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安徽潜山新发现的钝脚类头骨化石

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关键词　安徽潜山　古新世　牧兽科

内 容 提 要

本文记述了发现于安徽潜山盆地中古新统望虎墩组上段的一件较为完整的钝脚类头骨化石，将其归入 *Altilambda* 属中，并建立一新种——余井高脊兽（*A. yujingensis* sp. nov.）。

潜山盆地是我国最重要的古新世脊椎动物化石产地之一。自1970年至今，在该盆地中已采集到不少脊椎动物化石。1989年元月，本文的后两位作者在潜山县余井乡平原村中古新统望虎墩组中发现了一件保存较好的钝脚类头骨化石，在此予以描述报道。

哺乳动物纲 Mammalia Linnaeus, 1758
钝脚目 Pantodonta Cope, 1873
牧兽科 Pastoralodontidae Chow et Qi, 1978
高脊兽属 *Altilambda* Chow et Wang, 1978

属型种　和平高脊兽（*Altilambda pactus* Chow et Wang, 1978）。

属的补充特征　鼻骨窄长，鼻骨与前颌骨及上颌骨的接缝较直；颊齿脊形化程度较低；M^1、M^2 呈横宽的长方形，前尖、后尖、原尖呈三角锥状；P^3、P^4 的V形外脊和 M^1、M^2 的W形外脊的前、后臂中部分别有类似柱尖和后柱尖的结构；M^3 后尖退化，但仍很明显。

分布　安徽潜山盆地、广东南雄盆地，中—上古新统。

余井高脊兽（新种）*Altilambda yujingensis* sp. nov.

（图版 I）

正型标本　一具颧弓后部及枕部破损的头骨，齿列基本完整。安徽省潜山县文物管理所标本编号：QS055。

产地及层位　安徽省潜山县余井乡平原村陈家川门口东南约150米（北纬30°41′，东经116°37′），中古新统望虎墩组上段（?）。

特征　在 *Altilambda* 属中，为个体较大者，头骨显得比较粗壮。其他特征见该属的

补充特征。

名称来源 以产地余井（Yujing）作为其种名。

描述 头骨枕部破碎，保存长度为 124mm，估计全长约 140mm，头骨宽 93.8mm。整个头骨显得比较粗壮。

背面：整个轮廓大致呈菱形，吻部较短。鼻骨（nasal）窄长，顶面平，前端破碎，与前颌骨（premaxilla）接触；鼻切迹（nasal incision）后端位于犬齿上方；鼻骨中部不收缩，后半部与上颌骨（maxilla）接触，鼻骨与前颌骨及上颌骨的接缝较直；鼻骨后端稍膨大，向后伸达眼眶前缘的位置。额骨（frontal）短，基本上不向前插入两块鼻骨之间。额脊（frontal crest）粗壮，与矢状方向约成 45° 角斜交，向后愈合成矢状脊（sagittal crest）。矢状脊未保存。顶额缝位于额脊愈合处稍前。眶后突（postorbital process）不明显或无。顶骨（parietal）较宽且长，隆起不显著，后部有小的凹坑。

侧面：头骨压扁。前颌骨鼻突发育，向后上方斜伸至 P^2 上方，插入鼻骨与上颌骨之间，前颌骨与上颌骨之接缝呈 S 形。眶下孔（infraorbital foramen）大，位于 P^3 上方，水平位置与眼眶下缘平。眼眶小，由额骨、泪骨（lacrimal）和颧骨（malar）组成，前缘在 M^1 上方。上颌骨眶部在眼眶下方构成一个椭圆形的底板。泪骨位于上颌骨与额骨之间，在面部出露，无泪结节。上颌骨颧突伸至 M^2 中部的位置。颧骨前端分成两支，上支长，伸达 M^1 前部，与泪骨接触；下支短，仅达 M^2 前部。颞骨（temporal）颧突长，向前伸到颧弓前部，与 M^3 后缘在同一条直线上。

腹面：腭面窄长，前后基本等宽，宽 24mm。前颌骨构成硬腭前端，腭裂（palatine fissure）后端与犬齿后缘在同一条横线上。上颌骨腭突发育，几乎构成硬腭的三分之二。腭骨（palatine）前伸至 M^1 中部，腭孔（palatine foramen）两对，分别位于 M^1 中部和 M^1、M^2 之间的横线上。后鼻孔（posterior nares）前缘位于 M^3 后缘的横线上，中央有一后伸的后鼻棘（posterior nasal spine），长 5mm，后鼻孔的前侧方各有一向外伸的、小的翼状突起。翼板（alar plate）发育，后部有一对外展的外翼突（ectopterygoid process）。

牙齿：门齿很小，I^2 比 I^1 大，I^3 虽未保存，但从齿槽上判断应比 I^2 大。犬齿稍大，但不成獠牙状。颊齿排列紧密，无齿隙，内缘基本在一条直线上。P^1 单根，单尖侧扁。P^2 双根，两根近于前后排列，与齿列纵轴无明显交角；齿冠内侧圆凸，外侧略凹；主尖之后有一不太明显的小尖。P^3 外侧 V 形脊不对称，前臂短，开口宽；原尖位于外侧尖的后内侧，形态上与臼齿的次尖架相似。P^4 的 V 形外脊较对称，开口较窄，原尖前棱稍包过外侧尖，但不与明显的前齿带相连。P^3、P^4 的外脊前、后臂中部有类似柱尖和后柱尖的结构。臼齿横宽，齿冠较低，长轴方向与齿列方向近于垂直。M^1 长方形，齿冠磨蚀较深；主尖、附尖、小尖均很发育。前尖已基本被磨蚀掉，后尖比前尖更靠近唇侧。外脊（ectoloph）呈较对称的 W 形，中附尖很大，与相当发育的外齿带（ectocingulum）相连。外架（stylar shelf）很宽，宽度近于齿宽之半，缓缓向外侧倾斜。外中凹（ectoflexus）较浅，位于中附尖之前、前外架之中后部。前尖棱和后尖棱分别与前附尖和后附尖相连。在前尖棱和后尖棱的近中部分别有一类似柱尖和后柱尖的结构。前中央棱与后中央棱与中附尖相连。原尖前棱和原尖后棱分别与前小尖和后小尖相连，构成一个 V 字形。前小尖后棱和后小尖前棱短或不明

显；前小尖前棱和后小尖后棱长，分别伸达前外角和后外角，成为前中齿带（paracingulum）和后中齿带（metacingulum）。有内侧前齿带。内侧后齿带很发育，成为一宽的次尖架，使得整个牙齿呈长方形，其上有一明显的次尖。M^2 的基本结构与 M^1 相似，比 M^1 大，是颊齿中最大的一个。齿冠磨蚀较浅，原尖、前尖、后尖均呈三角锥形。原尖大，比前尖、后尖都低。前尖、后尖近于等大，后尖稍高，更靠唇侧。前尖棱比后尖棱长，W形外脊不太对称。外齿带、柱尖、后柱尖不如 M^1 发育。M^3 近似椭圆形，无中附尖、后附尖和后尖棱。外脊呈开阔的U形。后尖退化，紧靠唇侧，几乎位于牙齿的后外角，仅稍稍位于U形脊内侧。无柱尖。原尖低。无明显的前小尖和后小尖。内侧前齿带及后齿带均不如 M^1、M^2 发育。无次尖及次尖架。

臼齿齿冠磨蚀面由剪面（thegosis）和磨面（abrasion）构成。剪面主要存在于前尖棱和前小尖前棱、后尖棱和后小尖后棱上；磨面则主要发育于各主尖、小尖、原尖棱、前中央棱、后中央棱及中附尖上，在尖顶常形成凹面。从磨蚀面的发展上看，磨蚀程度越深，磨面越发育。

余井高脊兽的牙齿测量数据见表 1。

表 1　余井高脊兽（新种）上牙的测量数据（单位：毫米）

Table 1　The measurement of upper teeth of *Altilambda yujingensis* sp. nov. (in mm)

		I^1	I^2	I^3	C	P^1	P^2	P^3	P^4	M^1	M^2	M^3
长 L	左 left	1.70	3.15				6.95	9.10	9.35	13.55	14.35	10.30
	右 right		3.20	3.45[1)]	5.85	7.95	8.30	9.30	10.35	13.50	13.90	10.35
宽 W	左 left	2.10	2.60				4.40	11.35	13.15	16.40	17.90	16.65
	右 right		2.40		5.10	3.60	5.30	12.30	13.00	16.90	18.40	16.10
L/W	左 left	0.81	1.21				1.58	0.80	0.71	0.83	0.80	0.62
	右 right		1.33		1.15	2.21	1.57	0.76	0.79	0.80	0.76	0.64

		$C-M^3$	P^1-P^4	P^1-M^3	M^1-M^3
长 L	左 left	72.70	32.00	67.00	35.80
	右 right	74.25	33.60	68.05	36.35

1）据齿槽测量。

比较讨论　新材料为一头骨化石，与已知全为下颌骨的 *Altilambda* 属材料无法直接比较。但根据在同一盆地中别的地点新发现的咬合在一起的头骨及下颌材料，可以将本文描述的头骨化石归入 *Altilambda* 属中（详见另文）。

高脊兽属中，已描述的共有 4 种：*Altilambda pactus* Chow et Wang, 1978; *A.*

tenuis Chow et Wang, 1978; *A. minor* Tong, 1982; *A.* sp.。安徽潜山发现的 *A. tenuis* 和广东南雄发现的 *A. minor* 的个体远比新材料要小。虽然发现于安徽潜山的另一个种 *A. pactus* 比较粗壮，个体也较前两种大，但它仍明显小于新材料。因此，本文将新材料作为高脊兽的一个新种，取名为余井高脊兽（*Altilambda yujingensis* sp. nov.）。

周明镇、王伴月(1978)在建立 *Altilambda* 属时，主要根据下齿列和 DP^4 的外形轮廓等特点，将它归入牧兽科中。*Altilambda yujingensis* 与内蒙古晚古新统脑木根组所产的湖牧兽（*Pastoralodon lacustris* Chow et Qi, 1978）共有的特点表明 *Altilambda* 与 *Pastoralodon* 很相近，而与钝脚目中其他各科成员差别明显，从而支持了周明镇、王伴月(1978)的观点。

湖牧兽与新材料之间在头骨及上牙特征上也存在一些较为明显的差异，主要表现在：湖牧兽的个体远比新材料大；鼻骨中部收缩，鼻骨与前颌骨和上颌骨的接缝呈弧形；P^3—M^3 主尖的脊形化程度高，是较典型的棱形齿，齿冠相对较高；M^1、M^2 近方形，内缘直，次尖也更为发育；P^3 — M^2 的外脊上无类似柱尖和后柱尖的结构；M^3 上后尖更加退化。这些差别加上下牙的不同(见周明镇、王伴月，1978)，完全可以将两者区分为不同的属。

牧兽科的另一属，谷齿兽属（*Convallisodon*）的上臼齿也是横宽的长方形。但除此之外，新材料与 *Pastoralodon* 的差别基本上也是它与 *Convallisodon* 的差异，加上下牙上的不同特点(见周明镇、王伴月，1978)，也很容易将 *Altilambda* 与 *Convallisodon* 区分开。

到目前为止，已描述的发现于潜山盆地的钝脚类化石共有 5 属 7 种，分属五个科：Bemalambdidae, Plethorodontidae, Harpyodidae, Pastoralodontidae, 和 Archaeolambdidae。它们在潜山盆地的地层分布为：Bemalambdidae 和 Plethorodontidae 产于望虎墩组下段，Harpyodidae 和 Pastoralodontidae 产于望虎墩组上段，而 Archaeolambdidae 则产于寇姆组上段。虽然各科化石在地史分布上有一定的规律，且相互间存在一些共同的特点，但是除了黄学诗、郑家坚(1987)指出 *Plethorodon* 可能与 *Harpyodus* 有较近的亲缘关系外，各科化石之间的系统关系尚待进一步研究。

在本文写作过程中，得到了周明镇先生和李传夔先生的热情指导，齐陶先生将内蒙古晚古新世牧兽和谷齿兽标本提供给作者对比研究，翟人杰、童永生、王景文、黄学诗、王伴月、郑家坚先生给予了热情的帮助，张杰先生为本文摄制图版，在此一并表示感谢。

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参 考 文 献

王伴月，1979：翼齿兽（*Harpyodus*）一新种及其分类地位。华南中、新生代红层，366—372。科学出版社。

邱占祥、李传夔，1977：安徽潜山几种古新世哺乳动物化石。古脊椎动物与古人类，15(2)，94—102。

——、——、黄学诗，汤英俊、徐钦琦、阎德发、张宏，1977：安徽含哺乳动物化石的古新统。古脊椎动物与古人类，15(2)，85—93。

周明镇、王伴月，1978：华南古新世全齿类的新材料。古脊椎动物与古人类，16(2)，86—90。

——、齐陶，1978：内蒙古四子王旗晚古新世哺乳类化石。古脊椎动物与古人类，16(2)，77—85。

——、张玉萍、王伴月、丁素因，1977：广东南雄古新世哺乳动物群。中国古生物志，新丙种第20号，科学出版社。

——、邱占祥、李传夔，1975：关于原始真兽类臼齿构造命名和统一汉语译名的建议。古脊椎动物与古人类，13(4)，257—266。

黄学诗，1977：安徽古脊齿兽（*Archaeolambda*）骨胳记述。古脊椎动物与古人类，15(4)，249—260。

——，1978：安徽古新世钝脚类。古脊椎动物与古人类，**16**(4)，275—281。
——、郑家坚：1987：安徽潜山古新世一种似钝脚目的哺乳类。古脊椎动物学报，**25**(1)，20—31。
童永生，1982：广东南雄晚古新世瞳形类化石。古脊椎动物与古人类，**20**(1)，26—34。
Ding Suyin, J. A. Schiebout and Zhou Mingzhen, 1987: A skull of *Pantolambdodon* (Mammalia, Pantodonta) from Ningxia, North China. *Jour. Vert. Paleont.*, **7** (2), 155—161.
Granger, W. and W. K. Gregory, 1934: An apparently new family of amblypod mammals from Mongolia. *Amer. Mus. Novitates*, 720, 1—8.
Simons, E. L., 1960: The Paleocene Pantodonta. *Trans. Amer. Philos. Soc.*, **50** (6), 1—99.

A SKULL OF *ALTILAMBDA* (MAMMALIA, PANTODONTA) FROM THE PALEOCENE OF QIANSHAN, ANHUI

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Key words　Qianshan, Anhui; Paleocene; Pastoralodontidae

Summary

In January of 1989, a relatively well-preserved pantodont skull, described in this paper, was collected by the junior authors from the Middle Paleocene Wanghudun Formation near a small village in Yujing, Qianshan County, Anhui Province. This fossil represents a new form of pastoralodontid pantodonts.

Class Mammalia Linnaeus, 1758
Order Pantodonta Cope, 1873
Family Pastoralodontidae Chow et Qi, 1978
Genus *Altilambda* Chow et Wang, 1978

Type species　*Altilambda pactus* Chow et Wang, 1978.

Additional Diagnosis　The suture of premaxillo-maxilla and nasal straight except at the posterior end; cheek teeth less hypsodont, their crowns low; M^1 and M^2 transversely elongated and rectanglar; paracones, metacones and protocones conical with flat outer surfaces; cristas well-developed; stylocone- and meta-stylocone-like structures present on both the V-shaped ectolophs of p^3, p^4 and the W-shaped ectolophs of M^1, M^2; metacone of M^3 reduced but prominent.

Distribution　Qianshan, Anhui and Nanxiong, Guangdong, Middle and Late Paleocene.

Altilambda yujingensis sp. nov.

(Pl. I)

Holotype　The Cultural Relics Administrative Office of Qianshan County, Anhui Province,

specimen no. QS055, a well-preserved skull, with essentially complete upper dentition, except occipital region and the posterior parts of zygomatic arches.

Locality and Stratigraphical Horizon About 150m southeast to a small village named Chenjiachuanmenkou, Yujing, Qianshan, Anhui (approximately 30°41′ N, 116°37′ E), from the upper member of Wanghudun Formaton, Middle Paleocene.

Diagnosis Comparatively large among Altilambda species with a skull robust (consulting the additional diagnostic features of the genus for other characteristics).

Etymology The species is named after Yujing where the specimen was collected.

Description Occipital part of the skull broken. Length of preserved part is 124mm, and the total length of a complete skull is estimated to be about 140mm. The width of the skull is about 93.8mm. The skull looks rather robust.

Dorsal view: Outline of the skull is roughly rhomboid. Nasal, damaged at the anterior end, is elongated anteroposteriorly and extends posteriorly to the same transverse line as anterior border of orbit. It is in contact with premaxilla at the anterior part, not contracted in the middle and expands slightly at the posterior end. Its surface is flat. The nasal incision is above the canine. The suture of nasal and premaxillo-maxilla is straight except at its posterior end. Frontal is short and does not obviously insert forwards between two nasals. Frontal crests are prominent, at an angle of 45° to the sagittal plane, and submerge rapidly backwards into a sagittal crest which is not preserved. Postorbital process is not obvious. Parietal is large with small areas of depressions on its posterior surface.

Lateral view: Premaxilla extends forwards to the anterior end of the skull. Well-developed ascending ramus of premaxilla extends posterodorsally to a point above P^2, inserting between nasal and maxilla. Premaxillo-maxilla suture is S-shaped. Infraorbital foramen is comparatively large and above P^3 at the same level as lower border of orbit. Orbit is small and margined by frontal, lacrimal and malar. Anterior border of orbit is above M^1. Lacrimal is between frontal and maxilla, and exposes in the face without lacrimal tubercle. Zygomatic process of maxilla extends backwards to the transverse line of the middle of M^2. Malar is anteriorly separated into two branches: upper one is longer and in contact with lacrimal but lower one shorter. Zygomatic process of temporal is quite long, and extends forwards to the same transverse line as posterior margin of M^3.

Ventral view: Palate is narrow and elongated anteroposteriorly, about 24mm wide. Posterior edge of palatine fissure is at the line of posterior edge of canine. Palatine processes of maxillae are large and form about two-thirds of palate. Anterior end of palatine is at the line of the middle of M^1. Two pairs of palatine formina are at the transverse lines of the middle of M^1 and between M^1 and M^2. Posterior nares are at the line of posterior edges of M^3 with a posterior nasal spine, 5mm long, in the middle, and a pterygial process anterolateral to each side of posterior nares. Alar plate is well-developed with a laterally extending ectopterygoid process on it.

Upper teeth: Incisors are very small. I^2 is larger than I^1. I^3 is not preserved and estimated to be larger than I^2 according to the size of its alveolus. Canine is larger than any of incisors, but not tusklike and still comparatively small. The cheek teeth are crowded without diastema. Their interior edges are generally at a straight line.

P^1 has one root and its crown is compressed laterally. The outer side of its crown is broken.

P^2 has two roots in an anteroposterior line. Its outline looks like a semicircle. There is a small cusp on the postcrista of main cone.

P^3 is more transverse than P^2. Its V-shaped ectoloph is widely opened and asymmetric with stylocone- and meta-stylocone-like structures on it. Protocone is low and posterointerior to ectocone and looks like a hypocone shelf of a molar.

P^4 is larger than P^3. Its V-shaped ectoloph, also bearing stylocone- and meta-stylocone-like structures, is more symmetric and less opened than that of P^3. The preprotocrista extends forwards little beyond ectocone, and is not in connection with an obvious precingulum. Protocone is low and interior to ectocone.

Molars are transversely elongated with comparatively low crowns. The outline of M^1 and M^2 is like a rectangle.

M^1 is much worn. Its paracone is nearly worn away. Metacone is more labially located than paracone. Ectoloph is a relatively symmetrical "W" in shape. Parastyle, mesostyle and metastyle are well-developed, especially the mesostyle which is in connection with a quite well-developed ectocingulum to form a complicated structure. Stylar shelf is rather wide, about half the width of the tooth. Ectoflexus is slightly concave inwards and is anterior to mesostyle. Paracrista and metacrista are in connection with parastyle and metasyle respectively. Stylocone- and meta-stylocone-like structures are respectively present in the middle of paracrista and metacrista. Precentrocrista and postcentrocrista are in connection with mesostyle. Preprotocrista and postprotocrista, respectively in connection with prominent paraconule and metaconule, form a V-shaped structure. Both postparaconule crista and premetaconule crista are short or not obvious. Preparaconule crista and postmetaconule crista are very long and extend respectively to anteroexterior and posteroexterior corners to become paracingulum and metacingulum. Internal precingulum is obvious. Internal postcingulum forms a wide hypocone shelf with a prominent hypocone on it.

M^2 is larger than M^1 and is the largest one among the cheek teeth. Its crown is less worn than M^1's. Protocone is larger and lower than both paracone and metacone which are nearly equal in size. All the three cones are conical in shape with flat outer surfaces. Its crown structure is quite similar to M^1's, except ectocingulum, stylocone-and meta-stylocone-like structures are less developed.

M^3 is like an oval in outline. Its ectoloph is U-shaped. Mesostyle, metastyle, metacrista and stylocone-like structure are all absent. Metacone is reduced and located more labially. Paraconule and metaconule are less prominent. Internal postcingulum do not form a hypocone shelf and hypocone is not present.

The measurement of the teeth of this specimen is listed in Table 1.

Comparison and Discussion Another specimen of a skull with occlused lower jaws, found from another site in the same basin provides enough evidences for us to refer the here described specimen into the genus *Altilambda* Chow et Wang, 1978 (see another paper for details).

So far, four species of *Altilambda* have been described: *A. pactus* Chow et Wang, 1978; *A. tenuis* Chow et Wang, 1978; *A. minor* Tong, 1982 and *A.* sp. Both *A. tenuis* of Qianshan, Anhui and *A. minor* of Nanxiong, Guangdong are far inferior to the new specimen in body size. The size of *A. pactus* is larger than that of the other two named species of this genus, but it is still distinctly smaller than that of QS055. So that, under the circumstance of no directly comparable specimens, the authors consider the specimen under consideration as a new species of *Al-*

tilambda, named *Altilambda yujingensis* sp. nov.

Chow et Wang (1978) allocated *Altiiambda* to the family pastoralodontidae, based mainly on the features of lower dentition and outline of DP^4. The characters, shared by *A. yujingensis* and *Pastoralodon lacustris,* show that *Altilambda* is more closely related to *Pastoralodon* than to members of the other families of Pantodonta, and support Chow et Wang's (1978) view on the systematic position of *Altilambda.*

Pastoralodon could be easily distinguished from *Altilambda* by its markedly larger body size, contracted middle part of nasals, arch maxillo-nasal suture, typically hypsodont teeth with comparatively high crowns, square outline of M^1 and M^2, lacking of stylocone- and metastylocone-like structures on the ectolophs of P^3-M^2, and more reduced metacone in M^3, in addition there are also differences in the morphology of lower dentition.

Another genus of Pastoralodontidae, Convallisodon, is evidently quite different from *Altilambda* in upper teeth.

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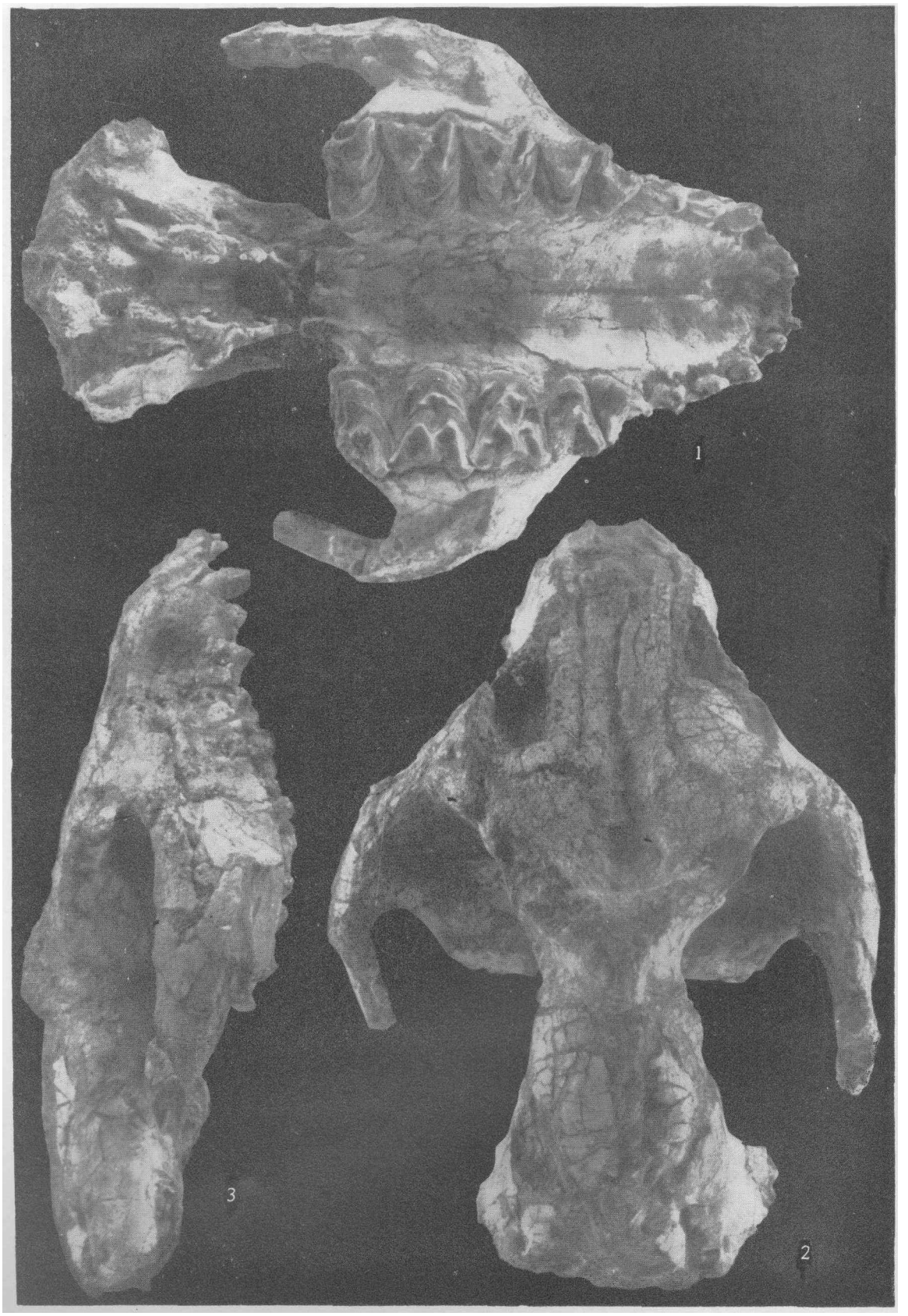
图 版 I 说 明

余井高脊兽(新种)头骨 The skull of *Altilambda yujingensis* sp. nov., 正型标本 Holotype QS055, ×1

1.腹视 ventral view; 2.背视 dorsal view; 3.右侧视 lateral view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