

古生物誌乙種第六號

秉志著

第五冊

中國北方之田螺化石

中華民國十八年十一月

(學術研究與國立中央研究院合作)

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Fossil Terrestrial Gastropods From North China

BY

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Plates II and 14 Text-Figures



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On The Fossil Terrestrial Gastropods of Chingshing and Chou Kou Tien, Hopei Province.

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INTRODUCTION

The fossil gastropods on which the following descriptions are based were collected from two localities in North China. Six species were collected by Mr. C. C. Wang from Shueh Hua Shan, Chingshing district, and nine species by Mr. W. C. Pei from Chou Kou Tien, 40 li south of Peking. The former were embedded in the Hipparion red clay of the early Pliocene period, (Pontian while the latter were found in the Polycene formation. These shells seem to bear a great deal of resemblance to recent forms. Searching in the literature on fossil Pulmonata of Asia, I have found that very little has been done in the past, and none of the forms that have been described from Asia agree with any of the species in these collections. Literature on recent forms has also been consulted in order to make comparisons. It is found however that eleven out of thirteen species in the present collections cannot be placed with either the Asiatic forms on record or those described from Europe, America or elsewhere of universal distribution, therefore each of these species in question is considered to be new.

The descriptions of all species are made as fully as possible in order to bring out every detailed structure in contrast with those of the most closely allied species on record. It is to be regretted that some points have to be omitted, for some of the specimens, after they were taken out from the clay, proved to be quite imperfect.

The measurements on the lengths or heights, and widths, are made with a fine graded caliber directly from the specimens, except in one species of which there were only two specimens, one was in poor preservation and another was damaged after

having been studied. This difficulty was overcome by taking the measurements from the enlarged photograph and reducing them to the original scale. In like manner the measurements of both the apical and side angles for most of the species are obtained from the enlarged photographs of the specimens, for it has been found very difficult to measure directly from the specimens even under the microscope, owing to their fragile conditions.

Recently a large number of fossil vertebrate skeletons have been found in the clay of Chou Kou Tien and a few reports have been published on them, so the geological age of that locality has become known, these deposits belonging to the Polycene period. But the age of the red clay of Shueh Hua Shan of Chingshing district, which contains only these gastropod shells, is less certain; it is only supposed to belong to the Hipparion formation of Lower Pliocene, (Pontian,) age. Until specimens of vertebrate forms are obtained from this stratum, and until more records of fossil forms from it are available, nothing can be done toward the precise determination of the age of the formation. It is interesting, however, to note the occurrence of those forms, whose genera could be identified with recent gastropods but, with only one exception, not with their species. The study of these forms may serve as a preliminary step for further survey of the fossil fauna of the latter locality.

The geological features of Chou Kou Tien¹ are given in Mr. C. Li's paper in the Bulletin of the Geological Society of China, Volume VI, nos. 3-4, 1927, while those of Chingshing will be found in Mr. C. C. Wang's report which is soon to be published by the Geological Survey of China. Those who desire to study the geology of these localities in connection with these species described in this paper, are referred to these reports.¹

My thanks are due to Dr. A. W. Grabau for guidance and criticisms, to my friend Dr. V. K. Ting for rendering me help in various ways, to Dr. W. H. Wong for granting me the facilities of the Geological Survey, to Mr. Sohtsu King for his courtesy in letting me use his conchological literature, to Mr. K. H. Hsu for taking photographs and to Mr. C. J. Shen for making drawings.

1. Teilhard de Chardin and C. C. Young: Preliminary Report on the Chou Kou Tien Fossiliferous Deposits, Bull. Geol. Soc. China. Vol. VIII, No. 3, 1929.

DESCRIPTION OF SPECIES

I TERRESTRIAL GASTROPODA OF CHINGSHING.

Genus **HELIX** Linnaeus**Helix pyrrhozona** Philippi 1845.

Text-Fig. 1a-1d. Pl. I, fig. 1a-1d.

1845. *Helix pyrrhozona* Philippi. Abbildungen und Beschreibungen neuer oder wenig bekannter Conchylien Pl. VI, fig. 4.

1882. *Helix pyrrhozona* Heude. L'Hist. Naturelle de l'Empire Chinois, Vol. I, p. 43; Pl. XVI, figs. 7,8.

Shell of moderate size, spire more or less elevated with whorls embracing to the ambitus, ambital region of last whorl near the aperture showing tendency of having an edge, which feature, however, shows a great deal of variation in the series of specimens both fossil and recent. Apex not prominent, out of five whorls, first four small, last one much larger, all whorls more or less rounded, whole shell not very discoidal in outline, particularly in the case of the young stage. No demarcation between the apex and first whorl, structures of apex and all the whorls very consistent. Width of exposed part of the first whorl about $\frac{2}{3}$ that of the second, such ratio existing as far as the fourth whorl, but that of the fourth to that of the fifth being about 1:2. Apex and in most cases also the first whorl smooth. Usually beginning with the second whorl there are visible, very fine and faint striæ, these striæ becoming more pronounced as the whorl increases in size. In many cases the striæ are more strongly developed, becoming distinct riblets, with a comparatively wide space between each two of them. This is probably due to the dying out

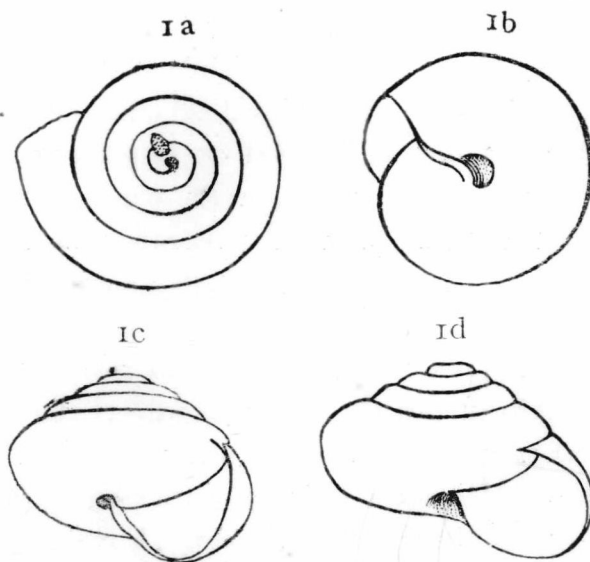


Fig. 1a-1d. *Helix pyrrhozona* Philippi. Enlarged $\times 5$. Cat. No. 2160.

of the less developed striæ between each two stronger ones. Such condition as the alternation of arrangement of the stronger and weaker striæ is found in most of the recent forms of this species. Opposite to the aperture the ambital region of the whorl is comparatively prominent, the exposed parts of the first four whorls are all more or less convex and the sutures between the whorls are very conspicuous. Aperture oval, outer lip well developed and comparatively thick around the aperture. Columella not erect. Umbilicus not large, but deep and fairly open, conspicuous.

Diameter 15 mm.; altitude 9 mm.

Diameter 7.5 mm.; altitude 4 mm.

Apical angle 143° .; side angle 19° .

Heude recorded this species in his *L'Histoire Naturelle de L'Empire Chinois*. The fossil specimens obtained from the Hipparion red clay of Chingshing and from the Polycene stratum of Chou Kou Tien, Hopei Province agree with his description in most of the detail features. Heude had specimens collected from the south of the Yangtse River. This species in recent form is common in both central and north China. Most of the fossil specimens from Chingshing I have in hand are of younger stages, their size and number of whorls are smaller, but among them I have some of fully grown size but of imperfect preservation. Those from Chou Kou Tien, however are in better condition, and among these I could find a few fully grown ones well preserved. On examining all these specimens, a great many variations are found in the same species, but allowance should be made for their developmental stages. The principal differences between the present specimens and the one Heude described and figured, are that in certain cases the spire of the latter is more elevated, and the ambital region of the last whorl is more rounded than in our shell. But on examining a series of specimens, we see that there is a range of variations for this species, which covers all the features which Heude had described from his specimens of the recent form from the Yangtse Valley region.

This species in certain ways resembles Connolly's (1925) *Halolimnohelix iredalei* which was described from Africa. In the latter, however, the sculpture on the whorls, except the first half whorl, consists of strong, rather irregular, coarse, curved oblique transverse growth wrinkles, while in the Chinese species the striæ, in most of the specimens, are fine, and quite regularly and closely arranged, making the surface of the whorl comparatively smooth. In the case of those of the same species with strong and better developed striæ, the arrangement of the latter is very regular and fairly straight.

HORIZON AND LOCALITY: From the Hipparion? red clay of Shueh Hua Shan Chingshing, Hopei Province. Coll. Mr. C. C. Wang. Cat. Geol. Sur. China No 2160.

Helix hipparionum Ping (sp. nov.)

Text-Fig. 2a-2b. Pl. I. fig. 2a-2b.

Size very small, planorboid, apex inconspicuous, flattened, only three whorls in a single specimen. First whorl with its first half portion very narrow, and second half with a great deal of increase in width, then each outer whorl about $1\frac{1}{2}$ times the inner whorl in width, but the width of last whorl near the region of the aperture more than twice that of its inner one. Surface of each whorl perfectly smooth, without, distinct striæ. Sutures between the first two whorls distinct, but narrow and shallow, and that between the second and the third whorls much more pronounced in width and depth. Exposed surface of each whorl slightly convex, and very slightly sloping down toward the suture which bounds its ambitus. Lateral surface of the last whorl rounded, smooth, without the slightest sign of any ridge. The aperture is not perfect in this specimen. Judging from what can be observed from this specimen it may be said to be of more or less pyriform outline. Both the aperture and the umbilicus are filled with red clay which can not be removed without injuring the specimen. The umbilicus is

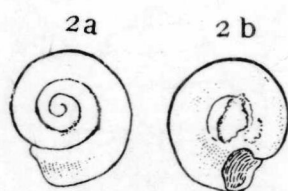


Fig. 2a-2b. *Helix hipparionum* sp. nov. Enlarged $\times 10$. Cat. No. 2162.

large and widely open. As the aperture is not in perfect preservation, the structure of the outer lip can not be determined. Owing to its depressed form, there is hardly any columella.

In lateral aspect, the shell shows a very slight degree of elevation dorsally, and the concavity on its ventral side is also shown, which is largely due to the wide, open umbilicus.

Diameter 1.7 mm.; altitude 0.5-0.6 mm.

Only one specimen was found in the red clay brought to the Palæontological Laboratory of the Geological Survey from Chingshing. Owing to its minute size and imperfect preservation, neither the apical nor the side angles are measured. The characters of this form do not agree with those of any on record, while its imperfect state does not affect the study of its main features.

HORIZON AND LOCALITY: From the Hipparion red clay of Shueh Hua Shan, Chingshing, Hopei Province. Coll. Mr. C. C. Wang. Cat. Geol. Surv. China. 2162.

Genus **PUPA** Lamarck

Pupa grabaui Ping (sp. nov.)

Text-Fig. 3a-3c. Pl. I, fig. 3.

Shell small, ovate, whorls sinistral, 6 altogether, apex blunt or rounded, depressed, hardly visible laterally. Whorls increasing in width until the middle of the shell and then decreasing toward the base; surface of the whorls smooth. Suture between the protoconch (first and second whorl) and the next whorl comparatively pronounced owing to the sudden increase in width, and more so between the fifth and sixth whorls, while those between the whorls in the middle region of the shell are rather shallow, particularly in the case of the one between the fourth and fifth whorls. Extremely fine oblique striae are present on the whorls, except on the first two. Surface of each whorl convex; aperture lunato-ovate, peristome expanding, slightly reflected; umbilicus semilunar in outline, fairly deep.

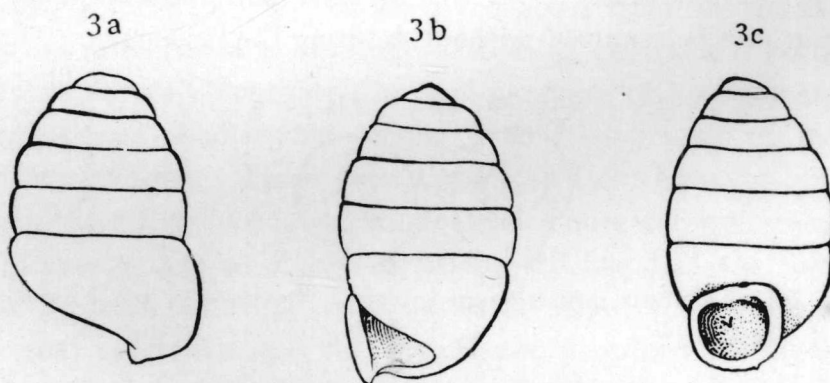


Fig. 3a-3c Pupa grabaui sp. nov. Enlarged $\times 10$. Cat. No. 2163.

Length 4.7 mm.; greatest width 2.86 mm.

Apical angle 136° ; side angle 6° .

There are only two specimens of this form found in the red clay of Chingshing, both of which are of fully grown size. One of the two is comparatively well preserved but the other one shows injuries on its surface, but it still preserves its important features permitting detailed observations.

The sinistral arrangement of its whorl distinguishes this shell from the most closely allied species on record, both recent and fossil, and its single and simple parietal tooth is another character which does not agree with what we could find in the case of other species. Besides this the peristome is fairly smooth, without any trace of ridges.

I take great pleasure in naming this new and interesting species after Dr. A. W. Grabau, the chief Palæontologist of the Geological Survey of China for his noble effort in developing palæontological research in this country.

HORIZON AND LOCALITY: From the supposed Hipparion red clay of Shueh Hua Shan, Chingshing, Hopei Province. Coll. Mr. C. C. Wang. Cat. G.S.C. 2163.

***Pupa subconica* Ping (sp. nov.)**

Text-Fig. 4a-4b. PL. I fig. 4.

Shell small, ovo-conical, apex very small, first two whorls much smaller in diameter than the following ones, so that the apical region looks rather conical. Whorls 5. After the second whorl the following one increases considerably in size. Length of body-whorl almost equalling that of spire. Fine oblique striæ present in whorls 3, 4 and 5. Surface of whorls convex, suture between each two whorls conspicuous and pronounced. From the opposite side to the aperture the shell appears somewhat fusiform, and the body-whorl reduced in width toward the lower extremity of the shell. Aperture ovate in outline; peristome expanded, but not reflected; at the junction where the expanded outer lip

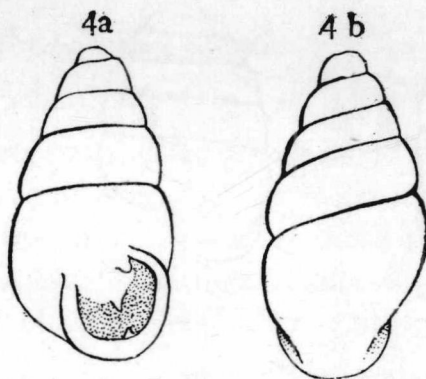


Fig. 4a-4b. *Pupa subconica* sp. nov. Enlarged $\times 9$. Cat. No. 2164.

touches the body-whorl occurs a mammilated nodule, looking distinct in front of the aperture. A single deep-seated plait occurs in the aperture below the nodule, and a parietal tooth, also deeply seated, on the outer lip. Umbilicus shallow, slit-like.

Length 4.7 mm.; width of body-whorl 2.3 mm.

Apical angle 102° , side angle 7° .

HORIZON AND LOCALITY: From the supposed Hipparion red clay of Shueh Hua Shan in Chingshing, Hopei Province, Coll. Mr. C. C. Wang. Cat. Geol. Surv. China 2164.

***Pupa hopeiensis* Ping (sp. nov.)**

Text-Fig. 5a-5c. PL. I, fig. 5a-5f.

Shell small ovate, whorls 7 and dextral; general shape resembling *Pupa grabaui* but different in the direction of coiling of the whorls, and in several other respects. Apex

extremely inconspicuous, slightly convex on the surface of the whorl, whorls increasing in size very gradually toward the middle region of the shell and decreasing toward the last whorl, without tendency to sudden change in the size of the whorls, so that the present form is quite different from *Pupa grabaui*. With the exception of the first two whorls which are the protoconch, all the rest of the whorls are characterized by very fine longitudinal oblique striae. Body-whorl equaling about $\frac{1}{2}$ the spire in length; surface of whorls convex; suture distinct and pronounced. Aperture rounded oval; peristome expanded, except at the region where the outer lip nearly touches the body-whorl and the inner lip is fused with the body-whorl. A single but broad parietal tooth in front of the aperture; obliquely opposite to it another single tooth or plait situated within the peristome, on the right corner of the aperture; both of these teeth or plaits deep-seated. Peristome not reflected; umbilicus slit-like, very shallow and inconspicuous. Thus again the present form is differentiated from *Pupa grabaui*. Body-whorl with a blunt keel on the side opposite to the aperture.

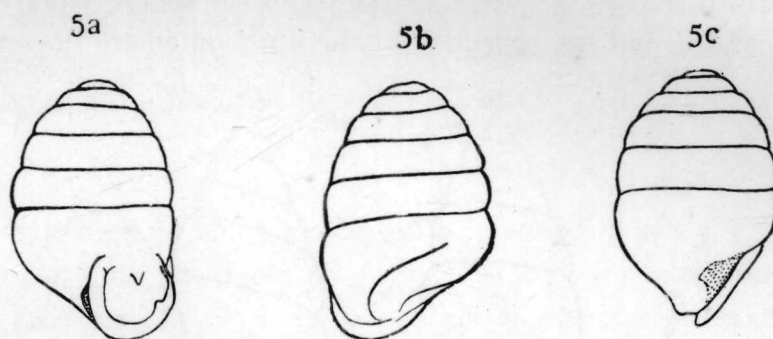


Fig. 5a-5c. *Pupa hopeiensis* sp. nov. Enlarged $\times 7$. Cat. No. 2165.

Length 5.3 mm.; greatest width 3 mm.

Length 4.4 mm.; greatest width 2.4 mm.

Length 2.5 mm.; greatest width 1.7 mm.

Apical angle 109° , side angle 5° .

Among the species which are comparatively similar to the present one in general feature there is one, *Pupa (Pupilla) signata* Mousson, (1873) recorded by Andreal (1908) from Thung Fan Yi, Kansu Province, which in size, shape and structure is very much like the species in question. There is, however, a distinct feature by which these two can be distinguished, namely the species from Kansu is comparatively cylindrical, while the one from Chingshing is more ovoid. In addition to this point, we may note that the rounded keel on the body-whorl is not found in the case of *Pupa signata*, and that the parietal of *Pupa hopeiensis* is smooth on both sides of the single tooth, while the parietal of *P. signata* possesses another small "nodule" near the upper end of the aperture.

HORIZON AND LOCALITY: From the supposed Hipparion red clay of Shueh Hua Shan, Chingshing, Hopei Province. Coll. Mr. C. C. Wang. Cat. G.S.C. 2165, 2166.

Genus **OPEAS** Connolly

Opeas chingshingensis Ping (sp. nov.)

Text-Fig. 6a-6b. PL. I, Figs. 6a-6f.

Shell slender, more or less cylindrical, reducing in width toward apex gradually; apex very small, blunt and inconspicuous. Whorls 8; surface of each whorl slightly convex; sutures between whorls very distinct, on the whole not particularly deep and broad. First and second whorls free from striae, while all the other whorls have fine slightly oblique or curved transverse striae which are very closely arranged. On the last whorl the striae are comparatively pronounced.

The height of either the first or the second whorl is not more than $\frac{1}{3}$ that of the last one. Last whorl, altogether much larger, not particularly expanding laterally; aperture pyriform with a rather pointed base; columella comparatively thick, oblique; umbilicus small and shallow.

Length 11 mm.; width of body-whorl 3.5 mm.

Apical angle 120.5° , side angle 7.5° .

Quite a number of specimens of this form were found in the Hipparion red clay of Chingshing. Among them different stages of development can be observed. The youngest ones I have found in this collection are those of three whorls, of which the first two are the protoconch free from striations. Following this each successive stage is represented with an addition of one more whorl, until the full growth of eight whorls is reached.

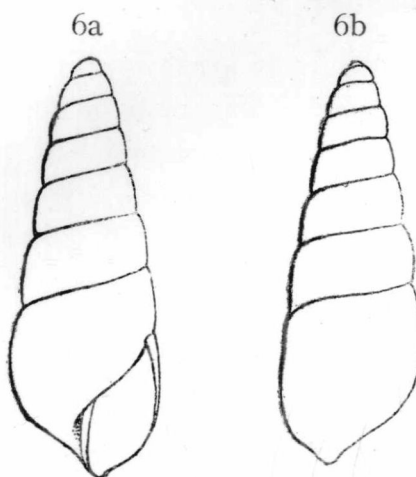


Fig. 6a-6b. *Opeas chingshingensis* sp. nov. Enlarged $\times 5.5$. Cat. No. 2167.

This form resembles quite closely, *Stenogyra turgida* Heude, but observations on the successive stages of its development show that the arrangement of the whorls of our shell is more horizontal than that of Heude's species, and also that the width of the whorls in the middle region of the fully grown shell is comparatively small. Among the different stages of development some variations are found. In some of the younger specimens the whorls have a more convex surfaces, consequently the sutures between them are deeper, in others the shape is more conical, but the specific characters are all evident.

The species described by Connolly, (1910,) as *Euonyma siliqua*, from South Africa resembles the present form in the size, number and distribution of the whorls and in the general outline of the shell. The South African form has, however, an ovate aperture, erect columella, and its body-whorl has a rounded base, which characters do not agree with those found in our species. Next to this *Opea tapeinum* Connolly 1923, approaches the present species in general shape, but it has one whorl less than the latter and its second whorl shows traces of faint spiral striations which are absent in the present form. Thus this fossil form of North China cannot be placed in the recent species of South Africa.

HORIZON AND LOCALITY: From the Hipparion red clay of Shueh Hua Shan, Chingshing, Hopei Province, Coll. Mr. C. C. Wang. Cat. Geol. Surv. China No. 2167-2172.

II FLUVIATILE GASTROPODA FROM CHOU KOU TIEN

Genus **PLANORBIS** Guettard

Planorbis chihliensis Ping (sp. nov.)

Text-Fig. 7a-7b. Pl. I. 7a-7b.

Shell small, typically discoidal and biconcave, apex very small and sunken, without demarcation between itself and the beginning of the first whorl. Whorls 3; width of the first whorl with a great increase in its second half this being almost twice that of the first half, width of the second half of the whorl at least three times that of the first whorl, and the same ratio existing between the second half of the third whorl and that of the second. Very fine striae seem to begin in the second half of the first whorl, while in the last whorl the striae remain just as fine as in the first two, until the last third of the whorl is reached, where they become coarser. Convexity increasing with the size of the whorls; first whorl in its sunken position with its exposed surface slightly convex. Second whorl with considerable degree of convexity at its beginning this increasing in the course of passing from the last portion of the second whorl to the third whorl. Surface smooth, without any structure to affect the regularity of arrangement of the

whorls, nor the slightest trend of angulation present along the periphery of the last whorl. Aperture not well preserved in the specimen, but its circular outline still recognizable.

The ventral side of the shell almost identical with the dorsal, every whorl being well shown; both the surface features and the whorl arrangement very much like that of the dorsal, except for the more sunken position of the apex and first whorl, and the greater elevation of the last portion of the fourth whorl, these features making the ventral side readily distinguishable from the dorsal. Umbilicus shallow and wide.

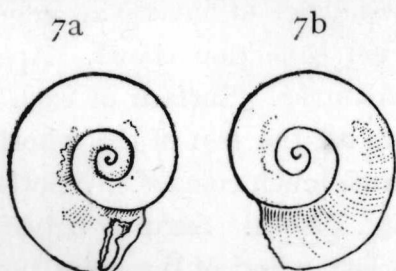


Fig. 7a-7b. *Planorbis chihliensis* sp. nov. Enlarged $\times 7$. Cat. No. 2173.

In examining this specimen one can not fail to notice at the first sight the illusive feature that the last whorl is so prominent and much expanded as to out proportion the whorl of the entire spire, but careful observation shows that the ratio in the increase of width from the first whorl to the last is quite regular, as mentioned in the preceding paragraph. The increase is, however, of a rapid nature, so that the second half of each whorl always attains a size at least twice that of the first half of the same whorl.

The preservation of the shell in the red clay of Chou Kou Tien is not perfect, beside the aperture is broken, and in several places on the surface of the whorl the periostracum has been eroded away, but the general structure of the shell remains intact. This shell is the only one found in the collection. For the study of the range of variations in its specific characters more specimens are needed. For the time being the detailed features of the shell are recorded as far as possible for comparison when more specimens are available.

Diam. 4.1 mm., altitude 0.9 mm..

HORIZON AND LOCALITY: From the Polycene formation of Chou Kou Tien, Hopei (Chihli) Province. Coll. Mr. W.C. Pei. Cat. G.S.C. No. 2173.

III TERRESTIAL GASTROPODA OF CHOU KOU TIEN

Genus **HELIX** Linnæus

Helix pyrrhozona Philippi 1845

The detailed descriptions and figures of this species are given on page 7. The comparison between the specimens collected from this locality and those from Shueh Hua Shan, Chingshing is found on page 8.