

## ON SOME EOCENE AND OLIGOCENE MAMMALS FROM KWANGSI AND YUNNAN

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In spite of the fact the Eocene or Early Tertiary continental deposits are extensively developed in South China, so far very few mammalian fossils have been found in these beds. Young and Bien (Young, 1932, Bien 1939; Young and Bien, 1939) have reported the occurrence of Eocene and Oligocene mammals in Lunan and Chuching, Yunnan; and the Eocene localities in Tientong and Tienyang have been recorded by Young and Chow (1956). But with the exception of a single tooth fragment from Chuching (Young, 1932), none of the fossils from these localities has been described. The present paper gives a brief description of all the few fossil mammals from these beds. Though very imperfectly known it may serve to give the first glimpse into the nature of the Early Tertiary mammals of Yunnan and Kwangsi. The results of the study have been partly summarized in a recent article by the present writer (Chow, 1957), therefore, only a few supplementary remarks are given here.

### 1. LATE EOCENE MAMMALIAN FOSSILS FROM THE RED BEDS OF LUNAN, YUNNAN

The mammalian fossils from Lunan described here were collected and first reported by Bien (1939) and the fauna was later studied by Young and Bien (1939). According to their preliminary determination it consists of: Carnivora indet., *Amynodon* cf. *mongoliensis* Osb., *Caenolophus minimus* Matt. et Gr., *Telelophus* sp., *Deperetella* sp., ? *Protitanotherium* sp., Anthracotheriidae indet., Chelonia indet. Some of these fossils had been lost during the War, some are still available for study and are described in the second part of this article. The following is a revised list of the fauna:

Carnivora indet.  
*Deperetella* sp.  
*Lunania youngi*, gen. et sp. nov.  
*Caenolophus medius*, sp. nov.  
*Amynodon* sp.  
*Titanotherium* sp.  
Anthracotheriidae indet.  
Chelonia indet.

As can be seen from the above list the mammalian fauna is essentially similar to the late Eocene faunas of North China and can be closely comparable to the Shara Murun fauna of Inner Mongolia as was originally suggested by Young and Bien (1939).

## 2. VERTEBRATE FOSSILS FROM TIENTONG SANDSTONE, KWANGSI

The fossil localities in Tientong and Tienyang were discovered in 1954 by some geologist working in Kwangsi. The teeth and bones are from the conglomeratic sandstone beds which are extensively developed in western Kwangsi. These fossils represent the first record of the occurrence of Tertiary mammals in that Province. The fauna contains of:

- Creodont indet.
- Metatalmatherium* cf. *browni* Colbert
- Deperetella* sp.
- Paramynodon* cf. *birmanicus* Pilgrim et Cotter
- Anthracothema rubrica* (Pilg. et Cott.)
- Anthracokeryx birmanicus* (Pilg. et Cott.)
- Anthracokeryx* cf. *moritus* Pilgrim
- Tragulid indet.
- Emys* sp.
- Amyda* sp.
- Crocodylus* sp.

Nearly all the above listed mammalian fossils belong to the forms which are of common occurrence in the Pondaung Sandstone of Burma. And the fossils from Tientong and Tienyang, as it is also the case with those of Pondaung, are mostly very fragmentary. This may be explained by the fact that both are preserved in the coarse detrital sediments deposited in a fluvial environment and by the abundance of crocodylian remains present. Therefore, we can be with fair certainty to assume that the mammalian faunas of Tientong and Pondaung belong to the same mammalian horizon. The age of the fauna according to the analysis of Colbert may be considered as of latest Eocene.

## 3. MAMMALIAN FOSSILS FROM THE TSAICHIACHUNG MARLS CHUCHING, YUNNAN

The age of the fossil bearing Tsaichiachung Marls was first considered as Pliocene by Young (1932) based on the first discovered specimen from this beds which was preliminarily identified as *Merycopotamus* sp. This view was followed with slight modification by Colbert (1940). But with some additional new material collected by Bien in 1937, the age of the beds was revised by Young and Bien as Early Oligocene. The mammalian fossils found as revised by the present writer include *Cadurcotherium* cf. *ardynense* Osb., and *Bothriodon* sp., Tragulidae indet. Remains of chelonians and crocodylian are also present. By the presence of *Cadurcotherium* and *Bothriodon* the Oligocene age of the Tsaichiachung marls may be established. This represents the only Oligocene mammalian locality so far known in South China.

## Description of the Fossils

### Mammalia

#### *Carnivora incertae sedis*

(Pl. I, Figs. 1, 1A)

Material: The anterior two-third of a right third lower molar. Cat. No. V. 909.

Horizon and Locality: Upper Eocene Tientong beds; Chulingteng, Tientong, Kwangsi.

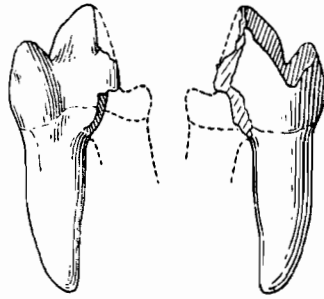


Fig. 1. *Carnivora* indet.

Internal and external views of the low carnassial, natural size.

Description: The tooth is of moderate size. It is strongly trenchant and with well developed sectional surface on the external side of the paraconid and protoconid. The trigonid is laterally compressed, the paraconid moderately strong and with an antero-basal cusp. The protoconid (17 mm high) is strongly developed and highly elevated above the level of the paraconid. The metaconid is broken off, but it seems to be only moderately developed and nearly on the same level as the paraconid, as can be observed from the remnant preserved part of the cusp. The nature of the tyloconid is unknown but is presumed to be well developed as judged from the structure of the tooth in general.

The anterior root is 122 mm long and very stout.

The tooth is too fragmentary for a generic determination. Probably it is a hyaenodont showing characteristics which are in general intermediate between those of *Sinopa* and *Ptrodon* and the true *Hyaenodon*.

The species through very imperfectly known is of some interest because it represents the first record of Tertiary carnivora in South China.

### Order Perisodactyla

### Brotheriidae Marsh

### *Matetelmatherium* Granger and Gregory, 1938

### *Matetelmatherium* cf. *browni* Colbert

(Pl. I, Figs. 8, 8A)

Material: A left mandible with slightly worn  $P_1$ — $M_2$  and broken at both ends and all through the lingual side of the lower teeth row, V. 910.

Horizon and Locality: Upper Eocene Tientong beds, Nawateng, Tientong, Kwangsi.

Description: The preserved part includes most of the horizontal ramus of the lower jaw which is broken in front behind the root of the canine and at the first lobe of the third molar. The ramus is rather heavily built, of moderate depth, and with nearly parallel upper and lower borders, the latter turns but slightly upwards anteriorly.

The teeth are moderately hypsodont and crowdedly set. The outline of the lophs are all broadly V-shaped. Those of the premolars are more or less rounded, while those of the molars are angulate and more acute. The crown as well as greater part of the roots of the canine are gone, but judging from the preserved part it seems to be of rather small size, and is separated behind from the small first premolar by a diastema of about 9 millimeters long. The external cingular ridges are developed between the valleys of the lophs but nearly absent on the external wall at the position of the main cusps.

The lingual side of the crown of all the teeth are broken, but it seems that the metaconid and the entoconid are rather strong.

Measurements in mm (figures for Burmese specimens after Colbert, 1938):—

	Tientong	Am. 10022	Am. 20016
Depth of ramus below $M_1$ .....	62	49	60
Length, $P_2$ .....	21.5	—	—
Length, $P_3$ .....	25	—	—
Length, $P_4$ .....	31	—	26
Length, $M_1$ .....	40	38	33
Length, $M_2$ .....	51	49	40

The identification of the above species is rather difficult with the material in hand. But a comparative measurements of this and the *T. browni* described by Colbert from the Pondaung Eocene show that they are rather close proportionally. The characters of the

lower teeth according to the diagnosis given by Colbert such as the rather hypsodonty of the teeth, lacking of external cingula, and having a swollen posterior process on the metaconid, and the structure of the mandibular is all in accord with the Tientong specimen. Therefore, I have provisionally referred the latter to the Burmese form.

### **Helaletidae Osborn**

#### **cf. *Deperetella* sp.**

(Pl. I, Figs. 6, 7)

The species is represented in the collection by two lower molar fragments from Tientong and Lunan respectively. The one from Lunan was mentioned in the paper by Young and Bien (1939) as *Deperetella* sp. without description. It represents the anterior transverse crest of a posterior lower molar. The tooth had not subjected to wearing and is probably not a fully erupted one for it is quite fresh and heavily coated with cementing material. The tooth is characterized by its rather hypsodont crown, non-connecting and more or less straight loph, slightly bending forward at both ends. The transverse diameter is 28 mm long. There is a well developed anterior cingulum, V. 107.1.

There is another specimen in the collection from Tientong which is only doubtfully represented by the lingual half of a posterior crest which is, somewhat similar to the above one. V. 107.2.

Both the teeth are too fragmentary for a close comparison with the several related known forms such as *Deperetella crista*, *Telelophus medius* from Inner Mongolia and *Cristidentinus depereti* from the Yuauchu basin but it is decidedly different from the Burmese species by its much larger size and more hypsodont crown of which the present form is closer to *Deperetella crista*.

### **Lophiodontidae**

#### ***Lunania youngi*, gen. and sp. nov.**

(Pl. I, Figs. 4, 4A)

Type: A mandibular ramus with the last two molars and the root of the first molar. V. 103.

Horizon and Locality: Upper Eocene, Lunan, Yunnan.

Diagnosis: A small lophiodontoid perissodactyla; lower molar rather hypsodont and distinctly dilophont but with the two transverse lophs connected by a broad but vertically reduced connecting ridges and the external walls of the crests are continuing at the base.

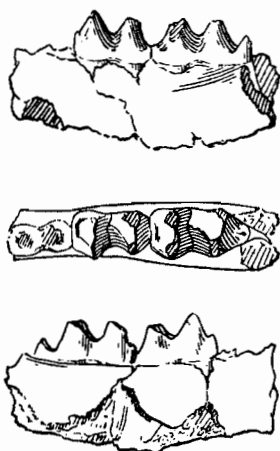


Fig. 2. *Lunania youngi* sp. nov.

internal, crown and external views of the type specimen (V. 103), natural size.

The third lower molar is slightly larger than the preceding one in size and with a reduced looped heel.

Measurements (in mm.):

Length $M_2$ .....	10	Width $M_3$ .....	11.3
Width $M_2$ .....	6	Height of crown at $M_2$ .....	11.3
Length $M_3$ .....	13		

Remarks: This species is characterized by its peculiar structure of the second or posterior loph of the lower molars of which the two sides descend and converge forward antero-externally to come into contact with the anterior loph at its posterior-external corner and in continuation with it externally. The structure of the anterior loph is same as that in those of the helaletids or related form to which the present genus is possibly affiliated.

The structural characteristics of the lower molars are evidently different from all the related known forms and I have erected a new generic name for it and included it provisionally in the family Lophiodontidae on account of its general lophiodont appearance of the lower molar and in having a small looped type heel on the last lower molar.

### Hyracodontidae Cope

#### *Caenolophus* Matthew and Granger

#### *Caenolophus medius* Chow, sp. nov.

(Pl. I, Fig. 2)

Type: A right upper jaw with  $P^1$ ,  $dp^{2-4}$ ,  $M^1$  and anterior of  $M^2$  in alviola. All the erupted teeth with the exception of  $dp^2$  are only slightly or moderately worn and broken at places. V. 912.

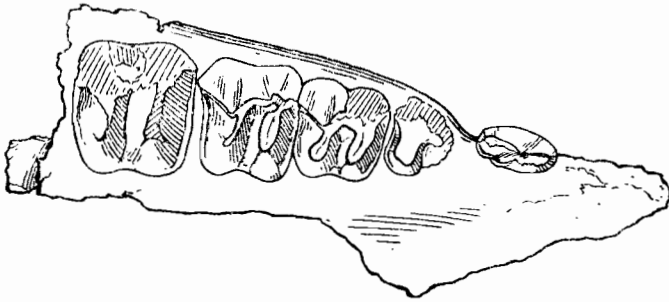


Fig. 3. *Caenolophus medius* sp. nov.

Crown view of the type maxilla (V. 912).  $\times 1$ .

Horizon and Locality: Upper Eocene, two kilometers north of the district city of Lunan, Yunnan.

Diagnosis: A *Caenolophus* slightly smaller than the Mongolian species *C. obligus* in size, but resembles the latter in general.

The first premolar is compressed conical and with a lingual cingular shelf. The transverse crest of the intermediate teeth are less strongly obliquely set than in the Mongolian form. Anterior and posterior cingula are well developed on all teeth.

Measurements (in mm):

	Length	Width
P <sup>1</sup> —M <sup>1</sup> .....	65	—
dp <sup>4</sup> .....	15	15.5
M <sup>1</sup> .....	17 (3)	18

***Caenolophus* sp.**

(Pl. I, Figs. 3, 3A)

Material: A left lower jaw fragment with moderately worn P<sub>2</sub> and P<sub>3</sub> and the alveolus of P<sub>1</sub>, V. 913.

Horizon and Locality: As the above species.

Remarks: The mandibular ramus is deep, narrow, and with nearly straight ventral border. There is a proportionally very long diastema in front of the first lower premolar which is double-rooted and reduced in size. The second lower molar (7.5 $\times$ 5) is not molariform and almost without a posterior loph. The third lower molar (8 $\times$ 5.3) is submolariform and with a distinct looped second loph which is lower than the anterior one in position.

Had the generic affinity with the *Caenolophus* of the present specimens been correctly established it seems to match the Mongolian species *C. minimus* in the size of the lower teeth. But the depth of the ramus is comparative greater in the specimen from Lunan. Therefore, it is probable that we are dealing with a specifically or even genetically new form of hyrocodontoid perissodactyla.

### **Amynodontidae**

#### ***Amynodon* sp.**

(Pl. I, Figs. 5, 5A)

Material: A fractured lower jaw fragment with the first and second molar teeth, V. 108.

Horizon and Locality: Upper Eocene, Lunan, Yunnan.

Remarks: The specimen is very much worn and fractured. Judging from the size and structure of teeth in general there is no noticeable difference between it and *Amynodon sinensis* from the Eocene of Yuanchu in southern Shansi, but it is too imperfectly represented for a closer comparison and specific identification.

### ***Paramynodon* Matthew, 1929**

#### ***Paramynodon* cf. *birmanicus* (Pilgrim and Cotter)**

Material: A broken second (?) upper molar.

Horizon and Locality: Upper Eocene; Lomantung, Tientong, Kwangsi.

Material: A broken upper molar. V. 915.

Remarks: The reference of the tooth to this species though highly probable is based on the reference of the close correlation of the faunas. It is comparable to that of the referred species in the structure of preserved part of the tooth as well as its size.

### **Artiodactyla**

#### **Anthracotheriidae**

#### ***Anthracothema* Pilgrim and Cotter**

#### ***Anthracothema rubrica* (Pilgrim and Cotter)**

(Pl. II, Figs. 1—3)

*Anthracothyus rubrica*, Pilgrim and Cotter, 1916; Rec. Geol. Surv. India, XLVII, p. 55, Pl. II, figs. 5—7; Pl. IV, figs. 1—6.



*Anthracothema rubrica*, Pilgrim, 1925, Mem. Geol. Surv. India, (N.S.) XIII, p. 14, Pl. II, figs. 1—7.

*Anthracothema rubrica*, Colbert, 1938, Bull. Am. Mus. Nat. Hist. LXXIV, p. 356—358, figs. 43, 44.

Material: P<sup>3</sup>, P<sup>4</sup>, M<sup>3</sup>, all of the left side and most probably of the same maxilla (V. 916), a left astragalus of comparatively large size may also be referred to the same species (V. 917).

Horizon and locality: Upper Eocene, Chulingtung, Tientong, Kwangsi.

Remarks: The structures of the three upper cheek teeth are essentially identical with Burmese form as described by Pilgrim and Cotter and Colbert.

The third premolar is sharply pointed, conial and subtriangular in outline; the internal cusp is merely indicated by a small swelling on the cingular shelf. The fourth premolar is only slightly longer than broad, strongly bicuspid and with strong cingulum posteriorly. The internal cusp is smaller than the external one, cingulum absent on lingual side.

The last lower molar is large, low-crowned, and five-cusped. The hypocone is the largest; the paracone, metacone and protocone are nearly of equal strength. The protoconule is the smallest and the top of which is on the same level as the protocone and are lower in position than the other cusps. The cingula are well developed on nearly all sides except on the external wall of the two main cusps. The styles are only feebly developed except the metastyle and on the posterior external corner of the tooth.

A larger astragalus might also belong to this species judged from its proportionate size.

Measurements (in mm):—

	Tientong (V. 916)	Type	Am. Mus. No. 20027 (after Colbert)
P <sup>3</sup> , Length .....	17 .....	— .....	—
Width .....	14 .....	— .....	—
P <sup>4</sup> , Length .....	16 .....	— .....	12.5*
Width .....	15 .....	— .....	17.5
M <sup>3</sup> , Length .....	25.3 .....	31.9 .....	26
Width .....	27 .....	34.3 .....	28.5
Astragalus—Length .....		51	
Width (distal end) .....		27	

\*This figure is probably too small because the interior of the tooth (see fig. 43) is much worn or “squeezed”.

***Anthracokeryx* Pilgrim and Cotter*****Anthracokeryx birmanicus* Pilgrim and Cotter**

(Pl. II, Fig. 4)

*Anthracokeryx birmanicus*, Pilgrim and Cotter, 1916, Rec. Geol. Surv. India, XLVII, pp. 61—62, Pl. V, figs. 2—5.

*Anthracokeryx birmanicus*, Colbert, 1938, Bull. Am. Mus. Nat. Hist., vol. XXXIV, pp. 260—262, fig. 45.

Material: A much worn right third molar (V. 918).

Horizon and Locality: Same as the proceeding species.

Remarks: Except being a little inferior in size there is no noticeable difference between our specimen and the Pondaung specimen figured by Colbert (1938, fig. 45). The size of the tooth ( $M^3$ ) is 21 mm long and 22 mm wide while in Burmese specimen it is 20 by 23.5.

***Anthracokeryx* cf. *moritus* Pilgrim**

(Pl. II, Fig. 5)

Material: A nearly complete but very much worn molar (most likely the first one). V. 919. A small fragment with unworn metacone from Tienyang is also considered under the same species.

Horizon and Locality: Upper Eocene, Chulingtung, Tientong and Shanchin, Tienyang, Kwangsi.

Remarks: The tooth from Tientong is comparable to the same tooth on Burmese specimen in size and their general outline. However, no close comparison is possible because that the tooth in the Burmese specimen are worn almost to the base of the crown. It is only slightly larger than the second molar or *A. ulnifer* in size but differs decidedly from that in the more square outline of the tooth which is generally characteristic of the first molar.

For convenience sake the tooth fragment from Tienyang has been referred under this species. It is equally probable to be that of a posterior tooth of another smaller species, such as *A. ulnifer*.

***Bothriodon* Aymard, 1846*****Bothriodon* sp.**

(Pl. II, Figs. 9—12)

*Merycopotamus* sp., Young, 1932, Bull. Geol. Soc. China, vol. XI, p. 385, fig. 2.

Material: Two lower jaw fragments, one of the right side and one of the left (V. 920.1), four lower molar teeth, two of which are complete (V. 920.2), two astragula (V. 920.3).

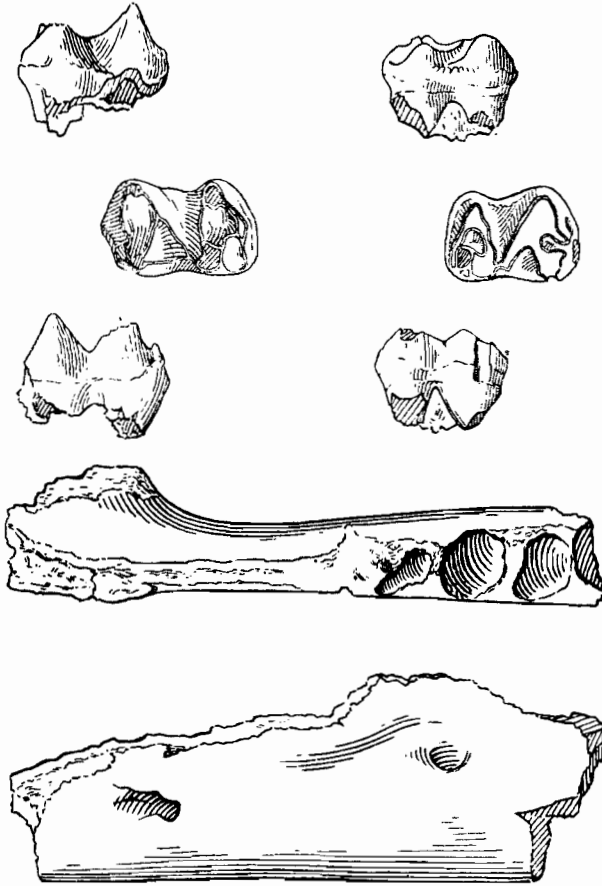


Fig. 4. *Bothriodon* sp.

Lower molars (internal, external and crown views) and lower jaw fragment (dorsal and external views). Natural size.

Horizon and Localities: Lower Oligocene, Tsaichiachung Marls, Chuching, Yunnan.

Description of the Specimens: The lower jaws of which only the anterior of the horizontal ramus are preserved are slender, shallow and with nearly straight and thick ventral border.

The symphysial part is narrow and strong. Two large mental foramina are present, the large one is situated slightly behind and under the first premolar and the smaller posterior one under the third premolar. There is a diatesma of 25 mm between the posterior border of the alveolus for  $P_1$  and the anterior border of  $P_2$ .

The lower molars which are represented by several specimens in our collection are of moderate hypsodonty and with structures which are typical for the genus as shown in Plate I (figs. 9, 10).

Measurements (in mm):

$M_1$ Length	.....	14
Breadth	.....	9
$M_2$ Length	.....	17
Breadth	.....	10
Depth of lower jaw at $P_2$	.....	22

In comparison with the known species of the genus from different parts of the world the Chinese form is comparatively smaller. It is about one third smaller in size than the well known European species, such as *B. aymardi*, *B. velanus*, etc. It represents most likely a new species of this well known genus.

One of the specimens in the collection, a broken lower molar, which had been described by Young and referred to the genus *Merycopotamus*, based mainly on the then supposed Pliocene age of the fossil bearing beds. In the light of slightly better preserved material and its stratigraphical relationship it is evidently more close to the genus *Bothriodon*.

## Class Reptilia

### *Emys* sp.

In the collection of fossils from Tientong and Tienyang there are a few fragments of the plastronic plates of an emydid turtle of fairly large size which may be referred to this genus. V. 921.

### *Amyda* sp.

A fragment of carapacic plate of a large soft shelled turtle indicates the presence of this genus at Tientong. Judged from the ornamentation of the plate it seems to belong to a form which is quite common in the Eocene deposits of China, but none of them has yet been subjected to description. V. 922.

### *Crocodylus* sp.

(Pl. II, Figs. 14, 15)

The presence of a large crocodile in the Tientong fauna is represented in the collection by a fairly large number of isolated teeth, vertebrate and fragmentary bones. The material is too fragmentary for a specific determination. V. 923.

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## 雲南广西發現的幾種始新世和漸新世哺乳類化石

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## 中 文 節 要

始新世和漸新世哺乳類化石在我国北方发现較多,但在南方各省,过去已发现的几乎仅有楊鍾健教授記述的湖南衡阳砂岩中的 *Propaleotherium hengyangensis* Young 的一个白齿和云南曲靖蔡家冲的最早定为 *Merycopotamus* sp. 一个白齿碎块,其余所有标本都未經

过描述。这些材料虽然很少，且都很破碎，但对我国南方老第三纪哺乳动物历史的了解则相当重要。本文是关于现有的一些标本的简单记述。

本文中描写的化石来源包括三个部分：(1)云南路面上始新统红砂岩层；(2)广西田东与竹东上始新统砂页岩层；(3)云南曲靖下渐新统蔡家冲泥灰岩层。全部化石计有下列各种：

#### 哺乳类

##### 肉食类

*Creodont incertae sedis* ..... 路南

##### 奇蹄类

*Metatelmatherium cf. browni* Colbert ..... 田东

*cf. Deperetella* sp. .... 路南、田东

*Lunania youngi* Chow (新属、新种) ..... 田东

*Caenolophus medius* Chow (新种) ..... 路南

*Caenolophus* sp. .... 路南

*Amynodon* sp. .... 路南

*Paramynodon cf. birmanicus* (P. et C.) ..... 田东

##### 偶蹄类

*Anthracothema rubrica* (P. et C.) ..... 田东

*Anthracokeryx birmanicus* (P. et C.) ..... 田东

*Anthracokeryx cf. moritus* Pilgrim ..... 田阳

*Bothriodon* sp. .... 曲靖

##### 爬行类

*Emys* sp. .... 田东、田阳

*Amyda* sp. .... 田东

*Crocodylus* sp. .... 田东、田阳

上表中几乎包括过去云南广西两省发现的全部老第三纪脊椎动物化石种。最近地质部胡永志同志又在云南路南采集了许多新材料，其中有一些新的种类。相信经过研究后，对了解中国南北第三纪初期哺乳动物群的关系可有较大帮助。

#### 插图说明

Fig. 1. *Carnivora* indet.

M<sub>3</sub> 内侧面及外侧面。原大。

Fig. 2. *Lunania youngi* sp. nov.

正型标本 (V. 103) 内侧面；嚼面及外侧面。原大。

Fig. 3. *Caenolophus medius* sp. nov.

右上颌（正型标本，V. 912）嚼面。原大。

Fig. 4. *Bothriodon* sp. 原大。

下白齿的内侧面；嚼面及外侧面。

下颌（破）的背面；外侧面观。

## EXPLANATION OF PLATE I

- 1, 1A. *Carnivora* indet.  
Crown and external views of the lower carnassial.
- 2, *Caenolophus medius* Chow, sp. nov.  
Ventral view of right maxilla (type).
- 3, 3A. *Caenolophus* sp.  
Crown and external views of lower jaw fragment.
- 4, 4A. *Lunania youngi* Chow, gen. et sp. nov.  
Crown and external views of lower jaw fragment with  $M_2$  and  $M_3$  (type).
- 5, 5A. *Amynodon* sp.  
Crown and external views of lower jaw fragment.
- 6, 7. cf. *Deperetella* sp.  
Crown views of lower molar fragments.  
(figs. 1—7, natural size).
- 8, 8A. *Metatelmatherium* cf. *browni* Colbert.  
Crown and external view of lower jaw with  $P_2$ — $M_3$  (first lobe).  $\times \frac{1}{2}$ .

### 圖 版 I 說 明

- 1, 1A. *Carnivora* indet.  
 $M_3$ , 1——嚼面; 1A——外側面。
2. *Caenolophus medius* Chow, sp. nov.  
右上顎 (正型標本), 嚼面。
- 3, 3A. *Caenolophus* sp.  
下顎 (破), 3——嚼面; 3A——外側面。
- 4, 4A. *Lunania youngi* Chow, gen. et sp. nov.  
下顎 (帶有  $M_2$  及  $M_3$ , 正型標本), 4——嚼面; 4A——外側面。
- 5, 5A. *Amynodon* sp.  
下顎 (破), 5——嚼面; 5A——外側面。
- 6, 7. cf. *Deperetella* sp.  
下臼齒, 6—7: 嚼面, (1—7 原大)。
- 8, 8A. *Metatelmatherium* cf. *browni* Colbert.  
下顎 (帶有  $P_2$ — $M_3$ ), 8——嚼面; 8A——外側面.  $\times \frac{1}{2}$ 。

## EXPLANATION OF PLATE II

- 1— 3. *Anthracothema rubrica* (Pilgrim et Cotter)  
 External (1), crown (1A) and internal (1B) views of M<sup>3</sup>; Crown (2) and external (2A) view of P<sup>2</sup> and crown view of P<sup>4</sup> (3).
4. *Anthracokeryx birmanicus* P. et C.  
 Crown view of M<sup>3</sup>.
5. *Anthracokeryx* cf. *moritus* Pilgrim  
 Crown view of first (?) upper molar.
- 6— 8. Astragula of anthracotherids.  
 Lateral (7, 7A, 8A), posterior (6, 8B) and front (6A, 8) views.
- 9—12. *Bothriodon* sp.  
 Crown (9, 10, 10A) and external (9A) views of lower molars. Dorsal (11, 12) and external (12A) views of lower jaw fragments.
13. Astragulus of a Tragulid (front view). (V. 924)
- 14—15. *Crocodylus* sp.  
 An anterior tooth (external and lateral views, 14) and a dorsal vertebra (ventral view, 15).  
 All figures are Natural Size

### 圖 版 II 說 明

- 1— 3. *Anthracothema rubrica* (Pilgrim et Cotter)  
 M<sup>3</sup>, 1——外側面; 1A——嚼面; 1B——內側面。  
 P<sup>2</sup>, 2——嚼面; 2A——外側面。  
 P<sup>4</sup>, 3——嚼面。
4. *Anthracokeryx birmanicus* P. et C.  
 M<sup>3</sup>, 嚼面。
5. *Anthracokeryx* cf. *moritus* Pilgrim  
 第一上臼齒( ? ), 嚼面。
- 6— 8. Anthracotherids indet.  
 距骨, 7, 7A, 8A——側面; 6, 8B——后面。
- 9—12. *Bothriodon* sp.  
 下臼齒, 9, 10, 10A——嚼面; 9A——外側面。  
 下頤(破), 11, 12——背面; 12A——外側面。
13. Tragulid indet. (V. 924).  
 距骨, 前面觀。
- 14—15. *Crocodylus* sp.  
 14——前端牙齒外面及側面; 15——背脊椎腹面。  
 (1—15 原大)。





1



1 A



2



4



4 A



5



3



3 A



6



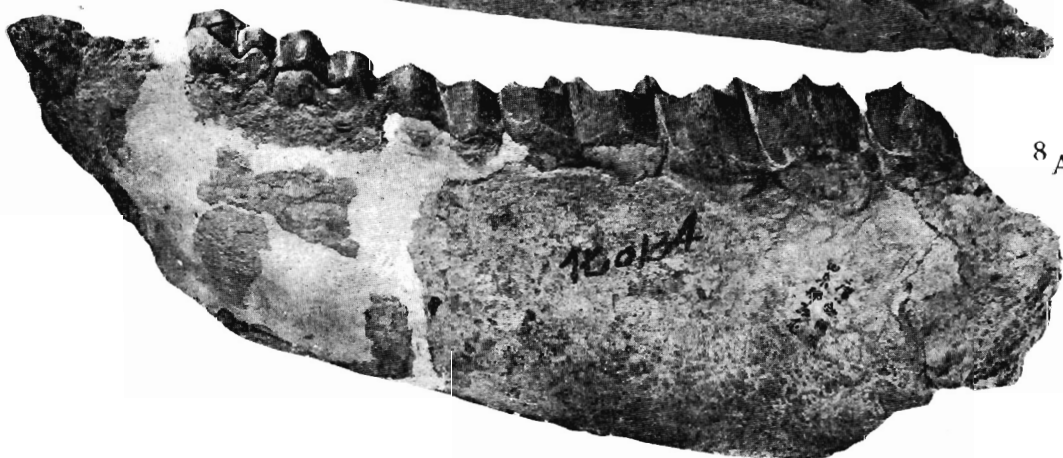
7



5 A



8



8 A

