the minions of eggs which are, or were, annually collected for the sake of their oil. Bates *(The Naturalist on the River Amazon)* gives a most interesting account of these turtles, which are entirely frugivorous.

FamiIy 2. Chelydidae.—The neck, when bent, remains partly exposed. Shell covered with shields. Plastron composed of 9 plates, but covered with 13 shields. This family, still represented by nearly 30 species, with 8 genera, is found in South America and in Australia. *Chelys fimbriata,* the “ matamata ” in the rivers of Guiana and North Brazil; total length about 3 ft.; with animal diet. *Hydromedusa, e.g. tectifera,* with very long neck, in Brazil, much resembling *Chelodina, e.g. longicollis* of the Australian region.

Family 3. Carettochelydidae.—*Carettochelys insculpta,* the only species, in the Fly river of New Guinea; still imperfectly known. This peculiar turtle seems to stand in the same relation to the Chely- didae and to the Trionychidae as do the Chelonidae to the Testu- dinidae by the transformation of the limbs into paddles with only two claws, and the complete reduction of the horny shields upon the shell which is covered with soft skin. The plastron is composed of 9 plates; the 6 neural plates are all separated from one another by the costals. The premaxilla is single, as elsewhere only in

*Chelys* and in the Trionychidae. The neck is short and non-retractile. Length of shell about 18 in.

Suρer-famiIy 3. Trionychoidea.—The shell is very flat and much smaller than the body, and covered with soft leathery skin, but traces of horny structures are still represented, especially in the young of some species, by numerous scattered little spikes on the back of the shell and even on the soft parts of the back. The limbs are short, broadly webbed and only the three inner digits are provided with claws. Head and neck are retractile, bending in a sig- moid curve in a vertical plane. The jaws are concealed by soft lip-like flaps, and the nose forms a short soft proboscis. The temporal region is not covered in by any arches; the quadrate is trumpet- shaped as in the Chelydidae, but the jugular arch is complete. The pelvis is not anchylosed to the shell. The carapace is much reduced in size, the ribs extending beyond the costal plates, and there are no marginals; except in the African *Cyclanorbis* the neural plates form a continuous series. All the nine elements of the plastron are deficient and but very loosely connected with each other. Most of these reductions in the skeletal and tegumentary armature are the result of life in muddy waters, in the bottom of which these creatures bury themselves with only the head exposed. They feed upon aquatic animals; those which are partial to hard- shelled molluscs soon wear down the sharp horny edges of the jaws, and thick horny crushing pads are developed in their stead. They

only crawl upon land in order to lay their round brittle eggs. Trionyxes inhabit the rivers of Asia, Africa and North America. *Trionyx ferox,* the “ soft-shelled turtle,” in the whole of the Missis- sippi basin and in the chain of the great northern lakes. *T. triunguis* in Africa, the largest species, with a length of shell of 3 ft. *T*. *hurum* and *T. gangeticus* are the commonest Indian species. The young are ornamented with two or three pairs of large, round, ocellated spots on the back. (H. F. G.)

**TORTOISESHELL.** The tortoiseshell of commerce consists of the epidermic plates covering the bony carapace of the hawksbill turtle, *Chelonia imbricata,* the smallest of the sea turtles. The plates of the back or carapace, technically called the head, are 13 in number, 5 occupying the centre, flanked by 4 on each side. These overlap each other to the extent of one-third of their whole size, and hence they attain a large size, reaching in the largest to 8 in. by 13 in., and weighing as much as 9 oz. The carapace has also 24 marginal pieces, called hoofs or claws, forming a serrated edge round it; but these, with the plates of the plastron, or belly, are of inferior value. The plates of tortoiseshell consist of horny matter, but they are harder, more brittle, and less fibrous than ordinary horn. Their value depends on the rich mottled colours they display—a warm translucent yellow, dashed and spotted with rich brown tints—and on the high polish they take and retain. The finest tortoiseshell is obtained from the Eastern Archipelago, par- ticularly from the east coast of Celebes to New Guinea; but the creature is found and tortoiseshell obtained from all tropical coasts, large supplies coming from the West Indian Islands and Brazil.

Tortoiseshell is worked precisely as horn; but, owing to the high value of the material, care is taken to prevent any waste in its working. The plates, as separated by heat from the bony skeleton, are keeled, curved, and irregular in form. They are first flattened by heat and pressure, and superficial inequalities are rasped away. Being harder and more brittle than horn, tortoiseshell requires careful treatment in moulding it into any form, and as high heat tends to darken and obscure the material it is treated at as low a heat as practicable. For many purposes it is necessary to increase the thickness or to add to the superficial size of tortoiseshell, and this is readily done by careful cleaning and rasping of the surfaces to be united, softening the plates in boiling water or sometimes by dry heat, and then pressing them tightly together by means of heated pincers or a vice. The heat softens and liquefies a superficial film of the horny material, and that with the pressure effects a perfect union of the surfaces brought together. Heat and pressure are also employed to mould the substance into boxes and the numerous artificial forms into which it is made up.

Tortoiseshell has been a prized ornamental material from very early times. It was one of the highly esteemed treasures of the Far East brought to ancient Rome by way of Egypt, and it was eagerly sought by wealthy Romans as a veneer for their rich furniture. In modern times it is most characteristically used in the elaborate inlaying of cabinet-work known as buhl furniture, and in com­bination with silver for toilet articles. It is also employed as a veneer for small boxes and frames. It is cut into combs, moulded into snuff-boxes and other small boxes, formed into knife-handles, and worked up into many other similar minor articles. the plates from certain other tortoises, known commercially as turtle-shell, possess a certain industrial value, but they are either opaque or soft and leathery, and cannot be mistaken for tortoiseshell. A dose imitation of tortoise shell can be made by staining translucent horn or by varieties of celluloid.

**TORTOLÌ,** a town and episcopal see of Sardinia, on the east coast, 140 m. N.N.E. of Cagliari by rail (55 m. direct). Pop. (1901), 2105. It lies 60 ft. above sea-level to the south-west of a large lagoon, which renders it unhealthy. The harbour is 2½ m. to the east, and serves for the export of the wine and agricultural produce of the Ogliastra. A little to the south of Tortolì was the station of Sulci on the Roman coast road, known to us only from the itineraries.

**TORTONA** (anc. *Derlona),* a town and episcopal see of Pied- mont, Italy, in the province of Alessandria, from which it is 14 m. E. by rail, on the right bank of the Scrivia, at the northern foot of the Apennines, 394 ft. above sea-level. Pop. (1901), 11,308 (town); 17,419 (commune). Tortona is on the main line from Milan to Genoa; from it a main line runs to Alessandria, a branch to Castelnuovo Scrivia, and a steam tramway to Sale. Its fortifications were destroyed by the French after Marengo (1799); the ramparts are now turned into shady