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甘肃东乡龙担的河狸(啮齿类,哺乳动物)化石——龙担哺乳动物群补充报道之一[1)]

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摘要:报道了在甘肃省首次发现的河狸化石:安氏河狸(*Castor anderssoni*)。安氏河狸在甘肃东乡的发现,扩大了河狸化石在我国的分布范围,并进一步证明龙担地点的黄土的时代为早于2 Ma的早更新世。对现生河狸生存环境的对比分析表明,东乡地区在早更新世时可能比现在更湿冷,河、湖广布,树木较多,与现在温带半干旱气候的黄土丘陵地区的气候和环境差别很大。这种差别很可能是青藏高原后期抬升的结果。

关键词:甘肃省东乡族自治县,早更新世,河狸科
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河狸是现生最大型的啮齿动物之一。现生河狸只有1属2种,主要分布于欧亚和北美大陆寒冷地带林区的湖泊和河流中;在我国仅分布于新疆阿尔泰地区乌仑古河的中、上游地区。河狸化石的种类比现生种类丰富得多(已知包括2亚科24属)(McKenna and Bell, 1997)。在我国发现的河狸化石已知有石河狸(*Steneofiber*)、杨氏河狸(*Youngofiber*)、近兽鼠(*Anchitheriomys*)、大河狸(*Trogontherium*)、真河狸(*Eucastor*)、假河狸(*Dipoides*)和河狸(*Castor*)等7个属,可能还包括豪狸(*Hystricops*)属。我国河狸化石分布的范围也比现生河狸要广得多,西部往南可到云南省,中、东部往南可达长江以北的地区[李有恒(1964)曾报道过在江南发现了河狸化石的踪迹,但化石只是一、两个不完整的牙,它们是否是真正的河狸是有疑问的]。不但在新疆有河狸化石,在内蒙古的通古尔、二登图和伊克昭盟的千里山地区,辽宁省,北京的周口店,河北省的张北、唐山和阳原县的泥河湾,江苏省泗洪县的下草湾,安徽省的和县,山西省的保德、寿阳和榆社和云南禄丰和昭通等地都发现过河狸的化石(王伴月等,1981;时墨庄等,1981;邱铸鼎等,1985;Xu, 1994; 邱铸鼎,1996;叶捷等,2001)。但在甘肃省境内至今还未见有关河狸化石的报道。本文记述的河狸化石是2003年秋在东乡龙担发现的,那时龙担哺乳动物群的专著(邱占祥等,2004)已经付印。这一发现不但将龙担哺乳动物群的化石从31种增加到了32种,而且将我国河狸化石的分布范围扩大到了甘肃省。这一发现既进一步证实了龙担哺乳动物群的地质时代确实较早,距今已超过2 Ma,还为进一步了解龙担地区更新世初期的古环境提供了新的佐证。

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文中描述所用术语依 Stirton (1935)。文中缩写:IVPP,中国科学院古脊椎动物与古人类研究所;IVPP Loc.,中国科学院古脊椎动物与古人类研究所野外地点编号;IVPP V,中国科学院古脊椎动物与古人类研究所脊椎动物化石编号;LX,临夏地区。测量缩写:L,长,W,宽。测量以毫米为单位。

河狸科 Castoridae Hemprich, 1820

河狸亚科 Castorinae Hemprich, 1820

河狸属 *Castor* Linnaeus, 1758

安氏河狸 *Castor anderssoni* (Schlosser, 1924)

(图 1)

标本 一段右下颌骨具 i2 和 p4 ~ m3 (IVPP V 13572.1)和一段右上门齿(V 13572.2)。

产地和层位 甘肃省东乡族自治县那勒寺乡下龙担,IVPP Loc. LX 200010;早更新世午城黄土下部下层。

记述 下颌骨粗壮。上升支前缘下端起于 m1 外侧。颏孔位于 p4 的前下方。咬肌窝前端达 p4 下方。下颌联合的后端达 p4 前缘下方,明显向下凸出。

上门齿稍窄于下门齿,横切面约为舌侧角浑圆、唇面横向稍圆凸的等边三角形。釉质层仅分布于唇侧,其表面为橘黄色,有微弱的、纵向平行的沟、棱。下门齿大部分埋在下颌骨内。从露出部分看,下门齿釉质层表面也为橘黄色,也具微弱的、纵向平行的沟、棱。颊齿齿冠很高。下颊齿冠面结构较简单,舌侧 3 个褶较平直或稍弯,无明显的釉质层褶皱或分叉。颊侧的次褶(hyxd)伸插在下中褶(msxd)和下后褶(mexd)之间。从侧面看,颊侧的次沟(hysd)明显地比 3 个舌侧沟要宽而长很多。颊齿的次沟伸到齿槽缘时未见缩小变窄的趋势,表明次沟在齿槽中还要延伸一段距离,但因所有下颊齿的下部均埋在齿槽中,次沟在齿槽中是否延达齿冠基部无法判断。舌侧 3 个沟在齿槽缘附近或其上则逐渐消失,其中以下中沟(mssd)最长,长于下前沟(pasd)和下后沟(mesd)。颊齿中 p4 最大,m3 最小。

测量 i2 与 p4 间齿隙长约 24 mm,下颌骨在 p4 下方的高 26 mm,在 m2 处宽 17.7 mm。p4 ~ m3 长 32.8;牙齿测量(L × W) I2: 9.7 × 9.6; i2: - × 9.3; p4: 9.7 × 8.6; m1: 8.3 × 8.8; m2: 8.3 × 8.7; m3: 8.7 × 7。

讨论 龙担的标本在下颌骨、门齿和下颊齿的形态和结构上都与安氏河狸(*Castor anderssoni*)的很相似,而且其大小也在该种的变异范围内,应归入安氏河狸种。

安氏河狸最早是 Schlosser (1924) 根据采自我国内蒙古二登图地点的河狸化石建立的。他当时将安氏河狸归入石子鼠(*Chalicomys*)属,称为安氏石子鼠(*Chalicomys anderssoni*)。Young (1934)建立了中国河狸(*Sinocastor*)新属,将 Schlosser (1924)的 *Chalicomys anderssoni*、Teilhard de Chardin and Young (1931)的布氏河狸(*Castor broilii*)和 Young (1927)的师氏河狸(*Castor zdanskyi*)均归入了 *Sinocastor* 属。而 Stirton (1935)却将上述 3 种归入现生属 *Castor*。Stirton 根据 *C. californicus* 的种内变异范围提出,上述 3 种的特征仍在单一种的变异范围内,亦即后 2 种(*C. broilii* 和 *C. zhanskyi*)可能是 *C. anderssoni* 的后出同物异名。Teilhard de Chardin (1942)认为 *Sinocastor* 是有效属,并且认为 Young (1934)描述的产自周口店的归入 *Castor* sp.的标本和北美的 *C. californicus* 也可能属 *Sinocastor* 属。辽宁省

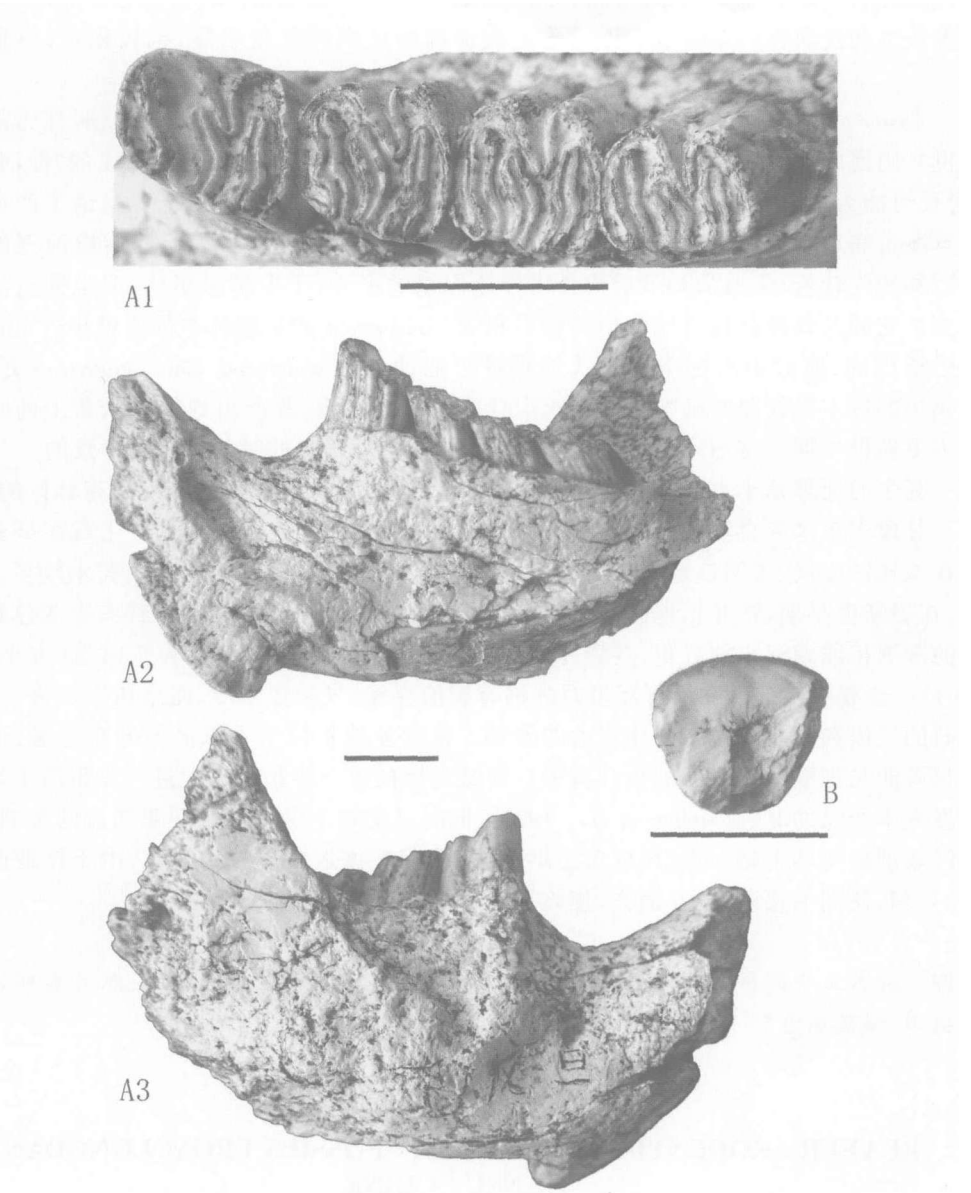

图 1 安氏河狸,比例尺 = 1 cm

Fig.1 *Castor anderssoni* (Schlosser, 1924), scale = 1 cm

A. 右下颌骨 right mandible with i2, p2 ~ m3 (V 13572.1), A1. p4 ~ m3 冠面 occlusal view; A2. 下颌骨舌侧 lingual view of mandible; A3. 下颌骨颊侧 buccal view of mandible; B. 上门齿横切面 transverse section of I2 (V 123572.2)

博物馆和本溪市博物馆(1986)也采用了 *Sinocastor* 属名。Xu (1994)赞同 Stirton (1935)的意见,并明确指出 *Sinocastor* 是 *Castor* 的后出同物异名,而 *C. broilii* 是 *C. anderssoni* 的后

出同物异名。笔者也赞同 Stirton (1935)和 Xu (1994)的意见,将安氏种归入 *Castor* 属。但笔者认为师氏河狸(*Castor zdanskyi*)与安氏河狸的区别特征较明显,也较稳定,应是有效种。

Castor anderssoni 过去已知主要分布于我国的华北地区:内蒙古二登图(时代为最晚中新世)、山西的保德和榆社等地(时代为晚中新世—上新世)和山西寿阳下庄的"泥河湾层"(时代可能为更新世早期?)。辽宁省博物馆和本溪市博物馆(1986)也曾报道了产自辽宁省本溪市庙后山地点的安氏河狸 *C. anderssoni*,时代为中更新世。但庙后山河狸的下颊齿舌侧的沟较长,下前沟和下后沟几乎伸达齿根的上方,下中沟虽短些,但也伸达齿的中下方。它的这些特征显得比龙担的标本和 *C. anderssoni* 的正型标本都要进步。正如原作者已指出的,庙后山的标本与安氏河狸进步亚种(*C. anderssoni* mut. *progressa*)更接近。从龙担的标本具较原始的特征和安氏河狸的地史分布看,其产出地层午城黄土的时代最晚为更新世早期。这与邱占祥等(2004)对龙担哺乳动物群的时代分析是一致的。

现生的河狸是半水生的喜冷动物,主要分布于欧亚和北美大陆寒冷地带林区的河、湖中。甘肃省东乡族自治县现处黄土丘陵地区,属温带半干旱气候。河狸化石在早更新世时在该地区出现,表明该地区在早更新世时应比现在更湿冷,河、湖广布,树木较多。事实上,在更新世早期,在龙担地区附近的临夏县的东山和积石县的王家山都有青灰色和灰黑色的深湖相或湖沼相的沉积,其中并产有大量云杉、冷杉腐树,被称为东山组(方小敏等,1997)。这表明该地区在早更新世时的确有湖泊存在,气候较寒冷,而且树木较多。显然,当时的气候和环境与现在有相当大的差别。临夏盆地正位于青藏高原的东北缘,上述变化很可能与青藏高原后期的抬升有关。青藏高原的进一步抬升不但进一步阻碍了潮湿的印度夏季季风的北进(Molnar et al., 1993),同时又受较干燥的西伯利亚气流的影响,使该地区逐渐变得越来越干燥,风成黄土形成,并沉积在该地区。与此同时,由于该地区的抬升、切割,使湖泊逐渐变少、消失,使该地区逐渐变为半干旱的黄土丘陵。

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BEAVER (RODENTIA, MAMMALIA) FOSSILS FROM LONGDAN, GANSU, CHINA
—Addition to the Early Pleistocene Longdan Mammalian Fauna (1)

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Key words Dongxiang Autonomous County of Gansu, early Pleistocene, Castoridae

Summary

In the autumn of 2003 some beaver fossils were collected from Longdan, when the monograph on the Longdan Mammalian Fauna (Qiu et al., 2004) was under press. It is first time to find beaver in Gansu Province. The discovery not only enlarged the list of the Longdan Mammalian Fauna

from 31 to 32 taxa, further confirmed the ancientry of the Longdan Fauna, but also expanded the distribution area of the beavers to the Gansu Province also. In addition, the discovery threw some new light on the paleoenvironments of the Longdan area during the early Pleistocene.

Castoridae Hemprich, 1820
Castorinae Hemprich, 1820
Castor Linnaeus, 1758
Castor anderssoni (Schlosser, 1924)

(Fig. 1)

Specimens One segment of right lower jaw with i2 and p4 ~ m3 (IVPP V 13572.1) and a fragment of right I2 (V 13572.2).

Locality and horizon IVPP Loc. LX 200010, Xia Longdan, Nalesi, Dongxiang Autonomous County, Gansu; early Pleistocene, lower level of Wucheng Loess.

Remarks The lower jaw is robust. The anterior border of the ramus ascendens starts from outside the m1. The mental foramen is located before p4. The anterior end of the masseteric fossa extends forwards to below p4. The I2 forms an equilateral triangle in cross-section and the enamel mainly covers the labial side. The lower cheek teeth have rather simple occlusal features. The lingual three flexids are straight or slightly curved, without distinct wrinkles or forks. The hypoflexid inserts between the mesoflexid and metaflexid. The hypostriid is long and deep. The three lingual striids are shallower and shorter than the hypostriid, and disappear before extending into the alveolus. The mesostriid is deeper than both the parastriid and metastriid. In the lower cheek teeth the p4 is the largest and the m3 is the smallest. All of the features are identical with those of *Castor anderssoni*, and the size is within the range of the latter (Mesearments see in Chinese text).

Castor anderssoni was erected by Schlosser (1924) and referred to the genus *Chalicomys*, as *Chalicomys anderssoni*. Young (1934) established a new genus, *Sinocastor*, and referred *Chalicomys anderssoni* of Schlosser and some others, including *Castor broilii* of Teilhard de Chardin and Young (1931) and *Castor zdanskyi* of Young (1927) to his *Sinocastor*. Stirton (1935) assigned the three species mentioned above into the extant genus *Castor*, considering both *C. broilii* and *C. zdanskyi* synonyms of *Castor anderssoni*. However, Teilhard de Chardin (1942) considered *Sinocastor* as a valid genus. Xu (1994) agreed with Stirton's (1935) suggestion and mentioned that *Sinocastor* was the later synonym of *Castor*. I agree with Stirton (1935) and Xu (1994) in assigning the species *anderssoni* into *Castor*, thus is *C. anderssoni*, but consider *Castor zdanskyi* as a valid species because it has stable and distinct features.

Castor anderssoni is known to occur from latest Miocene through early Pleistocene. *C. anderssoni* was also reported from middle Pleistocene Miaohoushan fauna in a book published by the Museum of Liaoning Province and Museum of Benxi City (1986). However, the specimen from Miaohoushan, as pointed out by its describers, was more progress than the holotype of *C. anderssoni* in having longer lingual striids, and might represent a more progress subspecies, *C. anderssoni* mut. *progressa*. The specimen from Longdan is similar to the holotype and more primitive than the specimens from Miaohoushan in evolutionary level of the cheek teeth. It seems that the deposits bearing *C. anderssoni* in Longdan area is early Pleistocene (> 2 Ma) in age at least. This is quite the same as originally suggested by Qiu et al. (2004).

The extant beavers are known to be semi-aquatic. They prefer streams and small lakes having nearby growths of woods in frigid zone. *Castor anderssoni* might have the same habit as the extant beaver does. If so, the palaeoclimate of Dongxiang Coundy might be frigid and damp. There were streams and small lakes nearby in this area during the early Pleistocene. In fact, rich dragon spruce and fir fossils were reported in early Pleistocene limnetic deposits in this area (Fang et al., 1997). However, the Dongxiang County is now located in the loess hills of temperate zone and has semiarid weather, which is quite different from that in early Pleistocene in Dongxiang area. Dongxiang County

is located at the northeastern margin of the Tibetan Plateau. The further uplift of the Tibetan Plateau may have played an important role in the paleoenvironment changes from the early Pleistocene to recent. It prevented the humid Indian Summer Monsoon into this area (Molnar et al., 1993). On the other hand this area became more and more influenced by the arid Siberian air flow. With the lift of the Tibetan Plateau, the weather became drier and drier, the loess began depositing, the land is cut and the lakes vanished gradually. Eventually the Dongxiang area became a part of the Loess Plateau with semiarid weather.

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