

described the egg-tooth. In one female, taken near Indianapolis, I find nineteen eggs, seven of which lie in the left ovary. These eggs are quite immature.

Some alcoholic eggs (U. S. Nat. Mus., No. 17956) of this species from an unknown locality furnish some points. They are of the usual elongated oval form, an inch and a half long and close to an inch in short diameter. The outer covering is thick and tough, and it is furnished with numerous hard points, as if of deposits of lime salts. Within the egg is a young racer $10\frac{1}{2}$ inches long and evidently nearly ready to come forth. The intromittent organs of this specimen are somewhat flattened, broad at the extremity, and with prominent terminal angles. The organ begins to expand from its base. It is furnished plentifully with spines. When the sexes unite, when the eggs are laid, how concealed, and when they hatch, are some of the things which we need to learn.

I have examined a specimen (U. S. Nat. Mus., No. 17969) of *Haldea striatula* from some point in Arkansas. It is $9\frac{1}{2}$ inches long and contains five eggs, each with a young *Haldea* in it. Only the hindermost egg is in the left oviduct. This is a little over an inch long, but the others are only a little more than three-quarters. The short diameter of the egg is about a quarter of an inch. The embryos are far from mature, being only $2\frac{3}{4}$ inches long when extended. They have a considerable mass of yolk still attached to them. The egg-coverings are very thin. This circumstance causes me to conclude that the young are brought forth alive. A series of sections through the snout of an embryo reveals the presence of the usual egg-tooth.

SOME OBSERVATIONS ON THE TURTLES OF THE GENUS *MALACLEMYS*. By O. P. HAY.

Of the turtles belonging to the genus *Malaclemys* there are now recognized five species, two new ones having been described within recent years by Dr. G. Baur. The genus is a very distinct one, and is distinguished from *Chrysemys* especially by the extremely broad and flat crushing surfaces of both upper and lower jaws. As a result of the provision made for the support of these wide, horny, masticatory plates, the internal nares are thrown far back, so as to lie behind the level of the eyes. In the Catalogue

of the Chelonians in the British Museum, 1889, Dr. G. A. Boulenger says that the "plastron is extensively united to the carapace by suture, with feeble axillary and inguinal peduncles, the latter ankylosed to the fifth costal plate." Sometime ago I macerated a large specimen, *M. geographica*, until the whole plastron fell away from the carapace, thus showing that there was no ankylosis of the parts.

The Map tortoise, *M. geographica*, was described by the naturalist Le Sueur, in the Journal of the Philadelphia Academy for 1817. In the Mémoires du Muséum de Paris for 1827, Le Sueur presented the description of another species of this genus from specimens which he had taken in the Wabash river, at New Harmony, Ind. Neither figure nor systematic name accompanied the description, although he appears to have had a name in manuscript, *pseudogeographica*. It is evident that Le Sueur had in mind the terrapin, which has for the most part gone by that name since then, although the description is in some respects erroneous. The first mention that I find of this manuscript name of Le Sueur is found in connection with the *Emys lesueurii*, described by Dr. J. E. Gray in his Synopsis Reptilium, 1831. It is also given by Duméril and Bibron in Erpétologie Générale, vol. II, p. 256, as a synonym of *Emys geographica*, with the remark, "jeune age." In his work, Herpetology of North America, published in 1842, Dr. Holbrook recognized the fact that this terrapin is distinct from the earlier described *geographica*, and gave to it the name that Le Sueur had bestowed on it in his manuscripts. He also accompanied the description with a colored plate. It is from this date, 1842, that we must reckon in determining the tenability of the name *pseudogeographica*.

In 1831 Dr. J. E. Gray, in his Synopsis Reptilium, p. 31, published a description of a species which he called *Emys lesueurii*. This supposed new species was founded on either a specimen of *geographica* or on one of what Holbrook afterwards called *pseudogeographica*. Dr. Gray himself, in all his subsequent publications, wrote down the name *lesueurii* as a synonym of *geographica*, although previously to the publication of his Catalogue of the Shield Reptiles he did not recognize Le Sueur's *pseudogeographica* as being distinct from the earlier described *geographica*.

In 1857 Louis Agassiz, in his Natural History of the United States, arranged both the species referred to under the genus *Graptemys*. Of his *Graptemys lesueurii* he says: "This species is commonly called *Emys pseudogeographica*, but the specific name *Le Sueurii* is older. It is evident from his reference that Gray at first applied the name of *Emys Le Sueurii* to this

species, and not to *Gr. geographica*; now Gray calls it also *Emys pseudogeographica*" Since that time Prof. E. D. Cope, in his Check List of 1875, employed the name used by Holbrook, but Mr. F. W. True, in Dr. Yarrow's Check List of 1882, adopted Agassiz's suggestion and called the species *Malacolemys lesueurii*.

Since now the name by which we are to know the species called by Le Sueur and Holbrook *pseudogeographica* depends on what Gray had before him when he described his *Emys lesueurii* it becomes necessary, if possible, to determine that matter. More certainly depends on that than on Gray's references to any previous writings.

Among other differences existing between the two species of *Malaclemys* referred to here, is one which enables us in all cases to distinguish them. This is found in the form of the yellow spot which lies on the side of the head just behind the eye. In *M. geographica* this spot is broad, rather triangular, and elongated in the direction of the head. In the other species the spot is a transverse streak, running behind the eye and sometimes curving forward below it. Now, in his description of *Emys lesueurii*, Gray has this language: "Temporibus macula triangulari notatis." At the end of his description he further says: "*Emys geographica* of Le Sueur agrees with the museum specimen, except in that the first vertebral plate is not urn-shaped, and Le Sueur does not notice the triangular temporal spot." In that remark we have evidence that Gray had before him but a single specimen and that that specimen had the "ear-mark" of *geographica*. We further learn why he described it as different from Le Sueur's species. That Gray was at this time aware of the existence of Le Sueur's manuscript name appears from the following words at the end of the description:

" β , Scutello vertebrali primo urceolato." *Emys geographica*. Lesueur, Jour. Acad. N. S. Phil. t. *Emys pseudogeographica*, Lesueur Mss. (Mus. Paris).

This is probably the reference that Agassiz alludes to, and it is hard to see why Gray introduces it here; but it no more proves that he had Le Sueur's *pseudogeographica* in mind than the other species. Indeed, he regarded them as both the same thing. Furthermore, in his Catalogue of the Shield Reptiles, he refers this β to *pseudogeographica*, while his *lesueurii* is referred to *geographica*. It is evident that he regarded what he placed under β as different from the species he was describing. I make the suggestion that the quotation marks were put in front of the β through an error of writing or printing. As to the characters assigned to *lesueurii*, I submit that they apply much better to *M. geographica* than to *pseudogeographica*.

The subsequent history of these two species, so far as Dr. Gray is concerned, is as follows: In the Catalogue of Tortoises, published in 1844, he regards both *pseudogeographica* and *lesueurii* as synonyms of *geographica*. He does not appear at this time to have seen Dr. Holbrook's work of 1842. In his description of the *geographica* of the Catalogue of Tortoises, Dr. Gray says of the head-spot only that it is "a yellow streak on the temple." In making this description he had before him two specimens, which according to his plan, he designates as *a* and *b*. Was either of these the one on which he had in 1831 based the species *lesueurii*? This is of some importance and will presently be considered.

By the time of the publication of the Catalogue of Shield Reptiles, in 1855, Dr. Gray had undergone another change of mind. He now recognized the existence of two entirely distinct species, and these he designates as *Emys geographica* and *E. pseudogeographica*. Of the latter species there were then in the British Museum seven specimens, five of which had certainly been received since 1844. The other two are distinctly stated to be the ones which had been recorded as *a* and *b* under *Emys geographica* in the work of 1844. Of *Emys geographica*, on the other hand, there was in 1855 only a single specimen in the Museum and that is expressly said to be the one which furnished the description of *E. lesueurii* in 1831. Even then Gray seemed to be a little doubtful about its being the same as Le Sueur's *geographica*, but his description of it removes all doubt. He contrasts it sharply with the specimens of *pseudogeographica*.

All these facts indicate that in 1844, when Gray wrote the Catalogue of Tortoises, the type of *E. lesueurii* was not in his hands. It had probably been misplaced and for the time being lost. The descriptions of that work had been drawn from two specimens of *pseudogeographica*. When the Catalogue of Shield Reptiles was written, the specimen had been recovered, and Gray was enabled to compare it with specimens of the other species and with Holbrook's descriptions and figures. It is spoken of as "animal dry from spirits," "the Museum specimen is in a bad state." Something concerning its history may be inferred from these remarks.

Dr. Boulenger, in his Catalogue of Chelonians, 1889, accepts the specific name *lesueurii*, instead of *pseudogeographica*. No mention is made of the specimen which served Dr. Gray as the type of *lesueurii*.

With the evidence before us, we must, it seems to me, accept the name *pseudogeographica* for the species under consideration. To reject it will be to ignore Gray's statements, repeatedly made, that his *lesueurii* is a syno-

nym of *geographica*, as well as the plain language of his descriptions. It may be a very objectionable name, but the laws of priority must be rigidly observed.

The masticatory surfaces of *M. geographica* are much broader than those of *M. pseudogeographica*, and we might infer therefrom that the food of the two species is not the same. In Volume XXII of the Bulletins of the Essex Institute, Prof. Harry Garman has made the observation that the broad surfaces of *M. geographica* are employed in crushing the shells of mollusks, the remains of which he found in their stomachs. In the stomachs of *M. pseudogeographica*, on the other hand, he found the remains of a species of sedge, as well some animal matter. During the month of May, 1891, at a meeting of the Indiana Academy of Sciences at Lake Maxinkuckee, in northern Indiana, three or four of us, within a few hours captured about thirty specimens of *M. geographica*. These specimens were almost invariably taken in the water near the shores of the lake where the bottom was covered with the shells, living and dead, of *Vivipara contectoides*. Seven of the terrapins were taken home and kept some days in a washtub partially filled with water. When they were taken out, there were found on the bottom of the tub large numbers of the opercula of that water snail. In the alimentary canal of one terrapin were found these opercula, as well as the remains of crayfishes, and what appeared to be the cases of some species of caddis-worm. The masticatory surfaces of the older specimens were found to be much worn. The crushing surfaces of Dr. Baur's recently described *M. oculifera* are rather narrow, while the cutting edges of the jaw are very sharp. The indications are that the food does not consist of mollusks, but rather of some soft vegetable and animal substances.

Most, if not all, the species of this genus are extremely variable in the size of the head. In the paper referred to above, Prof. Garman attempts to give us the characters that distinguish *geographica* from *pseudogeographica*, and among such differential characters is the size of the head relative to length of the carapace. *Geographica* is stated to have a large head; *pseudogeographica* a much smaller head. He also presents measurements that appear to prove his position. Dr. Holbrook long ago described a specimen of *geographica* under the name of *Emys megacephala*, the name being suggested by the massive head. Some years ago Dr. Gray suggested that the large head might be a sexual character, but he did not state which have the big heads, the males or females. Through the kindness of Dr. Stejneger, I have been permitted to examine all the specimens of both species that

are in the National Museum, and I have also examined a number of specimens of both the species in my own collection. I find that the size of the head is not a specific, but a sexual, character, and that it is the females which have the large heads. The heads of the males are much smaller and also more pointed. I believe that the same statements are true regarding the salt-water terrapin, *Malaclemys terrapin*, although I have not been able to examine a sufficient number of specimens to be certain about it. With regard to the other two species referred to I am quite certain that no appreciable differences will be found between them, when we compare specimens of the same size and sex.

Another interesting matter pertaining to most, if not all, the species of this genus is the size of the male as compared with that of the female. Le Conte is the only author who has, so far as I am aware, made the observation that the male of the salt-water terrapin is small. Of the seven specimens of *M. geographica* taken by myself at Lake Maxinkuckee, three had the carapace $3\frac{3}{4}$ inches long, while the other four had a length of carapace ranging from $6\frac{1}{4}$ to 9 inches. Dissections proved that all the small specimens were males and the large ones females. The same statements are true of such specimens of *M. pseudogeographica* as I have examined. All the specimens of *M. oculifera* Baur in the National Museum are, judging from the form of the shell, females; and they are all large specimens. Both Agassiz and Baur have observed that the males of *Trionyx spiniferus* are smaller than the females. On the other hand, the largest specimen of *Chelydra serpentina* that I have ever seen was a male, and I believe that the males of the various species of the genus *Chrysemys*, as defined by Boulenger, exceed the females in size.

It is quite characteristic of the species of the genus *Malaclemys* to have a prominent keel along the middle of the carapace, and this is often nodose. In *M. pseudogeographica* the keel is nodose all through life. However, all the species, so far as we know, have these elevations along the keel when young. In some of the young of the salt water terrapin I found that the nodosities were especially large and globular. They resembled greatly a row of medium-sized peas, four or five in number, lying along the back. The species *M. geographica*, having such a nodose keel while young, but losing it as age advances, must be regarded as attaining a higher stage of development than *pseudogeographica*, which retains this embryonic character throughout life. The young of *M. oculifera* will undoubtedly be found to have a distinct and nodose keel.

Agassiz (*loc. cit.* p. 260) discusses the various ways in which the different kinds of turtles get rid of the older layers of the epidermis. He mentions certain species of fresh-water turtles, among them *M. pseudogeographica* in which he observed in the spring the uppermost layer of the dermal plates to be cast off at once as one continuous, thin, mica-like scale all over the plate. In a number of very young specimens of *M. geographica* taken at Lake Maxinkuckee, the outer layer of the epidermis was lifted up from the underlying layers by a quantity of fluid. This was preparatory, no doubt, to the casting off of the epidermal layer.

THE GRYLLOIDE OF INDIANA. By W. S. BLATCHLEY, A. M., Terre Haute, Ind.

The *Gryllidæ* or crickets are, in the main, distinguished from other *Orthopterous* insects, by having the wing covers flat above and bent abruptly downward at the sides; the antennæ long, slender, and many jointed: the tarsi, or feet, three jointed, without pads between the claws; the ear situated on the tibia of the fore leg; and the abdomen bearing a pair of jointed cerci or stylets at the end.

The ovipositor of the female, when present, is long, usually spear-shaped, and consists, apparently, of two pieces. Each of these halves, however, when closely examined, is seen to be made up of two pieces so united as to form a groove on the inner side, so that when the two halves are fitted together, a tube is produced, down which the eggs pass to the repository in the earth or twig, fitted to receive them.

The inner wings are, for the most part, short, weak, and comparatively useless as flying organs, though, sometimes, they are nearly twice as long as the outer pair. Like their nearest relatives, the grasshoppers and katydids, crickets travel mostly by leaps and, in the course of time, their hind femora have thus become greatly enlarged.

The chirps or love calls of the different species of crickets make up the greater part of that ceaseless thrill which fills the air, usually at night, from mid-August until after frost. These sounds are made only by the males, and are not vocal, as most persons suppose; but are produced by rubbing the veins in the middle of one wing cover upon those of the other. The peculiar structure of this stridulating organ of the male, as well as the high