

ON SOME NEW FOSSIL MOLLUSKS OF MONGOLIA

CHI PING, PH. D. (柴 志)

*Research Professor of China Foundation at the Biological Laboratory of
the Science Society of China, Nanking, and the Fan
Memorial Institute of Biology, Peiping.*

INTRODUCTION

This paper embodies the descriptions of four species of Gastropods and three species of Pelecypods collected from Tungur, Mongolia, by Dr. C. C. Young and Père Teilhard de Chardin of the Geological Survey of China, Peiping. They are all of Pliocene age, the Pelecypod shells being found to be associated with *Platybelodon* bones. On careful comparison they were found to be undescribed forms. The present paper deals with their detailed structures, variations and different growth stages.

Genus PLANORBIS Guettard

PLANORBIS YOUNGI Ping (sp. nov.)

Text Figs. 1-12; Pl. I, Figs. 1-12

Shell fairly large, typically biconcave, discoidal and sinistral. Apex extremely small, inconspicuous, rounded, passing into first whorl without any demarkation. Whorls 4-5. Width of whorls increasing regularly and gradually. Each whorl slightly more than twice as wide as the preceding one. None of the specimens have their external surfaces well preserved, so it is very hard to determine the growth striae, but in some regions on the whorl where the periostracum is still preserved, extremely fine striae could be recognized, while nowhere coarse striae are present. As a whole all the specimens in the collection have very smooth whorl surfaces. Convexity of whorls quite pronounced, even in the case of the first two whorls which are very small and decidedly sunken in position, their rounded surfaces are noticeable. While in the last three whorls, which are much larger, the surfaces are very convex, there does not seem to be any sudden increase in the convexity of the surface from the first whorl to the last one. The aperture of none of the specimens is preserved, but the last portion of the last whorl seems to be somewhat dilated.

Last whorl smoothly rounded on its peripheral curvature without any tendency towards angulation at its terminal portion. The outline of its cross-section is more or less reniform owing to the concavity of the medial surface of the shell.

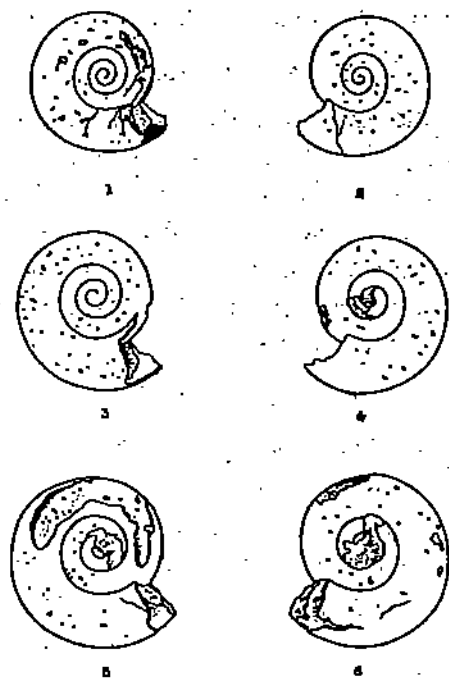
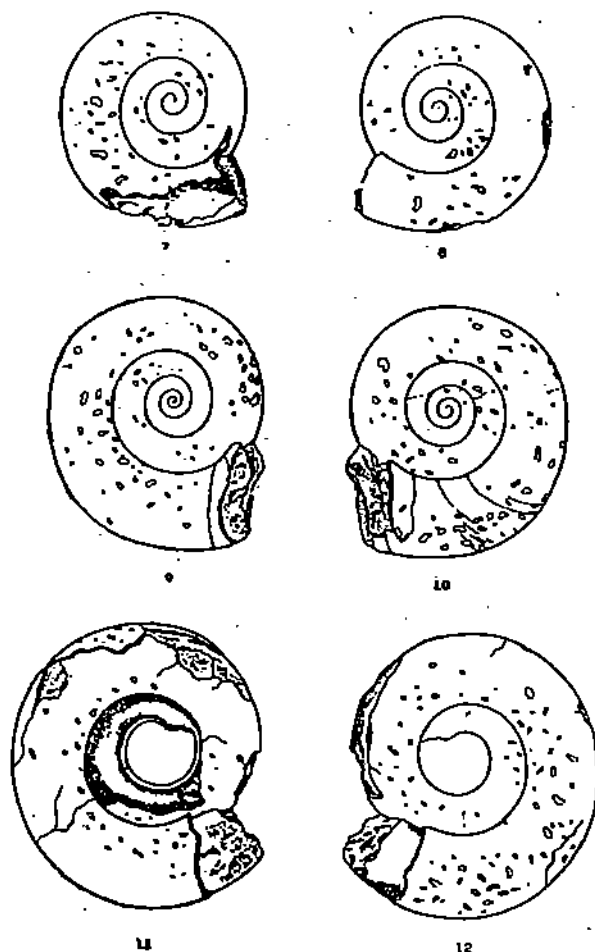


Fig. 1-6. *Planorbis youngi* Ping
Left figures, dorsal view
Right figures, ventral view
all $\times 2$

The ventral surface can be readily distinguished from the dorsal by the more sunken position and more inconspicuous appearance of the apex and the slight tendency of lowering down in position of the terminal portion of the last whorl. All the other features of the ventral surface of the shell are similar to those of the dorsal. Umbilicus small and fairly deep.

The shell has a stout appearance. It may have been quite solid when fresh. There are ten specimens of this species in the collection. As far as could be seen, there is hardly any variation at all. The general shape of the

shell is quite uniform throughout all the stages of growth. All of them look rather heavy-set even in the case of the small ones.



Figs. 7-12. *Planorbis youngi* Ping
Left figures, dorsal view
Right figures, ventral view
all x 2

	Diameter	Altitude
1. a large shell	20 mm.	11.7 mm.
2. a smaller shell	17.5 mm.	6.0 mm.
3. another smaller shell	18.2 mm.	6.7 mm.

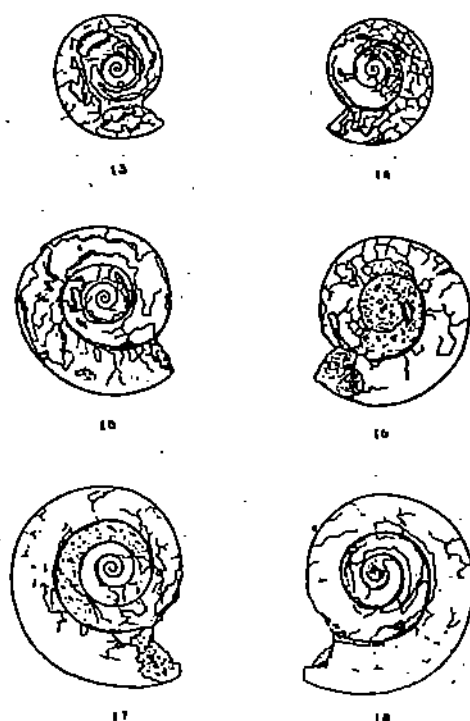
HORIZON AND LOCALITY: From the black limestone of the Pliocene formation, Tungur (Wolf Camp), Mongolia.

Coll. Dr. C. C. Young. Cat. G. S. C. Nos. 3347-3352 (Syntypes)

PLANORBIS TUNGURENSIS (sp. nov.)

Text Figs. 13-18; Pl. I, Figs. 13-18.

Shell of moderate size, discoidal, much depressed, sinistral. Apex very small, not so much sunken in position as in the case of the preceding species, owing to the less elevated whorl surfaces around it; it is situated on the same



Figs. 13-18. *Planorbis tungurensis* Ping
Left figures, dorsal view
Right figures, ventral view
all x 2

level as the first and second whorls or even slightly elevated above them. In general the shell is biconcave. There seems to be a slight constriction between the apex and the beginning of the first whorl, whorls 5. Surfaces of most

whorls not well preserved, but it appears that there is a rapid increase in width, the width of the second whorl being about three times that of the first, this ratio continuing throughout the entire shell. Last two whorls broader than high, so that the shell does not look as thick as the preceding species. Periostracum very poorly preserved, as far as it shows the growth lines on the surfaces of the whorl they must be very fine, and there seems to be no coarse striae toward the last portion of the last whorl. Convexity not increasing with the size of the whorl. Surface smooth without any tendency toward angulation on the last whorl. Aperture not preserved.

The ventral surface is markedly different from the dorsal not only in the greater degree of concavity of the shell, owing to the more sunken position of the apex and first two whorls as viewed from this aspect, but also in the greater degree of convexity of the surface of the last whorl. Looking at the entire surface of the last whorl, we can see at once that there is a gentle convexity on its dorsal side, while the convexity is much increased in degree when the shell is turned over to its ventral side. Umbilicus obscured by a bit of limestone, it seems to be wide and shallow.

There are half a dozen specimens of this species in the collection, some have a somewhat angulated region near the terminal portion of the last whorl, but this feature does not exist in all of the specimens and might be the result of pressure. The better preserved shells show the surface of the last whorl perfectly smooth and rounded. The general shape and the whorls all appear much more slender than in the preceding species.

Diameter	Altitude
15.0 mm.	4.3 mm.
12.9 mm.	3.6 mm.
8.7 mm.	2.7 mm.

HORIZON AND LOCALITY: From the black limestone of the Pliocene formation, Tungur (Wolf Camp), Mongolia.

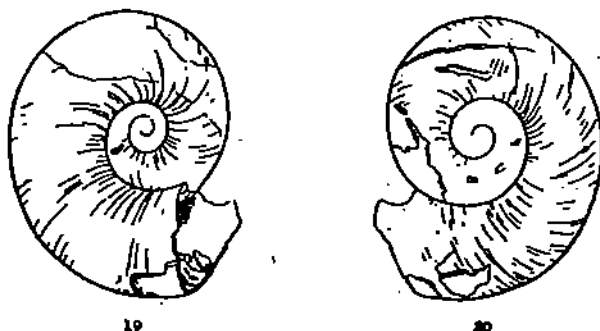
Coll. Dr. C. C. Young. Cat. G. S. C. No. 3353-3355 (syntypes)

PLANORBIS MINUTUS Ping (sp. nov.)

Text Figs. 19-20; Pl. I, Figs. 19-20.

Shell very small, discoidal, dextral, somewhat plano-concave. The apical region not raised at all. Whorls 3. Apex not preserved, probably ovate as

shown by the broken edges of this region. All the whorls in general look rather stout in spite of the minute size of the shell. The beginning of the first whorl is, however, narrow. The width of this whorl has a sudden increase, the last portion of the whorl being about three times that of its beginning. Surfaces of whorls all smoothly rounded, except the terminal region of the whorl which is considerably flat. First whorl practically on the same level with the apex or slightly higher, second whorl much elevated above the level of the apex and the first whorl, while the third whorl begins to show a tendency of lowering again and its distal third is below the level of the second, so that on the average the dorsal surface of the entire shell is somewhat flat. Surfaces of



Figs. 19-20. *Planorbis minus* Ping
Left figure, ventral view
Right figure, dorsal view
all $\times 15$

whorls marked with fine, closely arranged oblique growth striae which become more and more pronounced as the whorl gets larger. At the distal third of the last whorl the striae appear very conspicuous. Last whorl almost circular in constriction, without any tendency of angulation in its terminal portion. Aperture not preserved in the specimen.

The ventral surface of the shell different from the dorsal in its decided concavity. The elevation of the surface of the whorl increases as the whorl gets larger from the first to the third one. Owing to the depression of the terminal portion of the third whorl on the dorsal side, the concave feature of the ventral side is made more conspicuous. Convex feature of the surface of each whorl quite similar on both dorsal and ventral surfaces. Umbilicus obscured by a bit of limestone, probably shallow and wide.

In studying this specimen one will be able to avoid the mistake of considering it to be a young stage of either *Planorbis youngi* or *Planorbis tungurensis* by its decidedly different appearance from the latter two. Its plano-concave feature is not to be found in either of two species described before, the stout appearance of the whorls stamps it as entirely different from the first three whorls of either of the others while the arrangement of its whorls is dextral, which is also an important point in differentiating this species from the other two.

There is only one specimen in the collection and the preservation of the shell is not perfect, the apertural character could not be observed.

Greatest diameter 2.3 mm., altitude 0.1 mm.

HORIZON AND LOCALITY: From the black limestone of Pliocene age, Tungur (Wolf camp), Mongolia.

Coll. Dr. C. C. Young. Cat. G. S. C. No. 3356 (Holotype).

Genus SUCCINEA Draparnaud

SUCCINEA GRANATA Ping (sp. nov.)

Text Fig. 21; Pl. I, Fig. 21,

Shell small, poorly preserved. Apex broken, probably very small. Whorls three, the first one only partly preserved and apparently not so small in proportion as in the usual case of most species of this genus. The second whorl has a rather sudden enlargement, much larger than the spire. The surface of each whorl is convex and the suture between each two whorls is very distinct. As the surface is cracked, it is hard to observe the detailed features of the growth striæ, but as far as the specimen shows, the surface is probably quite smooth and there seems to be a lack of coarse striæ on the body-whorl. The aperture can not be observed as this specimen has only its dorsal surface exposed on limestone. The ambital region of each whorl seems to be slightly elevated.

In general shape this form resembles *Succinea tenuis* Ping and the ratio of length between the body whorl and the spire 2: 1 is also similar, but the width of the body whorl of this shell is less in proportion and the size is much too great for *Succinea tenuis* Ping. Hence a new name is proposed for this species.

Single specimen.

Length 5.9 mm., width of body whorl 3.3 mm.

HORIZON AND LOCALITY: From the black limestone of the Pliocene formation, Tungur (Wolf Camp), Mongolia.

Coll. Dr. C. C. Young. G. S. C. Cat. No. 3357 (Holotype)



Fig. 21. *Succinea granata* Ping, x 10

Genus *PARUNIO* Ping (gen. nov.)

Shell ovoid. Growth-lines bluntly ridged, considerably roughening the external surface of the shell. Umbo moderately large. Dorsal margin very gently convex and ventral margin much more strongly so. In the left valve there are two cardinal teeth, of which the dorsal one is very prominent and thick and the ventral is much thinner but strongly developed. Posterior lateral teeth well developed, of considerable length. Right valve with a single cardinal tooth. Umbonal cavity of considerable depth.

Genotype: *Parunio crassus* Ping.

Horizon: Pliocene of Mongolia.

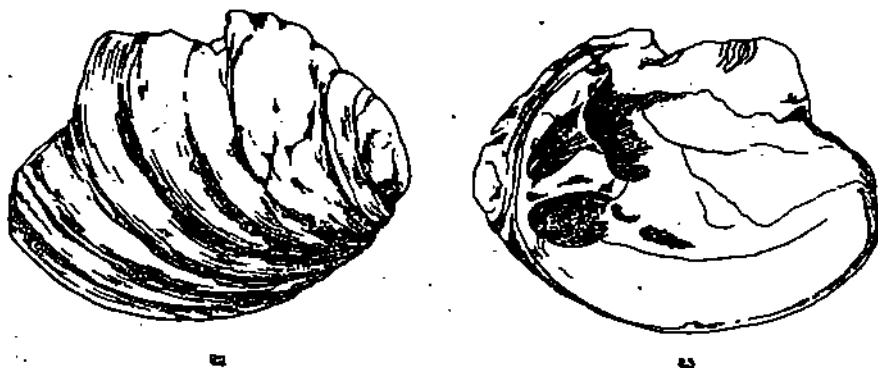
PARUNIO CRASSUS Ping (sp. nov.)

Text Figs. 22-25; Pl. I, Figs. 22-25.

Shell of considerable thickness. Its general outline is ovoid with its anterior region narrower than the posterior, and its ventral margin much more convex than the dorsal. The umbo is moderately large, bending ventrally. The periostracum of the left valve is largely preserved. The growth lines are

interrupted at regular intervals by sharp rough lamellæ, which divide the entire surface into broad concentric undulations. These as well as the grooves between them are covered by the finer growth-lines. In the anterior region the surface is marked by nodulose elevations, and near the umbo the nodules are elongated and fused with one another, giving this region and the portion immediately around it an irregularly corrugated character.

In the hinge the ligament is not preserved. From the groove we can see that it was narrow and long and deeply sunk into it. The posterior lateral tooth is a strongly developed ridge, whose anterior and posterior portions are thickened. In the left valve the dorsal cardinal tooth is large, its posterior



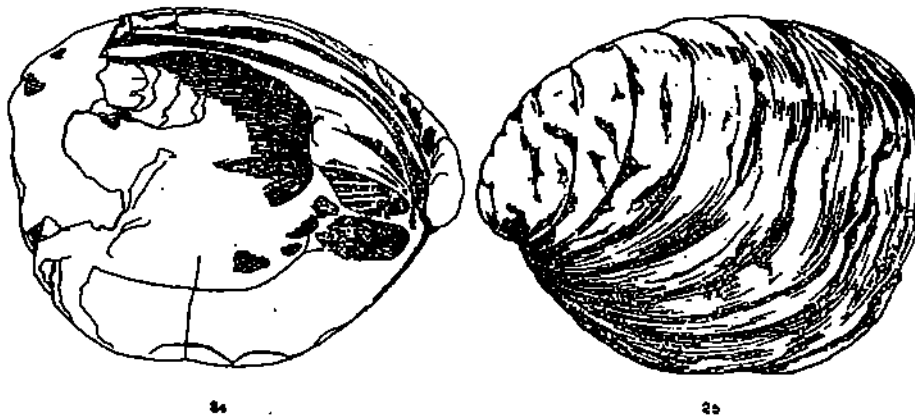
Figs. 22-23. *Parunio crassus* Ping, right valve Cat. 3343
Natural size. Syntype

end is broad and the tooth is much reduced anteriorly and its dorsal margin convex while the ventral is slightly concave. The ventral cardinal tooth is much thinner than the dorsal one, and both its anterior and posterior extremities are thicker than its middle. There is no tooth-like structure at the antero-ventral margin of the valve below the umbo. There are two large deep pits on both sides of the ventral cardinal tooth, each being oval in outline, especially the ventral one. The ventral pit is broader than the dorsal. In the dorsal pit there are from two to four, sometimes five or more, ridges which are very well developed and distinct in the case of better preserved specimens. They are almost parallel to the longitudinal axis of the valve. In the ventral pit there are much finer ridges which are irregularly arranged.

In the right valve, the two pits bounding the ventral cardinal tooth are similar to those in the left order. Immediately posterior to the ventral pit in each valve is a small slit-like depression parallel to the longitudinal axis of the valve.

The umbonal cavity is very deep. The pallial line is distinct and smooth and gently convex ventrally and the pallial sinus is not well preserved in any of the specimens. The inner surface of the valve is nacreous.

The thickening of the valve is very pronounced in its anterior half, especially toward the umbonal region.



Figs. 24-25. *Parunio crassus* Ping, left valve natural size
Cat. 3342.

Greatest length 68.2 mm.; greatest height 50.0 mm.

HORIZON AND LOCALITY: Pliocene of Tungur (Wolf Camp), Mongolia.

Coll. Père Teilhard de Chardin and Dr. C. C. Young. G. S. C. Cat. No. 3342-3343 (Syntypes)

PARUNIO MONGOLIENSIS Ping (sp. nov.)

Text Figs. 26-27; Pl. II, Figs 26-29.

The specimens of this form are fragmental. In the collection we have only the anterior portions of the valves which represent the umbonal region and the surrounding structures near by, while the posterior portions of the valves are all broken off. The valve is thick toward its anterior region. The

umbo is more or less worn in each of the present specimens and its general shape is similar to that of the preceding species. Around the umbo the growth lines are in comparatively coarse ridges and finer striæ are only faintly visible on the surfaces of some of the specimens. A nodulose appearance begins to be noticeable in the regions near the umbo.



Figs. 26-27. *Parauto mongoliensis* Ping, x $\frac{1}{2}$ right valve
Cat. 3344 (Syntype)

In the hinge this species differs from the preceding one in that the anterior end of its posterior lateral tooth is less broadened, while the cardinal tooth of the right valve has a more pronounced depression ventral to its anterior end. In a better preserved specimen there is a small blunt ridge extending between the anterior margin of the valve and the posterior end of the cardinal tooth, ventral to the said depression.

The umbonal cavity is deep, but the depth is less pronounced than that of the preceding species. The pillial line is very distinct as far as the preserved portion shows. In the right valve the two pits, one dorsal to the cardinal tooth and another ventral, are about equal in size, but the latter is deeper. This feature again differentiates this species from *P. crassus*. The inner surface of the valve is also nacreous.

HORIZON AND LOCALITY: From the Pliocene of Tungur (Wolf Camp), Mongolia.

Coll. Père Teilhard de Chardin and Dr. C. C. Young. Cat. G. S. C. No. 3344, 3345 (Syntypes).

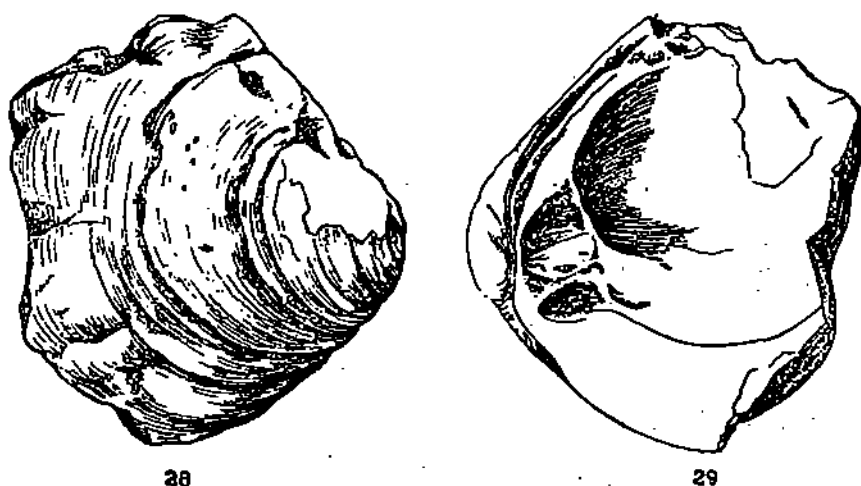


Fig. 28-29. *Parunio mongoliensis* Ping, $\times 1\frac{1}{2}$; another right valve Cat. 3345 (Syntype).

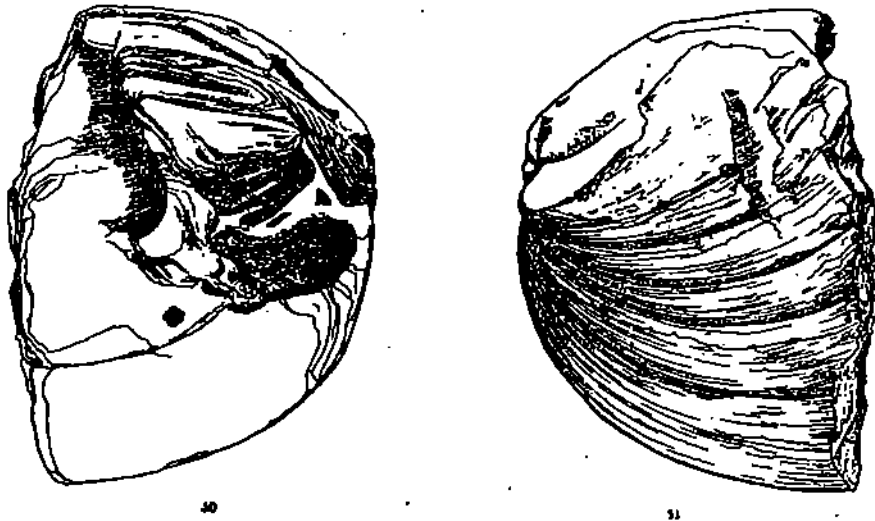
PARUNIO SPATULUS Ping (sp. nov.)

Text Figs. 30-31; Pl. II, Figs. 30-31.

Only the anterior portion of the left valve is found in the collection. The width of the anterior region behind the umbo is considerable. The periostracum is not preserved, but the growth lines are quite distinct. The umbo is not so strongly curved ventrally as in either of the preceding two species, and has two or three very faint elevations radially arranged. The surface of the valve is marked with evenly distributed growth lines, but there are neither nodulose structures nor coarse ridges or corrugations.

There are two large cardinal teeth in the hinge of the left valve. They are situated more or less parallel to the longitudinal axis of the valve. The dorsal one is much larger than the ventral, while its posterior end is much thicker than its anterior, and bears three or four longitudinal ridges on its surface. The ventral cardinal tooth has its anterior end thickened and markedly reduced posteriorly. The two pits, on either side of the ventral cardinal tooth, are large. The dorsal one has two or three longitudinal ridges

inside. The ventral one is filled up with sandstone, and it is not possible to examine its inner surface but in another specimens the ventral pit seems to have numerous small depressions on its interior. The general outline of both is somewhat triangular and they are about equal in size. The ligament groove and postero-lateral teeth are not preserved.



Figs. 30-31. *Parunio spatulus* Ping, natural size

The lunule is well developed and of considerable width as indicated by the area medial to the umbo. The longitudinal ridges of the lunule are distinctly preserved. The umbonal cavity is of considerable depth, but not so marked in degree as in the case of *P. crassus*. The pallial line is very distinct. Immediately posterior to the ventral pit is a shallow depression which is probably the anterior adductor impression. The portion of the valve ventral to the ventral pit is anteriorly extended, so that this portion of the valve appears rather expanded. The inner surface is nacreous.

The valve is much thickened, especially so in the region of the cardinal teeth and pits.

Greatest height posterior to the umbo 66.5 mm.

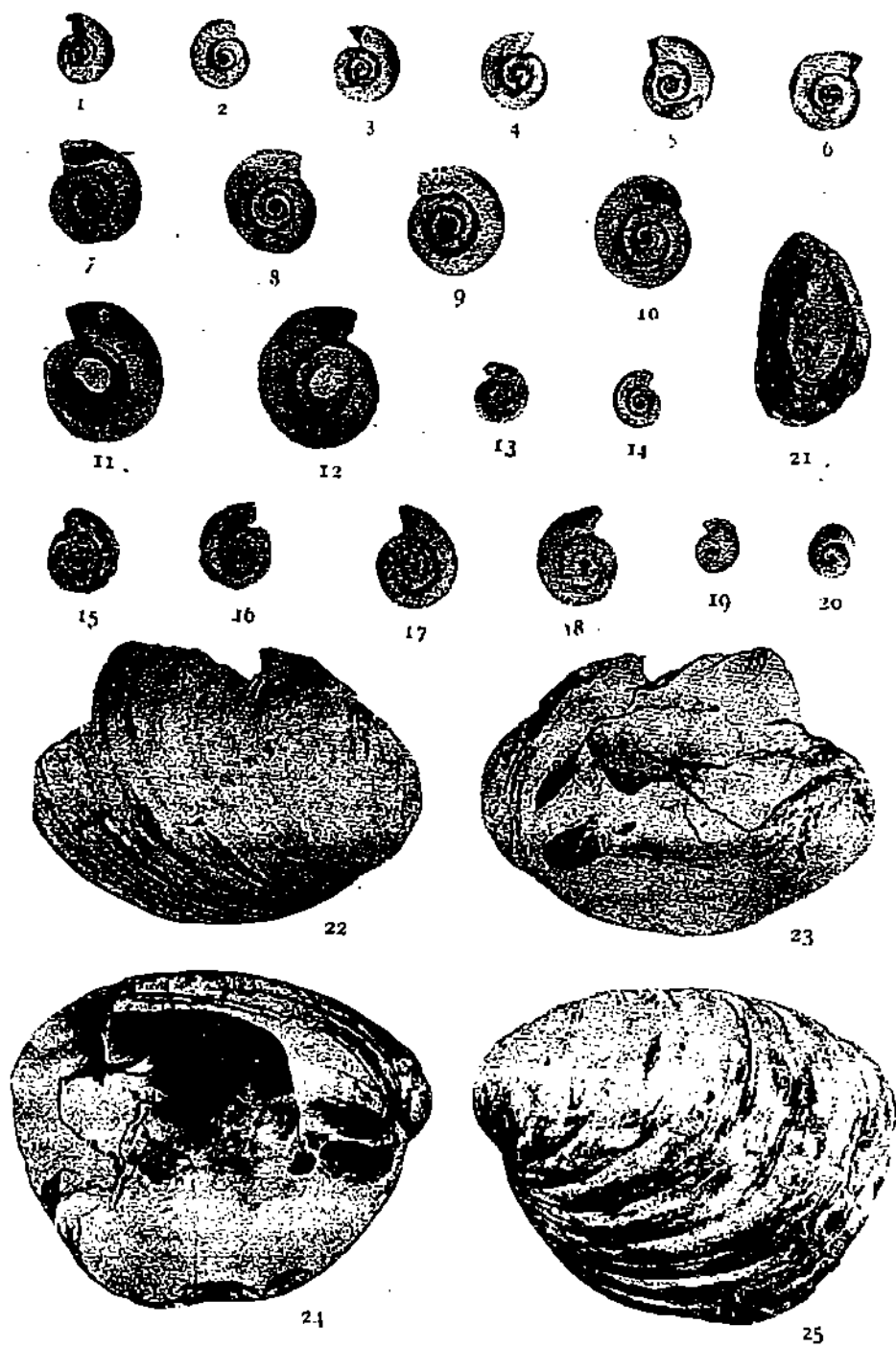
HORIZON AND LOCALITY: Pliocene beds of Tungur (Wolf Camp), Mongolia.

Coll. Père Teilhard de Chardin and Dr. C. C. Young. Cat. G. S. C. No. 3346 (Holotype).

**Explanation of
Plate I.**

PLATE I

- Fig. 1, 3, 5, 7, 9, 11. *Planorbis youngi* Ping. × 1, Dorsal view.
 Fig. 2, 4, 6, 8, 10, 12. " " " × 1, Ventral view.
 Cat. no. 3347-3352.
- Fig. 13, 15, 17. *Planorbis tungurensis* Ping. × 1, Dorsal view.
 Fig. 14, 16, 18. " " " × 1, Ventral view.
 Cat. no. 3353-3355.
- Fig. 19. *Planorbis minutus* Ping. × 3, Ventral view.
 Fig. 20. " " " × 3, Dorsal view.
 Cat. no. 3356.
- Fig. 21. *Succinea granata* Ping. × 3, Lateral view. Cat. no. 3357.
 Fig. 22. *Parunio crassus* Ping. × 1, Lateral view. Cat. no. 3342.
 Fig. 23. " " " × 1, Medial view. Cat. no. 3342.
 Fig. 24. " " " × 1, Medial view. Cat. no. 3343.
 Fig. 25. " " " × 1, Lateral view. Cat. no. 3343.



**Explanation of
Plate II.**

PLATE II.

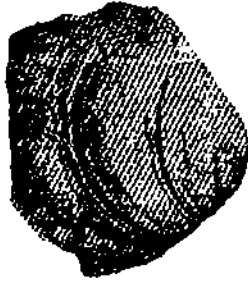
- Fig. 26. *Paranio mongoliensis* Ping. × 1, Lateral view. Cat. no. 3344
Fig. 27. " " " × 1, Medial view. Cat. no. 3344
Fig. 28. " " " × 1, Lateral view. Cat. no. 3345
Fig. 29. " " " × 1, Medial view. Cat. no. 3345
Fig. 30. *Paranio spatulus* Ping. × 1, Medial view. Cat. no. 3346
Fig. 31. " " " × 1, Lateral view. Cat. no. 3346



26



27



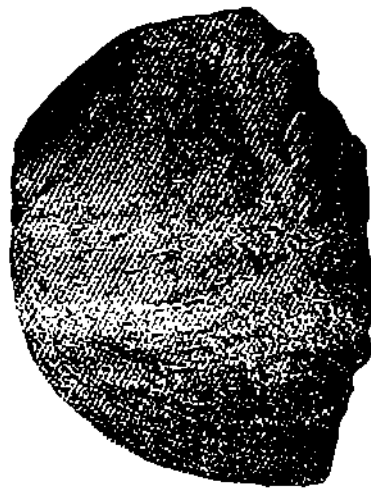
28



29



30



31