

國立中央研究院地質研究所

叢 刊

第 三 号

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CONTRIBUTIONS

FROM

THE NATIONAL RESEARCH INSTITUTE OF GEOLOGY

ACADEMIA SINICA

No. 3.

地質研究所印行

中華民國二十二年五月

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### 勘 誤 表

- 46 頁 第一行“舍”讀“含”
- 46 頁 第二段第一行“岡”讀“岡”
- 47 頁 第廿二行“岡”讀“岡”
- 48 頁 第二段第四行“地”讀“造”
- 51 頁 第三段第六行“薄”讀“薄層”
- 51 頁 第三段第七行“勝”讀“多”
- 52 頁 第三段第七行“下名石炭紀”讀“下石炭紀”
- 53 頁 第三行“標本”讀“標準”
- 68 頁 第二行“杏”讀“杏”
- 71 頁 第五行“darg”讀“drag”
- 71 頁 第二段第二行“花”讀“花山”
- 81 頁 第二段第八行“動山”讀“造山”

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# COMPARISON OF THE LUNSHAN LIMESTONE AT THE VICINITY OF NANKING WITH THE ORDOVICIAN ROCKS IN HUPEH PROVINCE.

By C. C. Yü (俞建章)

The Lunshan limestone is well-known in Kiangsu province, but the questions, first: whether it belongs to the same faunal province as the Ordovician rocks in South China, and secondly: whether the Lunshan limestone at the typical locality "Lun-shan" is actually equivalent to that at "Tang-shan" remain to be answered. In the discussion of these problems the lithological character and the palæontological sequence of the Ordovician rocks in Hupeh, the type locality of Ordovician in Central as well as South China, should first be taken into account, and those will be briefly reviewed for comparison.

Prof. J. S. Lee first suggested the separation of the Ordovician rocks in Hupeh province into two divisions<sup>1</sup>, the Ichang limestone below and the Neichiashan formation above. The Ichang limestone attains a thickness of from 1250 to 1680 meters. It includes concretions of flint throughout, especially toward the top. The actual geological horizon of its lower part has been discussed by the former authors, but is as yet unsettled. However, at a level not very far from the top, the following Lower Ordovician fauna has been found.

*Callograptus* cf. *salteri* Hall  
*Proterocameroceras mathieui* Grabau  
*Eccyliopteris* sp.  
*Asaphus* sp.

The Neichiashan (now Neichia) formation also consists of two parts. The upper part is composed of a dense grey limestone, which measures a few meters in thickness and includes numerous *Orthoceras* usually of the gigantic type, while the lower part is a green calcareous shale alternating with the slabby argillaceous limestone where *Triplecia poloi* and *Clitambonites giraldii* occur abundantly. This formation, according to Prof. Lee's report, has furnished the following:

*Triplecia poloi* (Martelli)  
*Clitambonites giraldii* (Martelli)  
*Orthis calligramma* Dalm.

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1. Bull. Geol. Soc. China, Vol. III, No. 3-4, pp. 367-372.

*Eccyliopteris sinensis* Frech  
*Vaginoceras duplex* Wahlenberg  
*Discoceras eurasiaticum* Frech  
*Endoceras* sp.  
*Cycloceras* sp.  
*Cyrtoceras* sp.  
*Asaphus* cf. *expansus* Dalm

Subsequently Mr. C. Y. Hsieh and the late Mr. Y. T. Chao went to western Hupeh<sup>1</sup>, and collected from the Ichang limestone numerous specimens of cephalopods identified by them as *Proterocameroceras mathieui*, and from the Neichia formation many other forms, which are quite similar to Prof. Lee's collection.

In the year 1930 I studied the cephalopods collected by these authors, and found that the cephalopod from the upper part of the Ichang limestone comes nearer to *Cameroceras styliforme* rather than to *Proterocameroceras mathieui*. As the apical portion of the specimens has so far not been observed, I still hesitated whether it belongs to *Proterocameroceras* or *Cameroceras*, although it had been compared with *Cameroceras styliforme* Grabau<sup>2</sup>. Recently Mr. Hsu placed at my disposal some well-preserved specimens of the forms previously called *Proterocameroceras mathieui*, which were also collected by Prof. Lee and Mr. Hsieh respectively in the same localities. In one of them the apical end is in a splendid state of preservation and entirely encircled by the annulated ridges. From this, I am inclined to refer it without hesitation to *Cameroceras*. In view of the absence of the outer shell it is rather difficult to make specific identification. However, as far as the endoconch is concerned, the *Cameroceras* from the Ichang limestone may be divided into three different forms<sup>3</sup>, though they are closely related to *Cameroceras styliforme* from the Liangchiashan limestone of Chihli province.

As regards the cephalopods from the upper part of the Neichia formation, I had made a precise specific determination on these forms, and these were listed in the *Palæontologia Sinica*, Ser. B, Vol. I, fasc. II, pp. 9 and 10.

On the whole the uppermost part of the Ichang limestone of Hupeh, from the palæontological point of view, is characterized by the much weathered black endoconch of *Cameroceras*. It is very abundant

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1. Bull. Geol. Surv. China, No. 7, pp. 26-33.

2. Pal. Sin. Ser. B, Vol. I, Fasc. II, p. 23.

3. These forms will be described below.

and widely distributed in central China. In addition to the index forms *Triplecia* (*Yangtzeella*) *poloi* (Martelli) Kolarova, *Orthis calligramma* Dalm etc., the lower division of the Neichia formation consists of many forms of trilobites<sup>1</sup> and graptolites. The form *Didymograptus murchisoni* Bech var. has been found from this horizon in Hupeh by Mr. Shu and the writer<sup>2</sup>. With respects to the upper part of the said formation *Orthoceras chinense* Foord, *Vaginoceras wahlenbergi* Foord etc. are the predominant types.

Now let us discuss the Lunshan limestone at Lun-shan and the Ordovician limestone at Tang-shan individually.

#### I. At Lun-shan

A. The Lunshan limestone was first recognized by von Richthofen. He had collected the following species, which according to Frech's determination, were considered to be of Upper Ordovician age.

*Asaphus* sp.

*Endoceras duplex* Wahlenberg

*Orthisina squamata* v. Pahlen.

*Orthis* cf. *calligramma* Dalm.

*Raphistoma sinense* Frech

According to Foord's opinion the form *Endoceras duplex* Wahlenberg should be called *Endoceras Wahlenbergi*<sup>3</sup>. The generic name of the latter form has been again changed to *Vaginoceras* by the writer<sup>4</sup>, for the text figure of *Endoceras wahlenbergi* given by Foord shows that the tubi always extend beyond the preceding ectoseptum. Furthermore, the forms *Orthisina squamata* as well as *Raphistoma sinense*, so far as we know, should be referred to the genera *Clitambonites* and *Eccyliopteris* respectively. As a whole the forms in Richthofen's collection are apparently of the same types as those collected from the Neichia formation of Hupeh by Prof. Lee, Hsieh, and others.

B. In 1924 Mr. Y. M. Hsu carried on field work at Chen-chiang, Kaotze and the neighbourhood in Kiangsu province<sup>5</sup>. From the top of the Lunshan limestone at Lun-shan he obtained several specimens of

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1. See Y. C. Sun: Ordovician Trilobites of Central and Southern China. Pal. Sin. Ser. B, Vol. VII, Fasc. 1.
  2. Mem. National Research Inst. of China, No. VIII, p. 46.
  3. Catalogue of Fossil Cephalopoda in the British Museum (Nat. Hist.) pt. I, p. 136.
  4. C. C. Yü: Ordovician Cephalopoda of Central China, p. 30.
  5. "Science" Science Society of China, Vol. X, No. 4, pp. 456-459.

cephalopods, which were provisionally identified by Prof. Grabau as the following species:

*Proterocameroceras mathieui* Grabau

*Succoceras attenuatum* Grabau

The above mentioned species are Lower Ordovician forms characteristic of the Peilintze limestone in the Kaiping basin, Chihli province. Now the question arises, if the top part of the Lunshan limestone represents the Lower Ordovician, where did Richthofen's collection of the Middle Ordovician fauna come from. In attempting to answer this question we are confronted with three possibilities. The first one is that the Lunshan limestone is actually of Lower Ordovician age while Richthofen's collection might be wrongly identified or came from another locality. The second one is that due to the bad preservation of the fossils the determination of the age of the limestone as Lower Ordovician is erroneous. The third possibility is that the Lower Ordovician forms collected by Mr. Hsu were not in situ, but belonged to a horizon below the fossiliferous bed where Richthofen's collection was made. Although neither the specimens procured by Mr. Hsu, nor the figures of Richthofen's forms are available, it is quite improbable that either Frech or Grabau made erroneous determinations, and hence the last possibility seems to be the most likely. In support of this hypothesis there is another fact given by Messrs. C. Li and S. Chu.

C. Messrs. Li and Chu had made a detailed survey at Lunshan in 1931. A succession of the strata of the Lunshan limestone has been recorded in descending order as follows:

Silurian Shales

Ordovician beds

1. Yellowish gray thin bedded limestone with irregular pale yellow shaly layers, containing *Orthoceras* ..... 30 m.
  2. Light gray thin bedded limestone ..... 50 m.
  3. Whitish gray silicified thin bedded limestone ..... 100 m.
  4. Light gray thick bedded limestone ..... 60 m.
  5. Light gray thin bedded limestone more silicified and interbedded with silicified layers ..... 120 m.
  6. Light gray thick bedded limestone ..... 100 m.
- Base not exposed.



The beds of the Lunshan limestone at Lun-shan dip more or less toward the south, and its middle part forms topographically the higher part of Lun-shan. At the uppermost portion of the Lunshan limestone Mr. Li has collected several specimens of cephalopods from the actual beds. They are very fragmentary, but one of them is comparatively complete and of large size. A close examination shows that it is not an *Orthoceras* but a *Vaginoceras*<sup>1</sup>. This form may be compared with *Vaginoceras uniforme* which has been found by C. Y. Hsieh in the upper red bed of the Tafang limestone at Yang-sing-hsien, and by C. Li and W. P. Shu in the red limestone at San-shan-yuan, Chung-yang-hsien, Hupeh province. These fossiliferous beds are considered to correspond to the Neichia formation.

At the same time Mr. Li obtained another small fragment of an endoconch adhering to a limestone pebble. He has informed the writer that the pebble was picked up on the sloping side of the Lun-shan. Even though we don't know the actual horizon, from which this pebble came, nevertheless, it is quite certain that it must have rolled down from the higher part where the beds are stratigraphically much lower. In other words, this pebble must originate from the bed lower than the horizon where the *Vaginoceras* was collected. As regards the adhering siphuncle it recalls the form found in the upper part of the Ichang limestone in central China i.e. *Cameroeras hupehense*. Moreover, the Lunshan limestones below the bed containing *Vaginoceras aff. uniforme* largely carry chert nodules or layers<sup>2</sup>. This fact suggests that the main part of the Lunshan limestone lithologically resembles the upper part of the Ichang limestone.

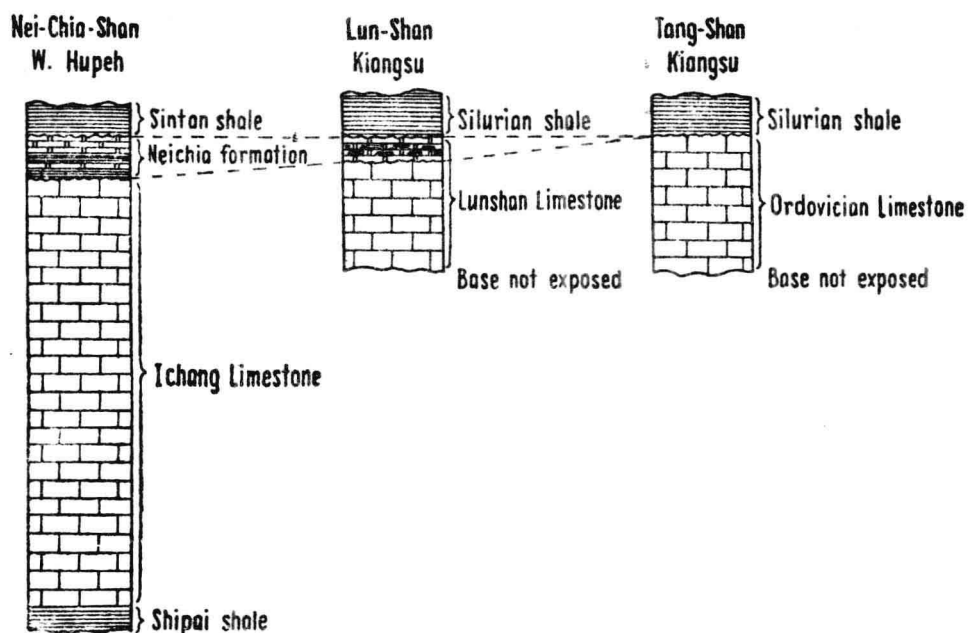
In general, the top of the Lunshan limestone would correspond to the Neichia formation, and the lower, to the upper part of the Ichang limestone. However, the boundary between these two at Lun-shan is still quite unknown to me, though it might be drawn above bed 3 in the foregoing succession recorded by Mr. Li. This point will be left for further research.

## II. At Tang-shan.

Messrs. C. C. Liu and J. C. Chao in 1924 found an indeterminate species of *Clitambonites*<sup>3</sup> in the Ordovician limestone at Tang-

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1. The description will be given below.
  2. According to the reports of Mr. Li and Mr. Hsu (Science, Vol. X, No. 4, p. 457).
  3. Preliminary Report on the Geology and Mineral Resources of Kiangsu, p. 7. Geol. Surv. China.

shan. Four years later C. Y. Hsieh and K. Chang re-studied the geology of Tang-shan. According to their report<sup>1</sup> the oldest rock at Tang-shan is the Lunshan limestone, its exposed part totalling a thickness of about 400 m. The whole formation is characterized by the presence of abundant chert nodules or layers. Near the top of the limestone, where a layer of red chert about 1-2 m. thick occurs, numerous *Proterocameroeras* and several brachiopods were collected. In June of 1931 the writer spent half a day in re-examining the Ordovician limestone at Tang-shan, and collected from the uppermost part of the limestone some well-preserved siphuncles of *Cameroeras* (*Proterocameroeras*) which suggest nearly the same forms as those obtained from the Ichang limestone of Hupeh. From both the palæontological and lithological points of view the whole part of the Ordovician limestone at Tang-shan would be equivalent to the upper portion of the Ichang limestone in Hupeh, but not exactly corresponds to the Lunshan limestone at Lun-shan, for the Lunshan limestone at Lun-shan is capped by the bed including the forms of the Neichia formation, while the top red chert layer of the Ordovician limestone at Tang-shan, so far



as we made the traverse along its northern and northeastern slope, is directly succeeded by the Silurian shale, and the Neichia forma-

1. Bull. Geol. Soc. China, Vol. 7, No. 2, p. 158, 1928.

tion is wholly missing by a strike fault. I am quite doubtful whether the Neichia formation might be partly found by another traverse near the northwestern border of Tang-shan.<sup>1)</sup>

The columnar sections are drawn above in order to make a comparison between the Ordovician rocks at the different localities.

### DESCRIPTION OF SPECIES.

#### *CAMEROCERAS HUPEHENSE* Yü (sp. nov.)

Pl. I, Figs. 1-6.

1924. *Proterocameroceras mathieni* Grabau (partim), Lee: Bull. Geol. Soc. China, Vol. 3, No. 3-4, p. 368 (listed)
1926. *Proterocameroceras mathieni* Grabau (partim), Hsieh & Chao: Bull. Geol. Surv. China, No. 7, p. 28 (listed)
1930. *Cameroceras* cf. *styliforme* Grabau (partim), Yü: Ordovician Cephalopoda of Central China, p. 23, pl. I, fig. 1.

This form usually shows nothing externally but a slender sub-cylindrical fragment adhering abundantly to the surface of the country rocks, and is distributed over a wide area. Among the material now at hand, however, there is a well-preserved endoconch (Pl. I, fig. 1) provided with a complete conical apical end. It measures about 70 mm in length. It tapers at the apical extremity more rapidly, giving the rate of tapering about 1 mm in a length of 3 mm. Above the point about 20 mm from the apex, it expands very gently, and the rate of increase may be computed as 1:20 approximately. The endoconch is wholly covered with a thin layer of the endotheca, which is throughout marked by the annular ridges. The ridges are separated at a distance of 1.5 mm at the apical portion and 2 mm at the upper part. They are oblique to the axis of the endoconch making at its lateral sides an angle of about 65°. They form broad saddles on the ventral side. This fact indicates that the endoconch are sub-marginal to the outer shell, but not close to it.

In another specimen (Pl. I, fig. 2) of the same species the endoconch is slightly oval in cross section, measuring 8.5 mm in dorso-ventral diameter and 9 mm. in transverse. At the same stage the ovate-

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1) This paper was written several months ago. Recently Mr. S. Chu has also gone to Tang-shan and found that the *Orthoceras* limestone of the Neichia formation does occur at the northwestern as well as southwestern border of the hill 'Tang-shan'. C. C. Yü. October 20th., 1932.

elliptical endocone is 2 mm and 3 mm in its two diameters. The endocone is slightly flattened at the side which corresponds to the ventral surface of the endoconch. Around the endocone there are several concentric layers indicating the endosepta. In a transverse section below the endocone, a small elliptical endosiphotube is exposed with a flatter base. From the extremities of the longer diameter of the endosiphotube, two endosiphoblades<sup>1</sup> are prolonged outwards to the periphery of the endoconch. The cross section of the endosiphotube is slightly variable in different individuals. Its outline is either elliptical (Pl. I, fig. 2) or subtriangular (Pl. I, fig. 3) or convexo-concave forming a crescentic shape (Pl. I, fig. 4), but the last one is more commonly the case. The endosiphoblades usually extend out crossing the dorso-ventral direction of the endoconch. When the endosiphotube assumes a crescentic form, the endosiphoblades often slope obliquely along the direction of the limb of the curved endosiphotube. Still in some cases the endosiphoblades take a different direction at each side of the endosiphotube.

**REMARKS:** Formerly this shell was considered by some authors to be *Proterocameroceras mathieui* Grabau. In reality it is a form of *Cameroceas*, for the endoconch is wholly surrounded by the ectosepta. The outer shell of this form has not as yet been found. However, as far as the endoconch is concerned, the present form may be distinguished from the closely allied form *Cameroceas styliforme* Grabau<sup>2</sup> in having the much more cylindrical endoconch, and in having the two distinct endosiphoblades prolonged nearly along the direction of the longer diameter of the endosiphotube. In 1930 I had compared three specimens with Grabau's species. Recently I find that one<sup>3</sup> of them should be grouped into the present species.

**HORIZON AND LOCALITIES:** The specimens (Pl. I, figs. 1, 2, 4 and 6) are from the uppermost part of the Ichang limestone at Nei-chia-shan of Tze-kuei-hsien and at Lo-jo-ping of I-chang-hsien, Hupeh province. (Coll. J. S. Lee and C. Y. Hsieh respectively). Mr. C. Li had collected one small specimen (Pl. I, fig. 5) from the upper part of the Lunshan

1. Holm suggested the term "Endosiphoblade" for the thin calcified endosiphuncular membrane which connects the endosiphotube and endosiphococone with the ectosiphuncle (N. Y. S. M. Bull. 80, pp. 303 and 304). In our form the position of the endosiphoblades is occupied by the narrow open slits, which is filled with the substance same as in the endosiphotube. The absence of the endosiphuncular membrane is due to the destruction before fossilization.
2. Grabau: Ordovician Fossils from North China, p. 39, pl. IV, figs. 4-6.
3. loc. cit.

limestone at Lun-shan. The same species (Pl. I, fig. 3) was also obtained not far from the top of the Ordovician limestone at Tang-shan (Coll. C. C. Yü). The fossiliferous beds at the latter two places correspond to the upper part of the Ichang limestone of Hupeh province.

*CAMEROCERAS HUPEHENSE* var. *ACUTINUM* Yü (sp. et var. nov.)

Pl. I, Figs. 7, 8a-b.

1930. *Cameroceas* cf. *styliforme* Grabau (partim), Yü: Ordovician Cephalopoda of Central China, p. 23, Pl. I, figs 2 and 3.

This variety resembles the preceding one in all essentials, but only differs from it in the endoconch tapering much more rapidly, this being at the rate of 1:10 approximately. The specimens as figured in the "Ordovician Cephalopoda of Central China" (Pl. I, figs. 2 and 3) shows the tapering of the endoconch and the two endosiphoblades precisely in the same condition as in this variety. In the rate of tapering and some other characters this is very similar to *Cameroceas styliforme*, but the presence of two endosiphoblades can serve to distinguish the former from the latter.

HORIZON AND LOCALITIES: This variety (Pl. I, Fig. 8) was obtained from the uppermost part of the Ichang limestone at Lo-jo-ping, I-chang-hsieh (Coll. C. Y. Hsieh). It was also found by the author from the uppermost part of the Ordovician limestone at Tang-shan, near Nanking, Kiangsu (Pl. I, fig. 7).

*CAMEROCERAS TRIFORMATUM* Yü (sp. nov.)

Pl. I, Figs. 9a-c.

1924. *Proterocameroceas mathieui* Grabau (partim), Lee: Bull. Geol. Soc. China, Vol. 3, No. 3-4, p. 368. (listed).

1926. *Proterocameroceas mathieui* Grabau (partim), Hsieh & Chao: Bull. Geol. Surv. China, No. 7, p. 28. (listed).

Endoconch straight, moderately large, with a conical apical end. It tapers rather rapidly, this being at the ratio of 1:10. Below a point 15-20 mm from the apical extremity, the rate of tapering becomes much greater. Either the endoconch or the endocone is oval in section with the ventral side more or less flattened. On the transverse section taken across the endocone there are six or more endosiphoblades extending out from the periphery of the endocone to the margin of the endoconch, while below the endocone the endosiphotube is usually accompanied by three endosiphob-

blades. The apical angle of the endocone formed by the last endoseptum is  $20^{\circ}$ - $25^{\circ}$ . The cross section of the endosiphotube varies from the crescentic to sub-elliptical form. When the ectotheca is present, it is marked on the lateral sides by the oblique annular ridges which are 1.5 mm apart at the lower end and about 2 mm at the upper.

**REMARKS:** This form may be readily distinguished from *Camero-ceras hupehense* by its much greater rate of tapering of the endoconch and in having three endosiphoblades attached to the endosiphotube. So far as the general characters of the endoconch are concerned, it bears much resemblance to *Camero-ceras styliforme* from the Liangchiashan formation in North China, but whether or not Grabau's species has the endosiphoblades was not mentioned in the description. The original specimens of Grabau's form are not sufficiently abundant to allow us to make any more polished sections. Whether our form is actually conspecific with Grabau's species or not might be determined by the further collections of the completely preserved specimens from North China.

**HORIZON AND LOCALITIES:** This form was collected by J. S. Lee and C. Y. Hsieh respectively from the uppermost part of the Ichang limestone at Nei-chia-shan of Tze-kuei-hsien and at Lo-jo-ping of I-chang-hsien, Hupeh province.

#### VAGINOCERAS aff. UNIFORME Yü

Pl. I, Figs. 10 a-b

1930. *Vaginoceras uniforme* Yü: Ordovician Cephalopoda of Central China. p. 42, Pl. II, figs. 8a-b; 9; Pl. V, figs. 4a-b.

Shell straight and of very large size. The apertural portion as well as the apical extremity are not preserved. As shown on the upper surface of the rock the width of the lower end of the specimen measures about 40 mm, while that of the upper is about 50 mm. A cross section at the upper end shows the maximum width of the shell to be more than 70 mm. From this, we know that the width of the specimen exposed on the surface of the rocks is not the actual diameter of the shell and that the lower end is probably much more deeply buried in the rock than the upper end. Owing to the imperfectly preserved condition, the diameter of the shell of the lower end is quite unknown, and the rate of tapering of the ectoconch is not determinable. Judging from the general outline at the upper end, the ectoconch seems to be subelliptical. External character entirely unknown.

The ectosepta are crowded and almost equally separated from one another. In general the ectoseptal distance is about 12 mm throughout

the whole fragment, though some are either slightly shorter or longer. The ectosepta are gently concave, their concavity being a little less than the depth of one camera at its centre.

The endoconch may be seen at the larger end. It is situated close to the outer shell, but not in juxtaposition with it. It is elliptical in outline, their diameters being at the ratio of 4:3. Its longer diameter is about  $1/4$  as large as the maximum width of the ectoconch. In actual measurement the endoconch attains a major diameter of 17 mm, while that of the ectoconch is 70 mm or more. The tubi are not clearly shown. But near the upper end one tubus is seen to extend apicad beyond the preceding ectoseptum at some distance. The interior of the endoconch reveals nothing except the lime matrix.

REMARKS: The present form may be related to *Vaginoceras wahlenbergi* Foord<sup>1</sup>. But in Foord's species the transverse sections of both the ectoconch and endoconch are circular, and the endoconch is as large as  $1/3$  the ectoconch in the adult shell, while in our form either the ectoconch or the endoconch is elliptical in shape, and the diameter of the endoconch as compared with that of the ectoconch is much smaller. Furthermore, in *Vaginoceras wahlenbergi* the ectoseptal distances, as a whole, gradually increase upwards, but the ectosepta in our specimen are nearly equidistant from each other throughout. It may be also readily distinguished from *Vaginoceras vaginotum* Schlotheim<sup>2</sup>, for the latter has much more approximate ectosepta and much larger endoconch. So far *Vaginoceras uniforme* from Hupeh province agrees with the present species in all respects except that the specimen now at hand is comparatively much larger in size, and its rate of tapering is quite uncertain.

HORIZON AND LOCALITY: *Vaginoceras uniforme* was first found by Mr. C. Y. Hsieh in the upper red bed of the Tafang limestone at Yang-sing. Later Mr. C. Li obtained it from the corresponding bed at San-shan-yuan, Chung-yang-hsien. Last year the present specimen was collected by C. Li from the uppermost part of the Lunshan limestone at Lun-shan near Nanking. The beds yielding this species at the different places are probably the contemporaneous deposits and considered as the equivalent of the Neichia formation.

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1. Catalogue of Fossil Cephalopoda, Pt. I, p. 136.

2. loc. cit. p. 140.

## EXPLANATION OF THE PLATE

Fig. 1. *Cameroceras hupehense* Yü (sp. nov.) Nat. size.

- 1a. External view of an endoconch, showing the well-preserved apical end, tapering of the endoconch, and the last endosiphosheath at the upper end.
- 1b. Lateral view of the same, showing the endotheca and the annular ridges.  
Uppermost part of the Ichang limestone, Nei-chia-shan.  
Tze-kuei-hsien, W. Hupeh. (Coll. J. S. Lee).

Fig. 2. *Cameroceras hupehense* Yü (sp. nov.)  $\times 2$ .

- 2a-b. Transverse sections of a specimen, showing the outline of the endocone as well as the endosiphotube, and two endosiphoblades attached to the endosiphotube.  
Same horizon and locality as preceding. (Coll. J. S. Lee).

Fig. 3. *Cameroceras hupehense* Yü (sp. nov.)

- 3a. External view of a weathered specimen. Nat. size.
- 3b-c. Transverse section of the same, showing the form of the endosiphotube with two endosiphoblades at the sides.  $\times 2$ .  
Uppermost part of the Ordovician Limestone, Tang-shan, near Nanking, Kiangsu (Coll. C. C. Yü).

Fig. 4. *Cameroceras hupehense* Yü (sp. nov.)

- 4a. External form of a weathered endoconch. Nat. size.
- 4b. Transverse section of the same, showing the endosiphotube and the endosiphoblades.  $\times 2$ .  
Uppermost part of the Ichang limestone, Lo-jo-ping, Ichang-hsien, W. Hupeh. (Coll. C. Y. Hsieh).

Fig. 5. *Cameroceras hupehense* Yü (sp. nov.) Nat. size.

- View of a small portion of the endoconch. Upper part? of the Lunshan limestone, Lun-shan, near Nanking, Kiangsu. (Coll. C. Li).

Fig. 6. *Cameroceras hupehense* Yü (sp. nov.) Nat. size.

- A portion of the endoconch, showing the very gentle tapering of endoconch.  
Uppermost part of the Ichang limestone, Lo-jo-ping, Ichang-hsien, W. Hupeh. (Coll. C. Y. Hsieh).

Fig. 7. *Cameroceras hupehense* var. *acutinum* Yü (sp. et var. nov.)

- View of the weathered endoconch as exposed on the rock,



showing the rapid rate of tapering and the last endosiphosheath. Nat. size.

Uppermost part of the Ordovician limestone, Tang-shan near Nanking, Kiangsu. (Coll. C. C. Yü).

Fig. 8. *Cameroceras hupehense* var. *acutinum* Yü (sp. et var. nov.)  
Nat. size.

8a. Longitudinal section of an endoconch.

8b. Transverse section of the same.

Uppermost part of the Ichang limestone, Lo-jo-ping, Ichang-hsien, W. Hupeh. (Coll. C. Y. Hsieh).

Fig. 9. *Cameroceras triformatum* Yü (sp. nov.)

9a. External form of an endoconch. Nat. size.

9b. Transverse section across the endocone of the same, showing the outline of the endocone with 6 endosiphoblades.  $\times 2$ .

9c. Transverse section about 15 mm. below the above one, showing the three endosiphoblades.  $\times 2$ .

Uppermost part of the Ichang limestone, Nei-chia-shan, Tze-kuei-hsien, W. Hupeh. (Coll. J. S. Lee).

Fig. 10. *Vaginoceras* aff. *uniforme* Yü. Nat. size.

10a. Top view of the specimen, showing the position and the outline of the endoconch.

10b. A natural weathered section of the same, showing the ectoseptal distance.

Uppermost part of the Lunshan limestone, Lun-shan, near Nanking, Kiangsu. (Coll. C. Li).