

NATURAL HISTORY OF GENERAL ASIA VOL. X  
*The Reptiles of China*  
*Turtles, Crocodylians, Snakes, Lizards*

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CHAPTER III  
THE CHELONIANS

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INTRODUCTION

THE reptiles of this order, generally known as turtles, a term somewhat less restricted than the likewise widely used terrapin and tortoise, are perhaps too well known to require special definition. The name chelonian, though not as familiar as those just given, is, nevertheless, the least ambiguous and most definite non-technical one available.

Recent turtles represent much depleted end stages of long evolutionary lines dating from the Triassic. For this reason interrelationships of surviving species are often obscure and many opinions as to the best generic arrangement exist.

Since both Stejneger (1907) and Smith (1931) have given generic synonymies of Asiatic turtles, I have almost entirely omitted them below.

Lindholm (1929, p. 275) has compiled a very useful and well-documented list of the recent chelonians of the world, including genera and higher groups and giving generic types.

KEY FOR IDENTIFICATION OF CHINESE FAMILIES

- I. Limbs clawless; carapace with seven prominent, longitudinal ridges; size gigantic; marine..... *Dermochelidae*, p. 20
- II. Limbs with one or more claws; carapace without seven longitudinal ridges
  - A. Shell covered with horny shields
    1. Digits not distinct; limbs paddle-shaped with one or two claws; size large; marine..... *Cheloniidae*, p. 21
    2. Limbs not paddle-shaped; digits distinct; four or five claws present; not marine
      - a. Plastral shields separated from marginals by inframarginals..... *Platysternidae*, p. 25
      - b. Inframarginals lacking, plastral shields in contact with marginals..... *Testudinidae*, p. 27
  - B. Shell covered with soft skin..... *Trionychidae*, p. 56



## THE REPTILES OF CHINA

## CLASSIFICATION AND DESCRIPTION

## Class REPTILIA

## Order TESTUDINATA

## Family DERMOCHELIDÆ

This family includes but a single genus.

Genus *Dermochelys* Blainville

*Dermochelys* Blainville, 1816, Bull. Soc. Philom. Paris, p. 111 bis [=119] (type, *Testudo coriacea*).

The leatherback has frequently been recorded under the generic name *Sphargis* Merrem, 1820.

1. *Dermochelys coriacea* (Linnæus)

## Figure 1

*Testudo coriacea* Linnæus, 1766, Syst. Nat., ed. 12, I, p. 350.

*Dermochelys coriacea* Swinhoe, 1870, Proc. Zool. Soc. London, p. 409 (specimen taken at Amoy and released).

*Dermochelys schlegelii* Stejneger, 1907, Herp. Japan, p. 485 (full synonymy).

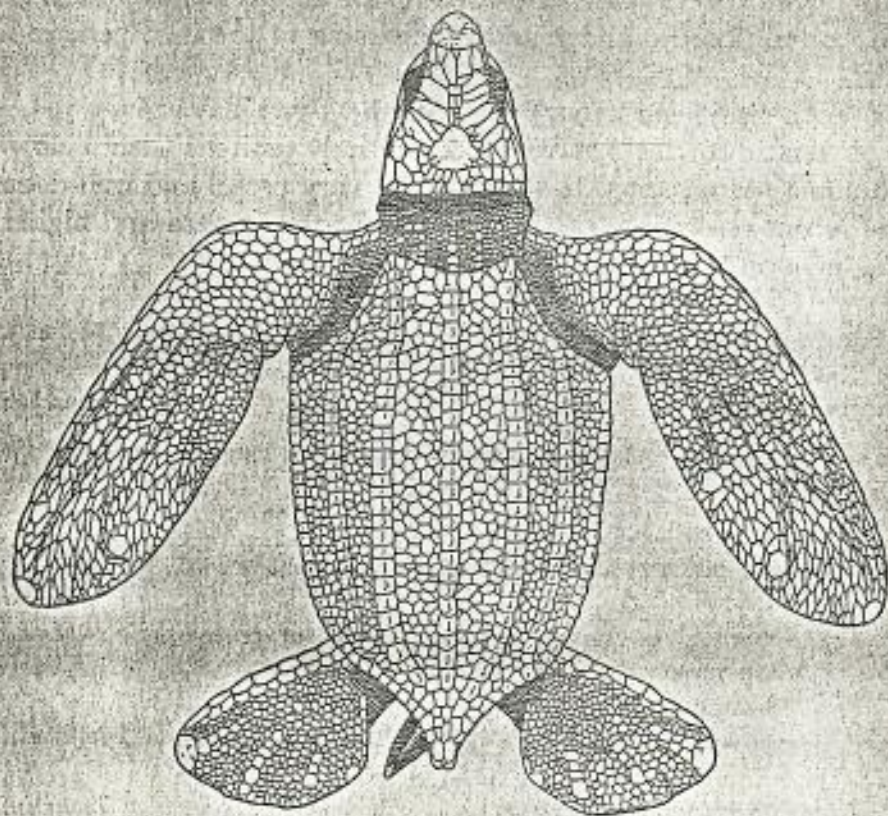


FIG. 1. *Dermochelys coriacea*. Nat. size. Dorsal view of juvenile. U.S.N.M. No. 19796. (From Stejneger.)



*Description*.—This giant among turtles is recognized at once by the absence of horny plates on its back which is covered instead with smooth skin and has seven prominent, longitudinal ridges. In the young, the body and limbs are covered with small, irregularly polygonal shields.

Deraniyagala (1930, p. 54) gives the following dimensions of a "normal female" taken off Ceylon:

Weight.....	301.63 kgms.
Length of carapace along curve of neural ridge.....	1475 mm.
Tip of snout to tip of tail.....	1875

Burne (1905, p. 291) describes in detail the muscular and visceral anatomy of a Japanese specimen.

*Distribution*.—Swinhoe's Amoy record is the only actual proof of the presence of *coriacea* on the coast of China that has come to my notice. Stejneger (1907, p. 487) has summarized early evidence of its occurrence on Japanese coasts.

Widely distributed in tropical seas.

*Habits and Habitat*.—Deraniyagala (1930, p. 48) has given the best account of this turtle and has described its breeding on Ceylon coasts. According to him it lays from 90 to 150 eggs that require probably 65 to 70 days to incubate. The eggs are buried deep, and the site of laying is hidden by the female's plowing up of the sand for about ten square meters all around. The newly-hatched turtles can swim and dive easily. Half-grown specimens are unknown.

*Remarks*.—Stejneger (1907, p. 485) used Garman's specific name, *schlegelii*, but presented no data to substantiate separation of the Pacific from the Atlantic turtles. Smith (1931, p. 59) considers the leatherbacks as representing a single species and in this opinion I concur.

#### Family CHELONIIDÆ

The chelonians of this family are entirely marine. They are generally known as sea turtles. Only three genera exist.

#### KEY FOR IDENTIFICATION OF GENERA

- I. Four pairs of costal shields, the first separated from nuchal by the anterior vertebral
  - A. Two pairs of prefrontals; dorsal shields strongly imbricate in early life, becoming juxtaposed with age..... *Eretmochelys*, p. 22
  - B. A single pair of prefrontals; dorsal shields juxtaposed..... *Chelonia*, p. 23
- II. Five or more pairs of costal shields, the first in contact with nuchal; two pairs of prefrontals; dorsal shields juxtaposed..... *Caretta*, p. 24



Genus *Eretmochelys* Fitzinger*Eretmochelys* Fitzinger, 1843, Syst. Rept., p. 30 (type, *Testudo imbricata*).

This genus, as here understood, is monotypic.

2. *Eretmochelys imbricata* (Linnæus)

## Figure 2

*Testudo imbricata* Linnæus, 1766, Syst. Nat., ed. 12, I, p. 350.*Eretmochelys squamosa* Stejneger, 1907, Herp. Japan, p. 511 (full synonymy).*Chelone imbricata* Mell, 1922, Archiv. Naturg., LXXXVIII, Abt. A, Heft 10, p. 109 (specimens, supposedly from the Hainan region, seen in Canton and Hongkong markets).*Eretmochelys imbricata* Herklots, 1931, Hong Kong Nat., II, p. 82, Pls. III-IV (photograph of specimen taken "off Haiphong . . . not far from . . . Hainan").

*Description*.—Dorsal shields imbricate, becoming juxtaposed with age; margin of carapace including 25 shields, more or less strongly serrated posteriorly; 4 pairs of costal shields; jaws hooked; 2 pairs of prefrontals. Carapace dark brown, marbled with yellow.

The tricarinate condition of the carapace in the young disappears with age.

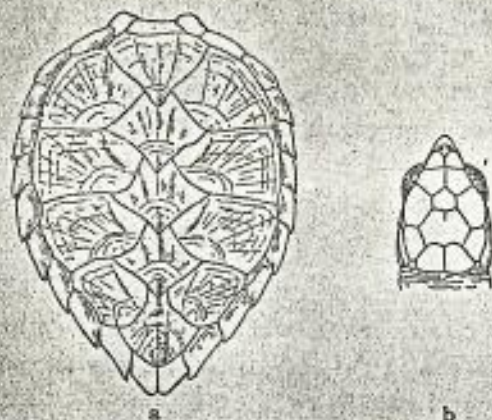


FIG. 2. *Eretmochelys imbricata*. a. Dorsal view of carapace,  $\times \frac{1}{4}$ . b. Dorsal view of head,  $\times \frac{1}{2}$ . (After Stejneger.)

*Distribution*.—This turtle has been recorded with certainty along the coast of China only in the region of Hainan. Stejneger (1907, p. 511) has summarized evidence of its presence in Japanese waters, stating that it is the basis of an important fishery in the Riu Kiu and that it occurs on the coasts of Japan proper. Horikawa (1930, p. 23) has recently recorded it from the Pescadores.

Widely distributed in tropical seas.

*Habits and Habitat*.—A recent account of the habits of this turtle has been given by Deraniyagala (1930, p. 72).

*Remarks*.—The hawksbill is the source of the tortoise-shell of commerce.

1, Yasuichi, Reptiles and amphibians in the island of Pescadore (Hoko-to) [Japanese text] pp 19-23 Trans. Nat. Hist. Soc. Formosa, xx



2 , Arthur. The collection of Chinese reptiles in the  
Shanghai Museum pp 21-31: Journ. N.-China  
Br. Roy. Asiat. Soc. (N.S.)  
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THE CHELONIANS

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Genus *Chelonia* Latreille

*Chelonia* Latreille, 1802, Hist. Nat. Rept., I, p. 22.—Fitzinger, 1843, Syst. Rept., p. 30 (type, *Testudo mydas*).

This genus, as here understood, is monotypic.

3. *Chelonia mydas* (Linnaeus)

Figure 3

*Testudo mydas* Linnaeus, 1758, Syst. Nat., Ed. 10, p. 197.

*Chelonia japonica* Stejneger, 1907, Herp. Japan, p. 509, figs. 393-395 (full synonymy).

*Chelone mydas* Stanley, 1914, Journ. N.-China Br. Roy. Asiat. Soc., (N.S.) XLV, p. 24 (China Seas).—Mell, 1922, Archiv. Naturg., LXXXVIII, Abt. A, Heft 10, p. 109 (Hongkong market).

*Description*.—Dorsal shields juxtaposed; margin of carapace including 25 shields not or but feebly serrated posteriorly; 4 pairs of costal shields; jaws not hooked; a single pair of prefrontals. Carapace brown or olive with yellow markings.

The carapace of the young is tricarinate but the lateral keels are very poorly developed.

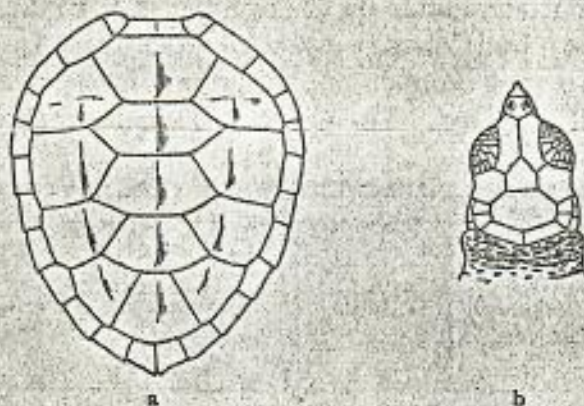


FIG. 3. *Chelonia mydas*. Nat. size. Hatchling. a. Dorsal view of carapace. b. Dorsal view of head. U.S.N.M. No. 7706 from the Bonin Islands. (After Stejneger.)

*Distribution*.—Stanley (1914, p. 24) has listed Chinese material representing this species, and Mell (1922, p. 109) has seen specimens in the Hongkong market but no really definite and concrete records are to be found. Herklots (1931, p. 82) states that it lays eggs on islands near Hongkong in July and August. The green turtle has long been known to occur in Japan and to breed on the Bonin Islands (Stejneger, 1907, p. 510).

*Habits and Habitat*.—Recent accounts of the habits of *Chelonia mydas* have been given by Deraniyagala (1930, p. 67) and Moorhouse (1933, p. 1), the former for the region of Ceylon, the latter for Heron Island, Queensland.

3 , Geoffrey A.C. *Kretzschalys nubiata* (Perman)  
pp 82-83 pls. III-IV: Hong Kong Nat II.



Genus *Caretta* Rafinesque

*Caretta* Rafinesque, 1814, Specchio Sci., Palermo, II, No. 9, p. 66 (type, *C. nasuta* = *Testudo caretta*).

This genus, as here understood, includes two species, the one treated below which is of wide distribution, and *kempii* of the Gulf of Mexico and the seas off the eastern coast of the United States.

4. *Caretta caretta olivacea* (Eschscholtz)

## Plate I

*Chelonia olivacea* Eschscholtz, 1829, Zool. Atlas, p. 2, Pl. III (type locality, Manila Bay).

*Caretta olivacea* Stejneger, 1907, Herp. Japan, p. 507, Pl. XXIV (full synonymy).—Sowerby, 1925, Journ. N.-China Br. Roy. Asiat. Soc., (N.S.) LVI, p. vii (Hwangpu above Shanghai); 1929, China Journ., XI, p. 45, Pl. (between the Four Sisters and Two Brothers Islands east of Chusan Island, about 29° N. Lat. by 123° E. Long.).

*Thalassochelys caretta* Stanley, 1914, Journ. N.-China Br. Roy. Asiat. Soc., (N.S.) XLV, p. 24 (China Seas).—Mell, 1922, Archiv. Naturg., LXXXVIII, Abt. A, Heft 10, p. 109 (markets of Canton and Hongkong).

**Description:**—Dorsal shields juxtaposed; margin of carapace including 23 to 27 shields, more or less serrated posteriorly; at least 5 pairs of costal shields; jaws strongly hooked; 2 pairs of prefrontals. Carapace brown.

There are few data available on the number of marginals in Pacific specimens (*caretta olivacea*), but Coker (1910, p. 61) found that, in Atlantic material (*caretta caretta*), an equal number of individuals have 12 and 13, while the nuchal is occasionally divided. The number of shields included in the margin

TABLE I. DORSAL SCUTES AND DIMENSIONS OF *CARETTA CARETTA OLIVACEA*

Authority	Locality and Shanghai Mus. No.	Costals	Marginals	Nuchal	Remark or Length of Carapace Along Curve
Sowerby.....	Fukien Coast No. 2579	Right 7 Left 6	Right 12 Left 12	Divided transversely?	880 mm.
Sowerby.....	Fukien Coast No. 2580	Right 5 Left 5	Right 11 Left 11	Single	1014 mm.
Sowerby.....	Hwangpu No. 2581	Right 5 Left 5	Right 11 Left 12	Single	1027 mm.
Smith.....			Nuchals + Marginals 27, rarely 25		A general statement for <i>olivacea</i>
Deraniyagala..	Ceylon		13, occasionally 14	Frequently divided	General statements

4, Robert E. Diversity in the scutes of *Chelonia*  
pp 1-75, 17 text figs. Pls 1-XIV  
Journ Morph XXI



of the carapace in *caretta caretta* may, therefore, be put down as 25 or 27, occasionally 26 or 28. These figures do not include abnormal and asymmetrical arrangements. Both Smith (1930, p. 71) and Deraniyagala (1930, p. 79) give the marginal counts of Pacific (*caretta olivacea*) specimens as somewhat higher than those included in data on three Chinese individuals in the Shanghai Museum of the Royal Asiatic Society kindly furnished me by Mr. Sowerby. Table I illustrates this point in detail.

The number of costals is very variable, but Pacific specimens have a definitely higher average count than those from the Atlantic (Coker, 1910, p. 62; Deraniyagala, 1930, p. 82; Babcock, 1930, p. 95) and I therefore consider Smith's (1930, l.c.) use of a trinomial justifiable.

The tricarinate condition of the carapace in the young disappears with age.

*Distribution*.—This turtle has long been known to breed on the southern coasts of Japan through the summer months as shown by Stejneger (1907, p. 508). Tomita (1929, p. 351) states that, in this region, *olivacea* lays from 10 to 14 dozen eggs requiring 6 to 8 weeks for incubation. More definitely, he gives 47 days as the usual period from laying to hatching. In spite of its abundance in Japanese waters, Sowerby's two records (Hwangpu; and between the Four Sisters and Two Brothers Islands situated east of Chusan Island) are the only really concrete ones for definite Chinese localities.

Widely distributed in tropical and semi-tropical Pacific waters.

*Habits and Habitat*.—The habits of this turtle have already been touched upon but it might be added here that the stomach of the Hwangpu example referred to above was full of crab remains (Sowerby, 1929, p. 45). Deraniyagala (1930, p. 81) gives additional notes on the feeding and other habits of the loggerhead.

#### Family PLATYSTERNIDÆ

This family includes but a single genus.

#### Genus *Platysternon* Gray

*Platysternon* Gray, 1831, Proc. Zool. Soc. London, p. 106 (type, *P. megacephalum*).

There is only one species in the genus *Platysternon*.

#### 5. *Platysternon megacephalum* Gray

##### Figure 4

*Platysternon megacephalum* Gray, 1831, Proc. Zool. Soc. London, p. 107 (type locality, China).

*Platysternum megacephalum* Mell, 1922, Archiv. Naturg., LXXXVIII, Abt. A, Heft 10, p. 108 (Lofaoshan, 400-500 meters; Tinghushan; near Hunan-Kiangsi boundary, 550-800 meters; and east of Shiuchow, 550-800 meters, four Kwangtung locality records).—Fang, 1930, Sinensia, Nanking, I, p. 96, figs. 1-2 (Sanfang, Kwangsi).—Fan, 1931, Bull. Dept. Biol. Col. Sci. Sun Yatsen Univ., No. 11, p. 142 (Lohsiang, Chihhsiu and Kuchen, Kwangsi).



*Description*.—This remarkable turtle is immediately recognized by its depressed form, long tail and large head. The latter cannot be drawn into the shell. Schmidt (1927, p. 401) records a Hainan specimen with a carapace 184 mm. long. Sixteen examples listed by him from Hainan had the following average dimensions:

Length of carapace.....	136 mm.
Width of carapace.....	101
Depth of shell.....	43
Length of plastron.....	107
Length of tail.....	146

Siebenrock (1907, p. 1742) has given a full account of the anatomy of this interesting turtle. He states that the cloaca is situated more posteriorly and that the tail is the thicker in the male (p. 1757).



FIG. 4. *Platysternon megacephalum*. Nat. size. a. Dorsal view of head. b. Lateral view of head. A.M.N.H. No. 30109 from Hainan.

*Distribution*.—In China, *megacephalum* has been frequently reported from Kwangtung, including Hainan, and Kwangsi. It is also known along the coast to the region of Foochow.

Distributed from southern Burma eastward through Siam and Indo-China to China.

*Habits and Habitat*.—*P. megacephalum* frequents mountain streams. Mell (1922, p. 108) reports it from 400 to 800 meters above sea-level in Kwangtung, while Boulenger (1893, p. 311) describes a specimen taken at 3000 feet in the Karin Hills, Burma. On Hainan, it was not found near Nodda but only in the mountains to the south (Schmidt, 1927, l.c.).

Smith (1931, p. 74) states that "it is a good climber, ascending trees and rocks in search of food and to bask in the sun." It is, however, nocturnal (Mell, 1929, p. 234).

In captivity, it has been described as eating meat, snails, worms, and fish (Fea, 1897, p. 449; Smith, 1931, l.c.; Siebenrock, 1907, p. 1757).

*P. megacephalum* lays but 2 eggs at a time (Mell, 1929, p. 192).



It has a fierce disposition and bites freely when annoyed, often holding the mouth open while on the defensive (Fea, 1897, l.c.; Siebenrock, 1907, p. 1758; Schmidt, 1927, l.c.; and Mell, 1929, p. 234, fig. 18). I observed in the field that specimens have a tendency to hold on while biting. They also hiss when disturbed and, if tapped on one side of the shell, raise the opposite side.

When walking, *megacephalum* advances at the rate of 25-27 feet per minute (Schmidt, 1927, l.c.).

*Material examined*:—I have seen the following specimens from China: 17 from Hainan, 5 from Amoy, and 1 from the Foochow region, in the American Museum; the type, and another example with no more definite locality than southern China, in the British Museum; and 1 from Lohsiang, in the Museum of Comparative Zoölogy.

*Remarks*:—*P. megacephalum* is eaten in Burma and China (Fea, 1897, l.c.; Mell, 1922, l.c.; and Fang, 1930, p. 100). The shell is used in making medicine (Fang, 1930, l.c.).

#### Family TESTUDINIDÆ

The term Testudinidæ as employed here includes the Emydidæ and Testudinidæ of the classification adopted by Smith (1931, p. 55). His Testudinidæ includes but a single Asiatic genus, namely, *Testudo*, and is equivalent to the term Testudininae as used below.

*Damonia? crassiceps* Gray, 1870, p. 43, based on a sketch by Reeves, has been tentatively placed in the synonymy of *Damonia subtrijuga* by Smith (1931, p. 105). The generic name *Damonia* is, however, no longer valid but must be replaced by *Malayemys* Lindholm, 1932 (p. 30).

#### KEY FOR IDENTIFICATION OF CHINESE GENERA

- I. Limbs more or less flattened; digits webbed; top of head covered anteriorly with undivided skin; costal plates not wedge-shaped with alternating broad and narrow ends
  - A. Hexagonal neural plates short-sided behind
    1. Plastron hinged; plastron connected with carapace by a ligament..... *Cyclemys*, p. 28
    2. Plastron not hinged; plastron directly united with carapace..... *Geoemyda*, p. 35
  - B. Hexagonal neural plates short-sided in front; plastron not hinged; plastron directly united with carapace
    1. Entoplastron intersected by gularohumeral suture
      - a. Alveolar surface of upper jaw without a longitudinal, median ridge



- (1) Top of head covered posteriorly with smooth undivided skin; alveolar surfaces of jaws narrow..... *Clemmys*, p. 37
- (2) Top of head covered posteriorly with small shields or granular skin; alveolar surfaces of jaws broad..... *Geoclemys*, p. 43
- b. Alveolar surface of upper jaw with a longitudinal, median ridge; top of head covered posteriorly with undivided skin; sides of head with numerous, narrow, longitudinal, yellow stripes..... *Ocadia*, p. 48
- a. Entoplastron not intersected by gularohumeral suture; entoplastron broader than long..... *Pseudocadia*, p. 50
- II. Limbs more or less cylindrical, the posterior pair club-shaped; digits not webbed; top of head covered anteriorly with shields; costal plates wedge-shaped with alternating broad and narrow ends..... *Testudo*, p. 54

No difficulty should be encountered in identifying Chinese turtles if the following facts are kept in mind:

1. As a rule chelonians change their shape and general appearance with age, and therefore individuals of an ontogenetic series must not be expected to resemble one another too closely.
2. With the exception of the hinged condition of the plastron and the relation of the plastron to the carapace, the value of the characters used in the foregoing key should not be affected by ontogenetic change. In juvenile specimens of *Cyclemys* the hinge of the plastron and the ligamentous connection of carapace and plastron are not readily detected.
3. The head pattern of turtles is characteristic of and remarkably constant in each species and should be frequently relied upon in identifications. The illustrations are especially valuable in this respect.

#### Genus *Cyclemys* Bell

This genus is made up of several species distributed from Assam, southern China, the Riu Kiu Islands and Formosa southward through the peninsula of southeastern Asia into the Malay Archipelago.

It is entirely possible that *Cyclemys amboinensis* (Daudin) occurs in China, but I have not included it below because one of the two Chinese records of it is old, the other somewhat indefinite. Both of these records possibly could have been based on imported specimens. The abundance of *amboinensis* in the Malay Archipelago and the southern part of the peninsula of southeastern Asia means that it might readily find its way to China by boat. The two records just referred to follow:

*Cistudo Amboinensis* Duméril and Duméril, 1851, Cat. Méthod. Rept. Mus. Paris, p. 7 (China).

Doctor Angel has kindly written me that the specimen on which this record was based still exists in the Paris Museum and that its identity is correct.



*Cyclemys flavomarginata* Mell, 1922, Archiv. Naturg., LXXXVIII, Abt. A, Heft 10, p. 108 (Tung Kiang region, Kwangtung) (not of Gray, 1863).

Doctor Mell has informed me that the specimens on which this record was founded were bought by him in the Canton market and subsequently lost. They were stated to be from the region cited above.

In *C. amboinensis* the carapace is not strongly tricarinate or flattened middorsally, nor is its posterior margin serrated. The plastron is rounded or feebly notched behind, the sole of the foot covered with numerous, small, flat scales and the temporal arch complete. The last two characters serve to distinguish it from *flavomarginata*, for in that species the sole of the foot has only six to eight large flat scales while the temporal arch is incomplete posteriorly.

KEY FOR IDENTIFICATION OF CHINESE SPECIES

- I. Carapace strongly tricarinate, flattened between the lateral keels, posterior margin serrated. . . . . *mouhotii*, p. 31
- II. Carapace not or only feebly tricarinate, not flattened middorsally, posterior margin not serrated
- A. Plastron rounded or feebly nicked posteriorly. . . . . *f. sinensis*, p. 29
- B. Plastron distinctly notched posteriorly
1. Top of head largely light yellow; plastron black with narrow, yellow margins. . . . . *trifasciata*, p. 32
2. Top of head dark olive, margined with yellow; plastron dull yellow save for a large reddish blotch in each shield. . . . . *yunnanensis*, p. 34

6. *Cyclemys flavomarginata sinensis* Hsü

Figure 5

*Cyclemys flavomarginata sinensis* Hsü, 1930, Contr. Biol. Lab. Sci. Soc. China, (Zool. Series) VI, p. 1, figs. 1-3 (type locality, Chunshan Id., Tungting Lake, Hunan).

*Description*.—The original description, apparently based on the type, together with measurements of the paratype, follow:

Snout short, not projecting, lateral profile vertical, straight. Edge of jaws not denticulated. Upper jaw rather strongly hooked. Mandibular symphysis equal to the length of eye slit. Body not at all depressed, its depth being less than one half its width. Carapace wider behind the middle, slightly emarginate in front. Shields with rather small areoles and wide margins with numerous deeply cut concentric lines. Vertebral keel more prominent in the center of each shield and sharply interrupted on the junction of the third and fourth vertebrae. A small longitudinal keel-like structure in the center of each costal areole. Nuchal rather large, broader behind than in front, longer than broad, with horizontally cut parallel lines covering its posterior two thirds. With exception of the fifth, all vertebrae emarginate behind, such character more pronounced in the case of the fourth. First vertebral narrowest, breadth about equal to length. Second vertebral longest, longer than broad. All the follow-