

# 中国的裂齿目化石\*

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裂齿目 (Tillodontia) 是一类絕灭的哺乳动物。它們的地质历史很短, 最老的化石发现于晚古新世, 始新世后的地层中即无发现。它們在系統发生上的来源还不清楚, 可能起源于第三紀开始时的某种肉齿类。

过去許多年来, 这一目的化石, 除了欧洲早始新世的一个种外, 只限于北美洲的上古新統至中始新統。1937 年, 楊鍾健教授研究李悅言先生在山西垣曲河堤村垣曲統中采集的化石时, 描述了一个化石, 初步认为可能是一种灵长类, 訂名为 *Adapidium huanghoense* Young。它的真正的性质很久都不能确定。后来, 盖辛 (Gazin, 1953) 在綜述全世界的裂齿目材料时, 明确地指出 *Adapidium* 应该是一种裂齿类。1953 年, 本文作者等在河南滎池李悅言采集化石的地点找到一段較大的齧齿类式的門齿, 但当时并未考虑到它可能为裂齿目的化石。1957 年, 在河南卢氏上始新統卢氏組中, 又采集了一个巨大的門齿的碎块。可以清楚地看出是一种裂齿目的牙齿。最近, 李传夔等同志去山东新泰西西周始新統官庄組采集始新世化石时, 找到一个下颌骨化石, 上面带有保存完好的两个門齿和两个臼齿可以确定为一种与北美中始新世的 *Trogosus* 相象的裂齿类。化石的时代也为中始新世, 前年在同一地点发现过獾 (Hyrachyus), 古馬兽 (*Paleotherium*), 恐角兽和鈍角兽等化石 (李, 1962)。

近年来我国这些新的发现表明, 裂齿目在东亚大陆的发展, 可能不亚于在北美大陆, 并且持續到始新世后期。

## 化 石 記 述

### *Kuanchuanius* gen. nov.

**属的特征:** 同属型种 (*K. shantunensis* sp. nov.)

### *Kuanchuanius shantunensis* sp. nov.

**材料:** 一个部分完整的右下颌骨以及左下颌骨的联合部 (V. 2764) (插图 1 及图版 I, 图 1—4)。

**层位及地点:** 官庄組中部泥灰岩层, 中始新統; 山东新泰西西周村 (新泰西偏北約 5 公里)。

**种的特征:** 一种較大的裂齿类; 下齿列式:  $3 \cdot 1 \cdot 3 \cdot 3$ , 下第二門齿巨大, 齧齿状, 无根, 持續生长; 釉质层限于牙齿的前側, 外側的大部分及內側的前半部分。兩側牙齿 ( $I_3$ —

\* 1963 年 5 月 3 日收到。

M<sub>3</sub>) 一般的排列和结构与 *Trogosus* 属的很相似,下颊齿最宽处在第二臼齿前叶处;第二臼齿齿座较窄。

**标本描述:** 下颌骨十分粗壮,颌骨水平枝高,下侧边沿线和齿槽线近于平行, 只在前端稍向上收。左右颌骨在前方联合部分,完全愈合,在下方成一长而平坦、坚实的颌下部, 后端延伸到 M<sub>1</sub> 前下方,以容受长大的第二门齿。

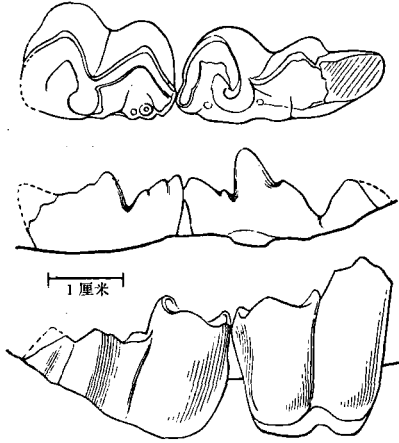


插图 1 *Kuanchuangius shantunensis*  
Chow gen. et sp. nov.  
M<sub>2</sub> 及 M<sub>3</sub>, 编号 V2764

上、嚼面视; 中、内(舌)侧面视; 下、唇侧面视

门齿, 在标本上,只保存有第一、第二对的被颌骨包裹的部分, 外露部分的齿冠已缺失。第一对很小,侧扁,紧挤在第二对之间。第二门齿发育成巨大的锯齿式的凿状齿, 呈管柱状,无根,牙齿横切面略成圆形,前侧、内侧的部分及外侧的大部都有釉质层复盖。釉质层较厚,表面有极细的布纹状结构,牙齿前半段,前下侧面上的中央向下凹入成一浅沟。第三对门齿退化,并且位置移到第二对的后方,与犬齿紧靠一起。在标本上仅由右侧的齿槽表示。

犬齿,从右侧齿槽可看出,也不甚发育,稍侧扁,大小与第三门齿的接近。

前臼齿及第一臼齿均未保存。从颌骨的齿槽观察,牙齿生长紧凑。P<sub>2</sub> 很小,单根。P<sub>3</sub> 较大,有较发达的根座。P<sub>4</sub> 根座发达,前面齿座也较宽,看来已臼齿化。M<sub>1</sub> 的根座比前面齿座长。

前臼齿及第一臼齿均未保存。从颌骨的齿槽观

M<sub>2</sub> 及 M<sub>3</sub> 保存相当完好,磨蚀程度不深。M<sub>2</sub> 前叶座部为颊齿列的最宽处,由此向后,第三叶渐次变窄。这一特征仅在北美的 *Tillodon* 属中可见到。从外侧(唇面)看,牙齿每一叶呈圆柱状,柱状体的两侧边,即使在齿冠顶部也无收敛现象。在接近齿柱下端处特别圆。臼齿内侧壁平直,齿冠较高,外侧的柱面则较为强烈地向内侧弯曲,表示在生长过程中,整个牙齿外侧部分向内侧旋转,以至使根部露出齿槽外面。M<sub>2</sub> 由两个“V”形褶曲组成,后面的较低,构成每一褶曲的两个翼(或斜脊)平直。前面的组成齿座的两个脊较平行,趋近“U”形,后面的组成齿座的两脊向内侧张开,在外侧作 90° 角相接。下前尖、下后尖、下后附尖、内尖均相当发达,跟座前脊在下后附尖外侧被一浅沟分开,并与齿座后脊相连接。M<sub>3</sub> 的构造基本上与 M<sub>2</sub> 相同,但向后收缩,后面多一第三叶(下次小尖),在标本上已大部破损,但仍可看出其为单一的锥状,中间并未形成浅沟或呈盆状。下后尖特别高大,呈尖锥状,下后附尖较小,附着在后侧斜面上呈一台阶状。

**标本测量(单位: 毫米)**

下颌骨高 (M <sub>2</sub> 内侧前方) (Depth of Mandible, internal, at M <sub>2</sub> ) .....	45
下颌骨厚 (Thickness, at M <sub>2</sub> ) .....	16
下颊骨联合部长 (Length of Symphysis) .....	65
齿列长 (Length post. of alveolus for I <sub>2</sub> to posterior margin of M <sub>3</sub> ).....	114
齿列前部长 (Length post. of alveolus for I <sub>2</sub> to posterior margin of alveolus for P <sub>3</sub> ).....	39
P <sub>3</sub> —M <sub>3</sub> 长 (Length P <sub>3</sub> —M <sub>3</sub> , inclusive, along alveolar border).....	90
M <sub>1</sub> —M <sub>3</sub> 长 (Length M <sub>1</sub> —M <sub>3</sub> , inclusive).....	64

M <sub>2</sub> 长 (Length of M <sub>2</sub> at occlusal surface) .....	20
M <sub>3</sub> 长 (same for M <sub>3</sub> , estimated) .....	24
M <sub>2</sub> 齿座宽 (Breadth near occlusal surface, trigonid of M <sub>2</sub> ) .....	13
M <sub>2</sub> 跟座宽 (same for talonid) .....	10
M <sub>3</sub> 齿座宽 (same for trigonid of M <sub>3</sub> ) .....	9
M <sub>3</sub> 跟座宽 (same for the 2nd lobe) .....	7.5
I <sub>2</sub> 最大直径 (greatest diameter of I <sub>2</sub> ) .....	10.4

### 标本比較:

目前裂齿目中已知的有五个属。*Esthonyx* 的門齿 (I<sub>2</sub>) 不特化,与山东的标本显然不同。*Anchippodus* 属只有一前臼齿为代表,它的性质还不清楚。从現有的材料比較,我国山东的标本显然是与北美的 *Trogosus* 和 *Tillodon* 两属相近,特别是第二門齿的性质与这两属的基本上相同。山东的标本,側齿列最寬处在第二臼齿前部,和北美中始新統上部的 *Tillodon* 属一致;而 *Trogosus* 属的各种內,最寬处在第三臼齿处。但前者的牙齿低冠,前面的頰齿有齿缺,排列方式很特殊,显然与我們的标本不同。从頰齿的整个构造上說,山东的标本显然最接近于晚期的 *Trogosus* 和 *Adapidium*,而特別与后者最相似,但除两者个体大小的悬殊外,*Adapidium* 臼齿齿座的两横脊更近于平行,与在 *Esthonyx* 属中相似,跟座也較寬;另外,*Adapidium* 的前面牙齿,特别是犬齿的性质不清楚。故目前对它們之間的关系还无法弄清。

### *Adapidium huanghoense* Young

这一个种的化石,自 1937 年以来,并无新材料增加。原标本已經楊氏詳細描述,并有精細的插图,本文內又增添原标本的照相(图版 I, 图 5—6),以便参考。这个属的代表种,虽然个体很小,但从保存的两个臼齿的构造看来,和过去知道的各属比較,与 *Trogosus* 属很相似,舌面低冠,唇面的齿冠高,牙齿外側部分依前后軸向內旋轉。外側面牙齿的每一叶呈圓柱状。但由于个体很小,前面的牙齿的性质不明,故它与 *Trogosus*, 以至 *Kuanchuanius* 的关系还不能确定,但很可能是和該两属的关系比与 *Esthonyx* 更接近些。

## 属、种未定的裂齿类

### Genus indet. sp. 1

从河南灑池任村与 *Huanghoni* 等化石同一地点发现的一块第二門齿断块 (V. 2765)(图版 I, 图 7—8),大小与 *Kuanchuanius shantunensis* 的接近,横切面的前沿較寬,前后方向較长。它虽然来自同一地点和层位,但显然不是属于 *Adapidium huanghoense*, 而是代表始新世晚期的另一种裂齿类,可能为 *Kuanchuanius* 属的一个較进步的种。

### Genus indet. sp. 2

河南卢氏孟家坡卢氏組中发现的一个下門齿断块 (V. 2766) (插图 2),在大小上超过中国現知的任何一个种。牙齿十分巨大,側扁,前沿圓,内外側平坦,上有平行沟紋;釉

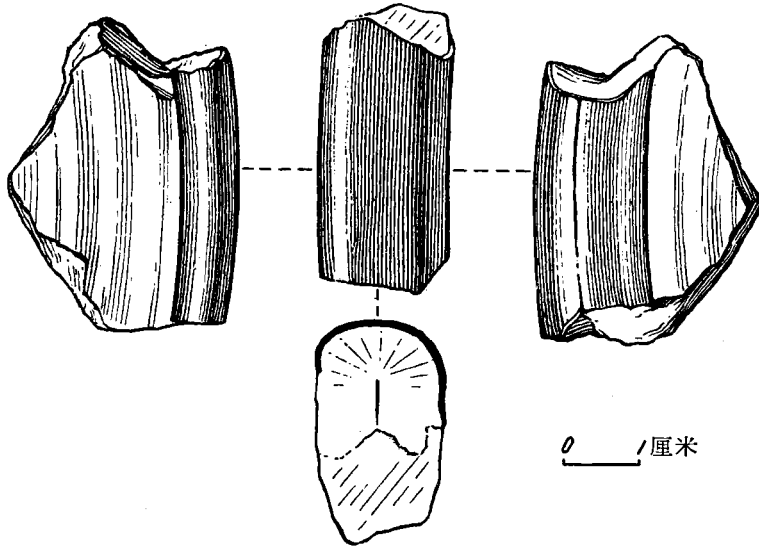


插图2 裂齿目,未定属种2,编号 V. 2766.  
Tillodontia, gen. indet. sp. 2.

质层上有细致而低的饰纹。切面轮廓近似于北美 *Trogosus castoridens* Leidy 的下第二门齿 (Gazin, 1953; p. 37, fig. 13.)。这个标本的层位也是上始新统,但比垣曲组低,显然代表时代较晚的一个特化的种或属。

## 结 语

从过去和最近发现的一些材料,初步可以知道裂齿目化石在我国至少已有四个种;分属于二或三个属。由于材料太少,它们的性质还都不清楚。在属的划分上也可能要作进一步的归并。在这一目已知的主要分布地区(北美),这一目的地质时代,限于晚古新世至中始新世晚期,而在亚洲,这一目可以肯定至少延续到始新世晚期。

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## TILLODONT MATERIALS FROM EOCENE OF SHANTUNG AND HONAN

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Fossils of the tillodonts were for a long time unknown in Asia. It owes to the work of Gazin (1953) that brought attention to the fact that *Adapidium huanghoense* Young (1937), from the upper Eocene of Honan, tentatively considered as a primate is really a tillodont. The present writer, while visiting this district in 1953, a fragment of rodent-like incisor of fairly large size was encountered, but its affinity with the tillodonts was not aware of then. Later, in 1957, from the Upper Eocene Lushih beds at Mengchiapu of Lushih basin in southwestern Honan (Chow, 1959) the writer collected another incisor fragment of very large size, evidently of tillodont type. Recently, in 1962, Mr. C. K. Li of the Institute (IVPP) while investigating the Kuanchuang Series in central Shantung collected another tillodont specimen, a mandible of a *Trogosus*-like tillodont. It is from the same beds and locality where fossils of *Hyrachus*, ?*Uinatherium*, *Paleotherium*, *Coryphodon flerowi* etc. (Chow and Tung, 1963) were found. A description of these newly discovered tillodont materials is being given in this paper.

### *Kuanchuanius* gen. nov.

**Diagnosis:** As for the genotypic species *K. shantunensis*.

### *Kuanchuanius shantunensis* sp. nov.

**Material:** Right mandibular ramus with  $I_2$ ,  $M_2$ ,  $M_3$  and alveoli of the other teeth, symphyseal portion of the left one with  $I_2$  broken off at the alveolar border (V.2764).

**Horizon and Locality:** Middle marly parts of Kuanchuang Series, Middle Eocene; Sisichou, Hsintai (Sintai) district, Shantung.

**Specific Characters:** A tillodont of large size; lower dentition: 3·1·3·3. Lower  $I_2$  much enlarged, grows from persistent pulp, and with enamel covering on anterior and much of the labial surface.

General arrangement and structure of lower lateral teeth ( $I_3$ — $M_3$ ) much as in *Trogosus*; greatest width of cheek teeth series across trigonid at  $M_2$ .

**Description:** The lower jaw (Pl. I, figs. 1—4) is deep and stout, firmly fused at symphysis as far back to a point below the anterior margin of  $M_1$ , at the posterior termination of  $I_2$ .  $I_1$  rudimentary and transversely compressed;  $I_2$  greatly enlarged, nearly oval or subquadrate with rounded anterolateral corners in cross section. Enamel covering on anterior and greater portion of the lateral surface, especially the external side. A shallow median groove is present on the anteroventral surface; small and situated behind  $I_2$ . All the lateral teeth  $I_3$  inclusive, are crowded together. Canine about the size of  $I_3$  and somewhat laterally compressed.  $P_2$  slightly larger than the canine and single rooted;  $P_3$  two rooted and more elongate;  $P_4$  almost as large as  $M_1$ , alveolus for talonid portion longer than that for the trigonid.  $M_1$ , also not preserved, slightly

### 图版 I 说明

1.—4. *Kuanchuanius shantunensis* Chow, gen. et sp. nov.

部分完整的右下颌骨及左下颌骨的联合部。编号 V. 2764。1. 上面视；2. 内侧(舌)面视；  
3. 外侧(唇)面视；4. 底面视；×1。

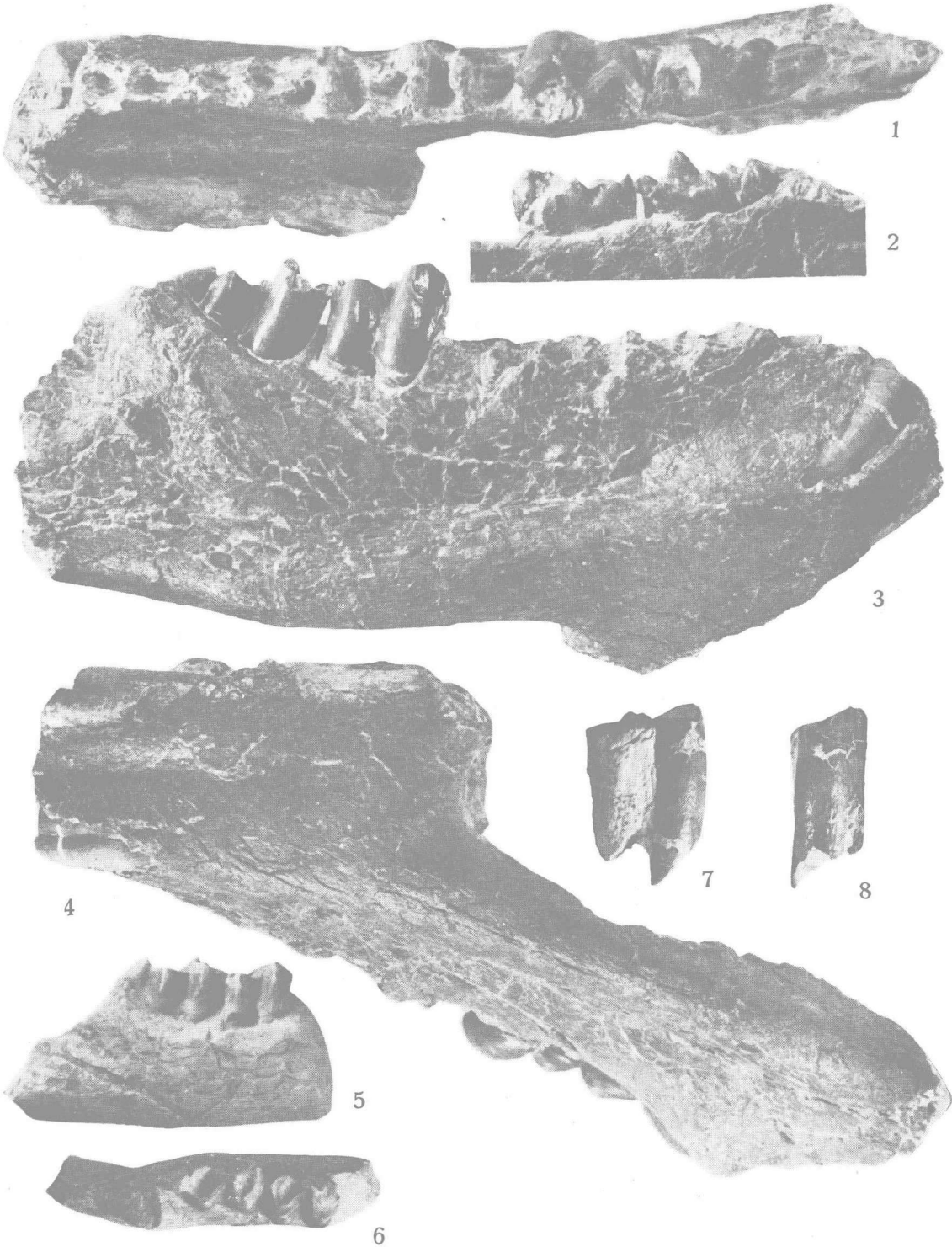
5.—6. *Adapidium huanghoense* Young

右下颌骨的一部分, 上有  $M^2$  和  $M^3$ 。5. 唇面视；6. 嚼面视。据杨鍾健原标本摄制, ×1。

7.—8. 裂齿目, 未定属种 1 (*Tillodontia*, gen. indet. sp. 1.)

第二下门齿断块, 编号 V. 2765。

7. 侧面视；8. 前面视, ×1。



larger than  $P_4$  and with larger talonid;  $M_2$  is much the widest of the cheek teeth series, as in the genus *Tillodon* Gazin, the specimen is broken at the antero-lingual corner. It appears to be quite columnar in lateral view, and the sides of the columns do not so much converge upward as in *Tillodon*. This tooth, as well as  $M_3$ , in course of eruption, shows strong tendency of rotating inward along its long axis. All the accessory cusps, i.e., *med*, *mtsd*, *end*, are large and prominent. The anterior crest of the talonid is connected to the posterior loph of trigonid at a point slightly labial to the *mtsd*, the latter being a step-like pointed cuspule budding off midway from behind the posterior slope of the large, highly elevated metaconid. The last molar, tapering posteriorly, differs from  $M_2$  mainly in having smaller talonid and a well developed hypoconulid lobe, which is broken off on the specimen. The two crests of talonid, as in  $M_2$ , are straight and open more widely lingually, broadly V-shaped rather than U-shaped, much as in *Trogosus*.

**Remarks:** Morphologically the Shantung specimen appears to have several important characters typifying different known genera of tillodonts. Therefore, its true affinity with these forms are difficult to elucidate at present. On the other hand, in spite of being much larger in size and chronologically earlier, the Shantung specimen resembles *Adapidium* in a number of characters. But in *Adapidium* the trigonid lochs are more parallel of U-shaped and talonid of  $M_2$  is as wide as, but longer than the trigonid. The posterior talonid crest is less developed than that in *Adapidium*.

#### ***Tillodontidae incertae sedis***

In addition to the above described lower jaw, there are two fragments of enlarged second incisor indicating the presence of two more forms of large tillodonts in Chinese Upper Eocene. One of these (V.2765), from the same district and same horizon but another locality on the southern bank of the river as *Adapidium*, is only slightly larger than that of *Kuanchuanius* in size, but it is oval in cross section and without median groove on the external enamel surface. It is certainly much too big to fit for the size of *Adapidium* and may more closely related to *Kuanchuanius*. The other one (V.2766), from Mengchiapu, Lushih, (vide supra) is a lower tooth and still much superior in size, very thick anteroposteriorly and with flat lateral sides. It is quite different from those in the other Chinese forms. A nearer resemblance is seen between it and that of *Trogosus castoridens* (Gazin, 1953; fig. 12), but the labial enamel covering is much more developed in our specimen. Stratigraphically it is intermediate between *Adapidium* and *Kuanchuanius*. Probably it represents a more specialized advanced form of the latter genus.

The new Asiatic materials do not add much toward an understanding of this mammalian order as has already been well summarized by Gazin (1953); but they do indicate that the group Tillodontia may likewise be well represented and flourished in Eastern Asia during Eocene time.