

SOME QUATERNARY GASTROPODS FROM EASTERN
SZECHWAN*

By

TENG-CHIEN YEN** (閻敦建)

The molluscan fauna of Szechwan Province had been worked out by several distinguished authorities during the past few decades. In recent years, Dr. Haas of Senckenberg Museum reported on some collections made in Kwantung, Szechwan, and Hupei Provinces by Dr. K. Krejci-Graf of Sun-yat-sen University, Canton, and Dr. Pilsbry also published a paper on some collection made in western Szechwan by the Dolan West China Expedition of 1931.

The present collection consisting of a small number of land gastropods was obtained from one locality near the hot spring of Pa-hsien (巴縣), eastern Szechwan. These specimens appear to be in subfossil state. Through the courtesy of Dr. C. C. Young and Père Teilhard de Chardin, of the National Geological Survey, the author was able to undertake the study of these gastropods which are mostly forms already known and represented in living state either in the same province or in adjacent regions. Sincere thanks are due to Drs. Young and Teilhard for putting the material at the author's disposal.

Family ZONITIDÆ

Xestina chrysoraphe krejci Haas 1933

Pl. I, Figs. 1, 1a, b, c.

1933 *Xestina chrysoraphe krejci*, Haas, Senckenbergiana, Band 15, Nr. 5/6. p. 319, abb. 8.

Shell orbicularly depressed in outline, rather large in size, subconically spired, and reducedly convex below. The apical part injured,

* Received for publication in April 1936.

** Work carried on by the aid of a grant from the research fund of the National Research Institute of Geology, Academia Sinica, Nanking, China.

with the last three whorls preserved. The exposed surface of the preserved whorls is rather flatly convex, embracing to the ambital region, and last one increasing rapidly in width. The first half of the first preserved whorl, probably the third whorl of the entirely well preserved shell, bears strong growth lines become very distinct and pronounced, and appear to be in spiral series, but on the basal surface of the last whorl, these granulose marks are not observed, and only some prominent growth-lines are visible. The body-whorl is obtusely angulated at the ambital region, and the angulation is rather obsolete near the aperture. Suture well incised and marked by the ambital angulation of the whorls of the spire, which is partly exposed on the larger whorls. The aperture is obliquely transversal ovate in outline, the outer lip appears to be thin and simple at its superior margin, and the inner lip is also very thin. The columella is short and slightly reflected, and the umbilicus is small but well exposed, and about $1/15$ the diameter of the shell.

Measurements of the single specimen:

Altitude of Shell.....	19.0 mm
Width of Shell.....	33.0 mm
Height of Aperture (oblique).....	14.0 mm
Width of Aperture.....	18.6 mm
Diameter of Umbilicus.....	2.5 mm
Locality: Pahsien (near the hot spring), Eastern Szechwan.	

The single specimen here recorded agrees well with Dr. Haas' subspecies, a living form described from the western Szechwan. Our specimen is not good in preservation, the apical part being especially injured. The granulose sculpture is, however, distinct, and the last three whorls are well preserved.

Macrochlamys sp.

The shell is poorly preserved as only the body whorl has been preserved. It is impossible to identify it satisfactorily with any species of this genus. The preserved body whorl shows that the shell is rather thin in substance, delicate, and small in size. The body whorl is somewhat convex and inflated below. The umbilicus is very small but exposed,

and the columellar margin is not preserved. The diameter of the shell is about 5.3 mm., the height of the body whorl is 2.8 mm., and the diameter of umbilicus is about 0.5 mm.

Locality: same as the preceding species.

Family CEPOLIDÆ

Aegista accrescens (Heude (1882)

Pl. I, Figs. 2, 2a, 2b.

1882 *Helix accrescens*, Heude, Mem. Conc. Hist. Nat. Emp. Chinois, p. 31, pl. XV, fig. 2.

1884 *Helix (Aegista) accrescens*, Möllendorff, Jahr. Deut. Malak. Gesel., Vol. XI, p. 355.

Shell orbicularly discoidal, rather thin, widely umbilicated, the umbilicus is $\frac{2}{5}$ the diameter of the shell. Spire depressed, body-whorl narrowly inflated. The whorls are 6 and $\frac{1}{2}$ in number, embracing to the ambital region, increasing rather gradually in width, and somewhat descending at the aperture. The exposed surfaces are scarcely convex, obtusely angular at the ambital region. The suture is well incised and somewhat canaliculate.

Measurements of the single specimen:

Altitude of Shell.....6.5 mm

Width of Shell.....14.0 mm

Diameter of Umbilicus.....5.5 mm

Locality: same as the preceding species.

The single specimen is not well preserved, part of the whorls or the spire being injured. The general characters are, however, identical with the species. The measurements of the present specimen are nearly the same as that given by Heude, except that the spire is in average slightly lower, and the umbilicus somewhat wider than that of the typical form of Heude. Moreover, the size of the present form is just one half that of "*Helix*" *vermis* Reeve, a form described from the Yangtze-Valley, e. g. Wuchang.

Cathaica constaniae vestita Pilsbry 1934

Pl. I, Figs. 3, 3a, b, c.

1934 *Cathaica constaniae vestita*, Pilsbry, Proc. Acad. Nat. Sc. Philadelphia, Vol. LXXXVI, p. 15, pl. 3, figs. 5-7.

Shell moderately sized, widely umbilicated, the umbilicus is about $1/4$ the diameter of the shell. The spire is rather low but elevated, and the body-whorl is angulated at the ambital region, and very convex at the base. The whorls are 4 and $3/4$ in number, and the first 2 from the protoconch. The protoconchial whorls are rather roundly convex, gradually increasing in size, and clearly marked off from the conch by an elevated, lip-like growth line. The exposed surface is in rather worn condition, and the granulose appearance near the end part of the stage is obscure. The conchial whorls are less convex, more rapidly increasing in width, and abruptly marking with growth lines on the exposed surfaces. The growth lines gradually become coarser and granulose on the final part of the penult and the whole body-whorl. Suture well marked, and impressed by convex whorl-surfaces. The aperture is subovate in outline, slightly descending. The outer lip is thin and simple, inner lip attenuated, and the columella is rather straight, short probably due to injury.

Measurements of the single specimen:

Altitude of Shell.....	11.2 mm
Width of Shell.....	19.0 mm
Height of Aperture.....	9.4 mm
Width of Aperture.....	9.0 mm
Diameter of Umbilicus.....	4.2 mm

Locality: same as the preceding species.

This subspecies was originally described from the locality somewhat further westward from the present site. This specimen agrees well in general contour of the shell as well as its characteristic sculpture on the exposed surface, except that there is one volution less in the present form while the spire is higher and the umbilicus wider.

This specimen appears to be slightly injured at its apertural region, as its peristome shows no tendency of expansion, and its columellar margin is non-reflected.

Coccoglypta pinchoniana (Heude 1886)

1886 *Helix pinchoniana*, Heude, Journ. de Conchyl., Vol. LXI, p. 213.

1890 *Helix pinchoniana*, Heude, Mem. Conc. Hist. Nat. Emp. Chinois, p. 135, pl. XXXV, fig. 33, 33a.

Shell in the present collection is not in good condition, only its spire preserved, while the body-whorl is entirely broken off. The whorls of the spire are, however, well preserved, 5 in number, and the first 1 and 1/2 probably constitute the protoconch. The exposed surfaces of the first 1 and 1/2 whorls are very convex, appearing to be rather smooth, and those of the subsequent whorls are scarcely convex, bearing costulate growth lines and spiral striæ on early whorls, and these lines are in granulose condition and the spiral striæ also more distinct beginning from the final third of the fourth whorl. The granulose appearance is less prominent on the base of the present specimen or the usually embraced surface of the penult whorl of a perfect shell. The whorls are normally embracing to the ambitus, and angulated at the ambital region. The umbilicus is rather wide although the opening of the present specimen is filled up by sand particles.

Measurements of the single specimen in mm:

Altitude of Shell.....	16.0
Width of Shell.....	26.0
Height of Aperture.....	11.0
Width of Aperture.....	11.5
Diameter of Umbilicus.....	8.0

Locality: same as the preceding species.

The above mentioned measurements are proportionally smaller than those given by Heude for the species, as these are made on an imperfect specimen with its body-whorl injured. I have compared our shell very carefully with the typical form of this species, and find that they are essentially identical.

This species was originally described by Heude from "Tchen-tou-fou" which is not far from the site of our specimen.

Family VALLONIDÆ

Vallonia pulchellula (Heude 1882)

- 1882 *Helix pulchellula*, Heude, Mem. Conc. Hist. Nat. Emp. Chinois, p. 20, pl. XIII, fig. 17.
- 1882 *Helix (Vallonia) pulchellula*, Hilber, Sitzb. der kais. akad. der Wissensch., p. 346, Taf. III, figs. 11, 12.
- 1898 *Helix (Vallonia) pulchellula*, Hilber in Wissensch. Ergeb. der Reise Grafen Bela Szechenyi in Ostasien 1877-1880, Band II, p. 600. Taf. II, figs. 15, 16.

The shell is minutely sized, somewhat orbicularly depressed. The whorls are 3 in number, increasing in width gradually at first, and rapidly in the last two whorls. The apex is large and prominent. The exposed surface of the whorls bears distinct growth lines, and these lines are finely costulated on the body whorl. The aperture is subcircular in outline, somewhat descending at the aperture, and the umbilicus is widely exposed, attaining about 1/3 the diameter of the shell.

Measurements of the single specimen in mm.

Altitude of Shell.....	1.4
Width of Shell.....	3.0
Height of Aperture.....	0.7
Width of Aperture.....	0.7
Diameter of Umbilicus.....	1.0

Locality: same as the preceding species.

This species was originally described from Shanghai and "Ning-kuo-fou" of Anhwei Province by Heude and his contemporaries (Hilber, Moellendorff, etc.) recorded it from Szechwan and Kansu Provinces. It seems to be rather widely distributed along the Yangtze Valley as I have had it from various places of this region.

Family ENIDÆ

Ena fuchsiana (Heude 1882)

1882 *Buliminus fuchsiana*, Heude, Mem. Conc. Hist. Nat. Emp. Chineis, p. 53, pl. XX, fig. 21.

1884 *Buliminus fuchsiana*, Moellendorff, Jahr. Deut. Malak. Gesel. Vol. XI, p. 172.

The shell is turreted and oblong in outline, with rather attenuated at apical part. The whorls are 7 in number, the early ones are very convex, the latter ones less convex, increasing in width rather gradually in the first three, and very rapidly in the last four. The exposed surfaces bear distinct lines of growth. Suture is well impressed by the convex whorl-surfaces. The aperture is rather elongated in outline, somewhat oblique and descending. The outer lip is thin and reflected, with its upper part inclined, the inner lip is very attenuated, and the columella is short, slightly oblique and very reflected.

Measurements of the single specimen in mm.

Altitude of Shell.....	17.0
Width of Shell.....	6.3
Height of Aperture.....	5.5
Width of Aperture.....	4.5

Locality: same as the preceding species.

The single specimen here recorded agrees well with the figures of the species given in Heude's work, but Heude's specimens show a great deal of variation and some of them even rather swollen in the middle part of the shell.

This species was originally recorded by Gredler (Jahr. Deut. Malak. Gesel., VIII, 1881, p. 20.) as *Buliminus rufistrigatus* Benson, and being separated as a distinct species with description and illustration by Heude. The original locality is in "Hou-nan" (Hunan), and it is said to be rather common in that province.

Ena cf. *clausiliaformis* (Møllendorff 1902)

A single specimen with the upper part of its shell preserved. This preserved part shows its close resemblance to this species, as its early whorls are rather convex, gradually increasing in width, and become very gradually inflated. The apical part is not preserved but is probably rather papillary.

Ena sp.

Only the last 3 and 1/2 whorls are preserved in this case, and it is impossible to identify it satisfactorily. Its whorl-surface is rather flatly convex with distinct oblique growth lines present on it. On the last whorl, which is probably the actual penult whorl, there is an angulation on the ambital region.

Family CYCLOPHORIDÆ

Cyclophorus punctatus (Grat. 1841)

- 1847 *Cyclophorus punctatus*, Pfeiffer, Zeit. für Malak. p. 107.
1852 *Cyclophorus punctatus*, Reeve, Conch. Icon. Cyclophorus, pl. XII, fig. 51.
1881 *Cyclophorus punctatus*, Gredler, Jahr. Deut. Malak. Gesel., Vol. VII, p. 129.
1882 *Cyclophorus punctatus*, Møllendorff, Ibidem, Vol. VIII, p. 268.
1933 *Cyclophorus punctatus*, Haas, Senckenbergiana, Band 15, Nr. 5/6, pages 318, 320, 321.

Two imperfect specimens are included in this collection, one with the whorls of the spire preserved, and another with 2/3 of the body whorl preserved. The two fragments give features identical with the species, except that the spire is somewhat higher. The characters like the marked angulation at the ambitus, the characteristic way of banding present above and below the ambital angulation, and its rather narrow umbilicus are all well shown on these fragments.

These specimens are evidently very close to *Cyclophorus fargesianus* Heude (l. c. p. 89, pl. XXII, fig. 2, 1885), a form described from

Tchen-keou of Szechwan, but the specific distinction of Heude's species needs further consideration.

This species was originally described from South China in a living state, and recently Haas recorded it from several localities in western Szechwan as well as from Ichang in Hupei, and the present site where these fragments were obtained is just about mid-way between the two.

Cyclophorus youngi Yen (sp. nov.)

Pl. I, Figs. 4, 4a, b.

Shell trochoid in outline, rather high-spined, and widely umbilicated. The umbilicus is nearly $1/5$ the diameter of the shell. Only the last three whorls preserved, early ones injured (probably 2 or 3 in number). The external surface is not well retained except some fragmentary parts near the sutural region, which show the surface bearing well developed strong growth lines, yellowish brown in coloration. The preserved whorls are roundly convex, rapidly increasing in size, especially the body whorl. The first fourth of the last whorl is very obtusely angulated at the ambital region, and the last three-fourth roundly convex. The aperture is descending, and subcircular in outline. The peristome is continuous, appearing to be thickened and reflected.

Measurements of the Holotype in mm.

Altitude of Shell	24.0
Width of Shell	29.0
Height of Aperture	15.6
Width of Aperture	15.2
Diameter of Umbilicus	6.0

Locality: Pahsien (near the hot spring), Szechwan.

This species is closely related to the preceding one and also to *Cyclophorus exaltatus* (Pfeiffer, Proc. Zool. Soc., London, p. 300, 1854), another form described from South China. It differs however from both

of them, by its more elevated spire, and much wider umbilicus and rather roundly convex ambital region of the body whorl, as shown distinctly on the preserved part of the shell.

Whether or not this species will be found in living state, is a matter for further observation, as the molluskan fauna of the present locality and its vicinal regions are not yet thoroughly explored.

I take pleasure in naming this species after Dr. C. C. Young of the National Geological Survey of China, for his courtesy in submitting his collection of these upper Pleistocene gastropods to me for study.

SUMMARY

In summarizing the foregoing pages, the following points may be noted as of particular interest:

1. All the species comprised in this small collection are terrestrial forms, and they appear to be identical with the recent gastropods of the province.

2. These forms, except *Cyclophorus youngi*, a new species here described, are all represented in living state, and were originally described either from the same province or from its neighbouring districts.

3. Some of the species are rather widely distributed in east, central and south China.

4. The geological age of these gastropods, judging from its close resemblance to the recent forms, seems not to be earlier than the Middle Quaternary or the Pleistocene Epoch, or it may even belong to the base of the Upper Quaternary. Any further suggestion in regard to this question can only be made by examining additional collections around the locality where this collection was made.

**Explanation of
Plate I**

PLATE I

- Fig. 1-1b. *Xestina chrysoraphe krejci* Haas, Natural Size.
Fig. 1c. The Epidermal Sculpture of the Same Species $\times 9$.
Fig. 2-2b. *Aegista accrescens* (Heude), $\times 2$.
Fig. 3-3b. *Cathaica constaniae vestita* Pilsbry, Natural Size.
Fig. 3c. The Epidermal Asperities of the Same Species $\times 9$.
Fig. 4-4b. *Cyclophorus youngi* Yen (sp. nov.), Holotype, Natural Size.

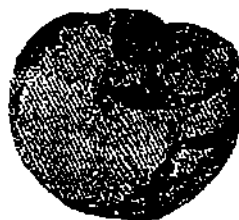
Yen:—Some Quaternary Gastropods from Eastern Szechwan Plate I



1



1a



1b



2



2a



2b



3



3a



3b



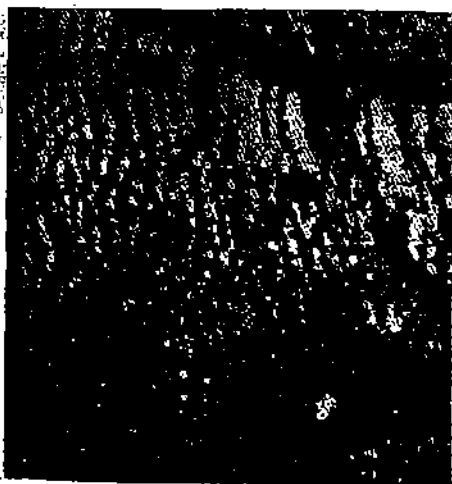
4



4a



4b



1c



3c