form would suggest that it lives mostly in the water. Of what its food consists is not definitely known, but it is undoubtedly mostly of a vegetable character. It is considered quite delicate, and is esteemed as food. It is frequently sold in the markets of Mobile, New Orleans, and other Southern cities.[1]

THE YELLOW-BELLIED TERRAPIN.—*Pseudemys scabra*, a species which occurs in the Carolinas, Georgia, and Northern Florida, is used to a considerable extent for food. It is known popularly as the "Yellow-bellied Terrapin." That it is a very abundant species, at least in Florida, we may learn from the following note, communicated to the Boston Society of Natural History in 1870, by the Rev. C. F. Knight:

"In the early summer [this species] congregates in great numbers in the shallow parts of certain lakes, and the warm and still bayous near the mouths of those streams which empty into the Gulf. On one occasion the speaker [Mr. Knight], floating quietly down stream, came upon one of these gatherings where there seemed to be many thousands within the space of two or three acres, covering every log and stump and hummock almost as thickly as shingles lie upon a roof."

The Yellow-bellied Terrapin is largely a carnivorous animal. It lives on small reptiles and other such animals as it can capture in the streams and ponds which it inhabits. In confinement, however, it will condescend to partake of vegetable food, particularly of the common purslain, *Portulaca oleracea*, of which it seems quite fond. It is frequently brought to Charleston, South Carolina, and other Southern markets in considerable numbers. The flesh is not considered as delicate as that of the "Diamond-back Terrapin," but the amount furnished is greater.

OTHER SPECIES.—Of the remaining species it will be necessary to speak only of *Pseudemys concinna*. The other three species, *Pseudemys hieroglyphica*, inhabiting the Middle, Western, and Gulf States, *Pseudemys Troostii*, inhabiting the Mississippi Valley, as far north as Illinois, and *Pseudemys elegans*, inhabiting Ohio and Texas and the States through which the western and northern tributaries of the Mississippi River flow, seem not to be sufficiently abundant to furnish regular supplies of food. *Pseudemys concinna*, the "Florida Cooter," is found in all the Southern States, from southern North Carolina to Florida, and from thence westward to Texas, and also in Arkansas. They seem to prefer brackish waters, but are found also in fresh-water streams. Their diet is principally of animal matter; in Florida they are said to feed upon certain species of worms which they capture by thrusting their long claws into the worm-holes in the clay. Although

[1] HOLBROOK: North American Herpetology, i, 1842, p. 74.

not as abundant as the Yellow-bellied Terrapin, they are sufficiently so to furnish considerable food, but whether they are brought to market I am not aware.

42. THE DIAMOND-BACK OR SALT-WATER TERRAPIN.

Three species of the genus *Malacoclemmys* inhabit the United States. By far the most important of these, and the most valuable of all Terrapins, is the *Malacoclemmys palustris*, or "Diamond-back Terrapin."

The other two species, the Geographic Tortoises, *M. geographica* and *M. Lesueuri*, are of comparatively rare occurrence, and are not used for food to any considerable extent.

DISTRIBUTION.—The "Diamond-back," or "Salt-water Terrapin," is common along our entire Atlantic coast from Nantucket and New Bedford, in Massachusetts, to Texas. It also occurs in South America. It was introduced into Italy by the Prince of Canino, a number of years ago, but of the success of the enterprise I have been unable to learn. Those which enter into commerce, however, are principally from Chesapeake Bay and the coast of the Carolinas. Some very fine ones also come from Egg Harbor, N. J.

CHARACTERISTICS AND HABITS.—The Diamond-back lives in salt marshes near the coast, and is seldom found far from them. They were formerly very abundant in such localities, and could be often seen on warm days sunning themselves on the bars and flats. But the increasing demand for them and the wholesale capture of old and young have reduced their numbers very materially. The species is a comparatively small one, and varies much in external appearance. The females attain a larger size than the males, and are much more highly prized in market. The average length of the under part of the shell is seven inches, and the weight of the animal four or five pounds. Rarely the length reaches ten inches, and the Terrapin weighs about ten pounds. The fixed standard of length for salable females in most markets is six inches, but in some it is as low as five inches. Terrapin having that length are known as "counts." The small specimens are separated into "heifers" and "little bulls"; their under shell rarely exceeds five inches in length. As has been already said, they are deemed very inferior to the females, and the price of them is therefore much lower.

In regard to the rate of growth, I have seen it stated that the Diamond-back reaches maturity, or rather lays eggs, when four years old, but this is hardly probable. It does not accord with the observations of Agassiz and others, nor with the peculiarities of the group generally. Experiments made by a dealer in North Carolina seem to show that the species grow about one inch each year, so that "counts" are at least six years old. Probably ten years at least elapse before they are fully grown.

FOOD.—What the food of the Diamond-back Terrapin is does not seem to be exactly known. Very probably, however, it consists of such matter, both animal and vegetable, as the animal is able to find in the marshes in which it lives. When penned, preparatory to sending them to market, they are fed on crabs, oysters, and fish. To give them the finest flavor they are said to be fed upon celery for some days previous to being served. In the winter the tortoise hibernates and takes no food, remaining buried several inches in the mud. Unfortunately for its welfare, a little mound of mud is always raised above the spot where it disappears, which at once catches the eye of the terrapin fisherman. A large proportion of the Terrapins are taken while they are in this torpid condition.

BREEDING HABITS.—Like all other species of Tortoises, the Diamond-back deposits its eggs on land. When the laying season arrives the female seeks some sandy bar or bank above water, and having excavated a shallow pit with the hind legs, deposits from five to seven eggs.

The breeding season occurs in the latter part of June and early part of July. It is said that the young show no disposition to seek the water, but prefer to remain in the sand.

ECONOMIC VALUE.—The Diamond-back is highly prized for food. Philadelphia furnishes the best market for this species, but it is also sold in large numbers in Baltimore, Washington, New York, Boston, Chicago, Pittsburgh, Cincinnati, Saint Louis, and many other cities. The season lasts from the beginning of October to the first or middle of June; the best months are October and November. The specimens from North Carolina usually appear in the market last. The "counts," or those over six inches long, bring from eighteen to thirty-six dollars per dozen in the market; the smaller ones are usually sold separately, at prices of from fifteen to fifty cents apiece. These prices, however, are almost sixty per cent. higher than the prices received by the catcher, for the Terrapins pass through several hands on their way to market. The majority of Terrapins are actually caught in the summer months and are penned in yards, known as "crawls," until the marketing season arrives. A description of the crawls and of the method of capturing the Terrapin will be found in the chapter on THE TERRAPIN FISHERY.

There are two principal modes of cooking the Diamond-back Terrapin, one known as the Maryland style, and the other as the Philadelphia style. The Maryland style is as follows: The Terrapin is first thrown alive into tepid water, the skin and claws are removed; a second immersion in the water follows. The under shell is then cut away and the gall-bladder and liver removed. After this operation the Terrapin is stewed until thoroughly cooked. The stew is then garnished with eggs, cream, butter, and spices, and when ready for the table a little wine is added. The Philadelphia style is different from the preceding only in the addition of terrapin eggs, which, in the estimation of epicures, are necessary to complete the dish.

43. THE POND TORTOISES.

THE GENUS CHRYSEMYS.—Three species of genus *Chrysemys*, the Pond Tortoises, inhabit the United States: *C. picta*, whose range extends from Nova Scotia and Maine to Wisconsin and the States on the east bank of the Mississippi, and southward to Louisiana, Northern Mississippi, and Georgia; *C. Belli*, whose range is from the States on the west bank of the Mississippi, and Texas, westward to the Sierra Nevadas, excepting the Sonoran region; and *C. reticulata*, whose range is from Southern North Carolina to Florida and west to Louisiana. Of these the most important, perhaps, is the *Chrysemys picta*. It is a very abundant species, is of considerable size, the shell being six or seven inches in length, and has no disagreeable qualities. It lives in ponds, ditches, and sluggish rivers, where it is almost invariably seen lying on rocks and fallen trees, basking in the sun. It is very timid, dropping into the water immediately on the approach of man, and soon dies in confinement. It feeds on worms, insects, and small aquatic reptiles.

THE "CHICKEN TORTOISE."—Of the two remaining species *C. reticulata* is the more valued. It is known under the name of "Chicken Turtle" in the region where it occurs. Its habits are very similar to those of the preceding species, but it is a somewhat larger animal. It is frequently brought to the Southern markets, and is somewhat more highly esteemed than the Yellow-bellied Terrapin *Pseudemys scabra*.

BELL'S TORTOISE.—The remaining species, *C. Belli*, is a fine Tortoise, but appears to be rare, except in the Cumberland and Tennessee Rivers. Little is known of its habits, except that it prefers clear waters. So far as I am aware it is but rarely eaten.

THE GENUS CHELOPUS: THE "EL-LA-CHICK."—Four species belonging to this genus inhabit the United States, of which the most important, commercially, is *C. marmoratus*, occurring on the Pacific coast between the Sierras and the sea, from Vancouver's Island to Monterey, California.

It lives in the rivers and fresh-water ponds, preferring those of which the water is somewhat warm. It grows to a very considerable size, the shell frequently measuring seven or eight inches. It is said to deposit its eggs in June. "They are almost constantly for sale in the markets of San Francisco, and make pretty good soups, though much inferior to the Sea Turtles." They are also seen in the markets in other parts of California. The species is called "El-la-chick" by the Nisqualli.

THE WOOD TORTOISE: OTHER SPECIES.—*Chelopus insculptus*, or the "Wood Tortoise," which inhabits the Eastern States from Maine to Pennsylvania and west to Ohio, is a species of medium size, but though available for food, it is, as far as I am aware, rarely eaten. It lives mostly in ponds, but is frequently seen on land, either in search of food, or, as has been suggested, to rid itself of the leeches which cling very persistently to it. The "Spotted Tortoise" or "Speckled Turtle," *Chelopus guttatus*, and Muhlenberg's Tortoise, *Chelopus Muhlenbergi*, are comparatively worthless varieties. The former occurs in the New England States and in New York, Pennsylvania, and Michigan, and probably also in Ohio. The latter inhabits southern New York, New Jersey, and eastern Pennsylvania. The Speckled Turtle lives in ponds and running waters, but *C. Muhlenbergi* is frequently found on land. Both subsist principally on an animal diet. The Speckled Turtle, when feeding, uses the fore-feet in retaining the prey, in a manner reminding one of that of the domestic cat.

THE GENUS EMYS.—Only one species of this genus inhabits the United States; it has, so far as I am aware, no common name. This is the *Emys meleagris*. It occurs in the New England States and westward to Wisconsin. It is a rare animal and seldom seen, and hence little is known of its habits.

44. THE BOX TORTOISES.

THE CAROLINA BOX TURTLE.—To the genus *Cistudo* belong the Tortoises which have the power of shutting the body and limbs within the shell, and from this peculiarity are known as "Box Turtles." The most common species is *Cistudo carolina*, with its Southern variety, *triunguis*, which singularly has but three claws on the hind foot. It occurs all over the eastern United States from the coast to the States on the west bank of the Mississippi River. In the Southern States it is known as the "Pine-barren Terrapin," and is also called "Cooter" by the negroes. It lives almost entirely on land, feeding on insects and other animal matter, and also on certain kinds of vegetables.

It is said to do damage in the fields to cucumbers and other growing vegetables. In confinement it can be readily raised on apples and other fruits. It has been sometimes kept in cellars to destroy mice and rats, but it is doubtful whether so sluggish a tortoise would be able to capture so nimble a rodent as a mouse.

Another species, or perhaps only a variety of the preceding, known as *Cistudo ornata*, occurs in the Mississippi Valley.[1]

---

[1] Although not appertaining strictly to the subject of this report, but as completing the foregoing sketch of the Tortoises of the United States, I may be allowed to allude to the three Gopher Tortoises of the South and West. The Florida "Gopher," *Xerobates polyphemus*, (Daudin) Cooper, inhabits the Southern States from South Carolina to Texas; Agassiz's Gopher, *X. Agassizi*, Cooper, is found in Southern California and Arizona; and Berlandier's Tortoise, *X. Berlandieri*, Agass., Southern Texas and Northeastern Mexico. All live in dry and sandy regions, and feed upon vegetable matter. The eastern and western Gophers, and possibly Berlandier's Tortoise, dig deep burrows in which to dwell. The Florida Gopher furnishes no inconsiderable proportion of the meat supply of many negro families in the South.

G.—THE AMPHIBIANS.

45. THE BULL-FROG.

DISCOVERY OF THE BULL-FROG.—The first mention of the Bull-frog, *Rana Catesbiana*, Shaw, is found in the eighteenth volume of the Philosophical Transactions, published in London in 1694, in which Clayton alludes to it as being a larger Frog than any found in England, and one which "makes a noise something like the bellowing of a bull."[1] Years later it was accurately described by Catesby under the name of "Bull-frog," an appellation by which it is now universally known.

RANGE.—The geographical range of the Bull-frog has never been accurately defined. It is found in all the States on the Atlantic seaboard, and in Canada. In the collections of the National Museum there are specimens from Alabama, Mississippi, Louisiana, and Arkansas, among the southwestern States; from Ohio, Wisconsin (Racine), and Montana (Yellowstone River); and from California (San Diego). If the specimens have been correctly identified, the species must extend over the greater part of the United States.

SIZE: MODE OF LIFE.—In regard to size, the Bull-frog is undoubtedly the largest animal of its kind inhabiting North America. Holbrook[2] states that it reaches a length of twenty-one inches, although the average, of course, is considerably less. It lives in quiet ponds and sluggish rivers, and is solitary in habit, collecting together only during the breeding season. Like other Frogs, it is carnivorous, feeding upon insects, mollusks, and other small animals which live in or near bodies of fresh water. It seizes its prey when in motion, and bites greedily at the hook.

BREEDING HABITS: FROG CULTURE.—The Bull-frog breeds in spring, at which time hundreds are to be seen together in small ponds. During this season the male utters the well-known bellowing cry which may be heard at a long distance.

The artificial culture of Frogs has been attempted in a number of localities, with greater or less success. Mr. Seth Green gives the following account of a method for propagating them, which he employed with good results:

"1. *How to get the spawn.*—Take a large dipper and go to the pond where the frog casts its spawn. You will find them in a glutinous bunch. When you dip them up, be very careful not to break the glutinous matter which binds them together. Put them in a pail or can, filled with water, and take them to your hatching-box, which is made after the fashion of the shad-hatching box. It is a box two feet long, eighteen inches wide, and a foot deep, covered on the bottom with gas-tarred wire sieving, twelve wires to the inch. Anchor the box in a gentle current. They will hatch in from seven to fifteen days, according to the temperature of the water.

"2. *How to take care of them.*—Soon after they are hatched, they should be turned loose in a pond prepared with great care, as they have numerous enemies, such as fish, snakes, birds, lizards, coons, and many other animals. The pond should be made where the ground is springy, and have plenty of soft muck in the bottom. In this muck the frog lies during the winter. The pond should have a tight board fence, so that no animals could get in, and should be built so close to the water that no bird could stand on the ground inside the fence and pick up the

[1] Philosophical Transactions, xviii, 1694, p. 125.
[2] HOLBROOK: North American Herpetology, iii, 1838, p. 82.

polliwogs. If you do not heed all these precautions, and more too, your young fry will all disappear down the stomach of some bird or animal; and if you are not an unusually close observer, you will be in great wonder where they have gone. You will have no trouble in feeding the young while they are polliwogs; nature has provided for that in all waters. They feed upon microscopic forms found in the sediment."[1]

MODES OF CAPTURE.—The capture of Frogs is effected in various ways. In Canada the fishery is carried on largely by boys, who employ spears, in the use of which they are said to become quite expert. In some localities scoop-nets are used. Mr. Paul Pieombo, of Oakland, California, informs me that he seldom has need of any apparatus, as he finds no difficulty in securing the Frogs by grasping them with his hands.

In regard to the capture of Frogs in Europe, where the species *Rana esculenta* is most generally eaten, Mr. Buckland furnishes us with the following information:

"The old fishwife of whom I bought the frogs informed me that she had a man regularly in her employ to catch them. He went out every evening at dusk to the ponds in the neighborhood of Paris, with a lantern and a long stick, to end of which was attached a piece of red cloth. The frogs were attracted by the light to the place where the fisherman stood. He then lightly dropped his cloth on the surface of the water; the frogs, imagining that some dainty morsel was placed before them, eagerly snapped at it, and, their teeth becoming entangled, they became an easy prey, destined for to-morrow's market and the tender mercies of the fish or rather frog woman."[2]

ECONOMIC USES.—Desmarest, in his article on Frogs in the "Dictionnaire d'Histoire Naturelle," makes the following remarks regarding the uses to which these animals may be put:

"The flesh of Frogs is white and delicate, and contains a great deal of gelatine. It is eaten almost everywhere in Europe, but particularly in France. Frogs taken in autumn are in the best condition for food, but they are also taken in the summer. In spring the flesh is not at all delicate. In England all parts of the Frog are eaten except the skin and the viscera, but with us only the hind legs are employed.

"Frog soup is used in medicines in cases of phthisis, hypochondria, and all those chronic affections which are accompanied by permanent irritation. This remedy, which has been prescribed by a celebrated Doctor Pomme, is not in use at the present time. In ancient days many preparations were made from Frogs, such as oil and salve, and from the spawn, water and oil, etc. Dioscorides recommended Frogs cooked with salt and oil as a remedy for the bite of the venomous serpents, and would have the patient swallow a heart every morning as a pill for incurable diseases. In the country the lack of ice is sometimes supplied by the application of a frog to the forehead in cases of cerebral congestion."[3]

The late Mr. Buckland, in his entertaining work on "Curiosities in Natural History," already quoted, also alludes to the gastronomic value of the Frog, in his usual inimitable style, as follows:

"Frogs are not often used in Germany, but in France they are considered a luxury, as any *bon vivant*, ordering a dish of them at the 'Trois Frères' at Paris, may, by the long price, speedily ascertain. Not wishing to try such an expensive experiment in gastronomy, I went to the large market in the Faubourg Saint-Germain and inquired for Frogs. I was referred to a stately looking dame at a fish stall, who produced a box nearly full of them, huddling and crawling about, and occasionally croaking, as though aware of the fate for which they were destined. The price fixed was two a penny, and, having ordered a dish to be prepared, the Dame de la Halle dived her hand in

[1] Report, United States Fish Commissioner, part ii, 1874, pp. 587, 588.
[2] BUCKLAND, FRANCIS T.: Curiosities of Natural History, 1840, p. 39.
[3] Dictionnaire Universel d'Histoire Naturelle, vi, 1845, p. 328.

among them and, having secured her victim by the hind legs, severed him in twain with a sharp knife; the legs minus skin still struggled and were placed on a dish, and the head with the fore legs affixed retained life and motion and performed such motions that the operation became painful to look at. These legs were afterwards cooked at the restaurateur's, being served up fried in bread-crumbs, as larks are in England; and most excellent eating they were, tasting more like the delicate flesh of the rabbit than anything else I can think of.

"I afterwards tried a dish of the common English frog, but his flesh is not so white nor so tender as that of his French brother.

"Should any person wish to have a dish of real French frogs, he can buy them at Fortnum and Mason's for half-a-guinea, a tin-caseful. They are beautifully preserved and are ready for cooking. I have eaten them at the house of a lady who kindly invited me to luncheon when she tried the experiment. . . .

"The edible frog (*rana esculenta*) is brought from the country, in quantities of from thirty to forty thousand at a time, to Vienna, and sold to great dealers who have conservatories for them. These conservatories are large holes, four or five feet deep, dug in the ground, the mouth covered with a board, and in severe weather with straw. In these conservatories, even during a hard frost, the frogs never become quite torpid; they get together in heaps one upon another, instinctively, and thereby prevent the evaporation of their humidity, for no water is ever put to them."[1]

The custom of eating Frogs was introduced into the United States from Europe, and has spread from the cities on the east coast to those in the interior and on the west coast. On account of the limited supply which is sent to market, frog meat has hitherto been considered an article of luxury, rather than one of general consumption. In restaurants and hotels it is seldom found on the regular bill of fare, but in those of the better class, in the large cities at least, it is not wanting on the order-list.

The supply of Frogs for the New York market, according to the statement of Mr. E. G. Blackford, is obtained principally from Canada, Northern New York, and the vicinity of Philadelphia. The season lasts from May to November. The hind legs, or "hind quarters" as they are termed, are the only portions usually eaten, there being but an insignificant amount of flesh on other parts of the animal. Mr. Blackford states that he is accustomed to sell about 12,000 pounds of frog meat annually, and it is probable that the consumption of New York City is not less than 60,000 pounds. The average retail price is thirty cents per pound.

At Boston "Frogs are sold generally by the dozen, and bring from twenty to fifty cents, according to quality. As the demand increases the business will furnish quite a source of rural income. . . . The subject of canning Frogs is being talked of, and efforts are being made to discover a good process for this purpose."[2]

The following paragraph from an American newspaper of recent date contains some information regarding the extent of the business in Minnesota: "A new industry has recently sprung up in parts of Minnesota, that has already arrived at the dignity of statistics. Frog culture is the new thing; it is a simple matter, consisting chiefly in the protection of eggs and tadpoles from birds and other enemies, by means of wire screens. The product, thus far reported, amounts to 3,000 dozen of frogs' legs, of which about two-thirds have been shipped to Saint Louis. The average quotation of prices is twenty cents per dozen."

Frogs are quoted regularly as appearing in the San Francisco market. Mr. Paul Picombo,

[1] BUCKLAND, FRANCIS T.: Curiosities of Natural History, 1840, pp. 38–40.
[2] Boston Commercial Bulletin.

whose name has been already mentioned, if his statements are reliable, is one of the largest dealers in Frogs in California. He writes, in answer to a circular: "Most of the Frogs caught in this State are caught by me"; and in response to the questions propounded, states that he sells about three hundred dozens of live Frogs annually, sending two-thirds of them to San Francisco, and the remainder to various other localities in California. The price during summer ranges from one dollar to two dollars and a half, and in winter from three to five dollars.