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18. Fossil Mammals from Katabira-mura, Kani-gun,
Gifu Prefecture, Japan.*

Fuyuji TAKAL.

(Contr. from Geol. Inst., Tokyo Univ.; Comm. by T. KOBAYASHI.)
(With Pl. XII)

It is well known that the Miocene Series is rich in foraminifers, corals, molluscs, mammals, and plants distributed through the southeastern part of the Gifu Prefecture, central Japan. In 1943 the writer made a short trip in this district and in accordance with the kindness of Yoshiyuki KANI, head-master of Katabira primary school, had an opportunity to study two new fossils unearthed from the Hiramaki formation at Higashikatabira, Katabira-mura, Kani-gun, Gifu Prefecture. The one is a fragment of a right lower jaw with the first and second molars of *Palaeotapirus yagii* MATSUMOTO and the other is a fragment of a left lower jaw with the second and third premolars of *Chilotherium pugnator* (MATSUMOTO). Both specimens lack their symphyseal parts and ascending bars. They are clearly identical with the species described by Hikoshichirô MATSUMOTO from the same formation. Besides these two species, H. MATSUMOTO,¹⁾ S. TOKUNAGA,²⁾ Jirô MAKIYAMA,³⁾ and Jôji NAGASAWA⁴⁾ reported the occurrences of *Bumolophodon annectens* (MATSUMOTO), *Anchitherium hypohippoides* MATSUMOTO, and *Amphitragulus minoensis* MATSUMOTO from the same formation. From the mammalian evidence, the climate of the Hiramaki formation seems to have been warmer than the present;

* Contribution from the Geological Institute, Faculty of Science, Tokyo University and the Department of Geology and Mineralogy, Research Institute for Natural Resources, no. 72.

1) H. MATSUMOTO: Descriptions of Some New Fossil Mammals from Kani District, Prov. of Mino, with Revisions of Some Asiatic Fossil Rhinocerotids. Sci. Rep., Tôhoku Imp. Univ., 2nd ser. (geol.), vol. 5, no. 3, pp. 75-91, pls. 13, 14, 1921.

2) S. TOKUNAGA: Fossils of Rhinocerotidae found in Japan. Proc. Imp. Acad., vol. 2, no. 6, pp. 289-291, 1926.

3) J. MAKIYAMA: On the Mastodon newly obtained from province Mino. Chikyû-The Globe, vol. 16, no. 5, pp. 333-345, figs. 1-4, 1931 (in Japanese).

—: Japonic Proboscidea. Mem. Coll. Sci., Kyoto Imp. Univ., ser. B, vol. 16, no. 1, pp. 6-12, figs. 2-4, 1938.

4) J. NAGASAWA: A Fossil Cervid obtained from Hiramakimura, Mino. Journ. Geol. Soc. Tôkyô, vol. 39, no. 464, pp. 216-224, fig. 1 1932 (in Japanese).

its geological age may perhaps be middle Miocene and it may be correlated with the European Burdigalian and American Harrisonian age.

The early Miocene fauna of Eastern Asia,⁵⁾ correlated with the European Aquitanian and the American Geringian faunas, includes only 2 orders, 2 families, and 2 genera;

Proboscidea	Trilophodontidae	<i>Serridentinus</i>
Perissodactyla	Baluchitheriidae	<i>Baluchitherium</i>

On the other hand the middle Miocene fauna of Eastern Asia⁶⁾ includes the following 5 orders, 26 families and 62 genera;

Rodentia

Ochotonidae.	<i>Ochotona</i> .
Castoridae.	<i>Amblycastor</i> .
Dipodidae.	<i>Heterosminthus</i> , <i>Paralactaga</i> , <i>Protalactaga</i> .
Spalacidae.	<i>Prosiphneus</i> .
Muridae.	<i>Paracricetulus</i> .
Cricetopidae.	<i>Plesiocricetodon</i> .

Carnivora

Hyaenodontidae.	<i>Pterodon</i> .
Canidae.	<i>Amphicyon</i> , <i>Cephalogale</i> , <i>Gobicyon</i> .
Ursidae.	<i>Hemicyon</i> .
Mustelidae.	<i>Melodon</i> .
Viverridae.	<i>Tungurictis</i> .
Hyaenidae.	<i>Hyaena</i> .
Felidae.	<i>Machairodus</i> , <i>Metailurus</i> .

Proboscidea

Dinotheriidae.	<i>Dinotherium</i> .
Trilophodontidae.	<i>Bunolophodon</i> , <i>Platybelodon</i> , <i>Serridentinus</i> , <i>Tetrabelodon</i> , <i>Trilophodon</i> .

Perissodactyla

Equidae.	<i>Anchitherium</i> .
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5) F. TAKAI: Present Knowledge on a History of Mammals in the Eastern Asia (in manuscript).

6) F. TAKAI: Ibid.

Tapiridae.	<i>Palaeotapirus</i> .
Amynodontidae.	<i>Cadurcotherium</i> .
Rhinocerotidae.	<i>Aceratherium</i> , <i>Baluchitherium</i> , <i>Buglitherium</i> , <i>Chilotherium</i> , <i>Diceratherium</i> , <i>Paraceratherium</i> , <i>Phyllotillon</i> , <i>Plesiaceratherium</i> , <i>Macrotherium</i> , <i>Schizotherium</i> .
Chalicotheriidae.	
Artiodactyla	
Suidae.	<i>Hyotherium</i> , <i>Listriodon</i> , <i>Palaeochoerus</i> .
Anthracotheriidae.	<i>Ancodus</i> , <i>Anthracotherium</i> , <i>Brachyodus</i> , <i>Gelasmodon</i> , <i>Gontelina</i> , <i>Hemimeryx</i> , <i>Hyoboops</i> , <i>Merycops</i> , <i>Microbunodon</i> , <i>Microselenodon</i> , <i>Telmatodea</i> , <i>Telmatodon</i> .
Tragulidae.	<i>Amphitragulus</i> , <i>Dorcatherium</i> , <i>Gelocus</i> , <i>Lagomeryx</i> , <i>Prodermotherium</i> .
Cervidae.	<i>Diceros</i> , <i>Stephanocemas</i> .
Giraffidae.	<i>Palaeotragus</i> , <i>Progiraffa</i> .
Bovidae.	<i>Oioceros</i> .

As comparison with the early Miocene fauna of Eastern Asia, the middle Miocene shows a marked increase in number of families and genera; 88.8% of them consist of developed forms of extinct genera and the rest are still now surviving. The generic interchange with Asia, Europe, and Africa took place in this age. The Japanese islands were connected by land with the Asiatic continent and over the land-bridge passed the first migration of mammals since the opening of the Neogene. From the climatic condition implied, it is unquestionable that the Hiramaki formation is the land facies of the Tsukiyoshi formation which contains several warm current animals such as *Operculina*, *Miogypsina*, *Vicarya*, and *Vicaryella*.

The two new vertebrates are described as follow:

Palaeotapirus yagii MATSUMOTO, 1921

Pl. XII, Figs. 1 a-c.

1921. *Palaeotapirus yagii* MATSUMOTO, Sci. Rep., Tôhoku Imp. Univ., 2nd ser. (geol.), vol. 5, no. 3, pp. 78-80, pl. 13, figs. 6-11.

Material:—Fragment of right lower jaw with the first and second molars; deposited in Katabira primary school; plaster model stored in the Museum of Geologi-

cal Institute, Faculty of Science, Tokyo University.

Description:— $\overline{M1}$ moderately worn, oblong quadrangular in outline, bilobed, and two-rooted; the anterior lobe slightly wider than the posterior; buccal side of anterior lobe somewhat damaged; valley between them deep; the enamel layer about 1.5 mm. thick; the metaconid, metalophid, and hypolophid prominent, but the paraconid rather indistinct; anterior and posterior cingula present, but very feeble; marks of compression against the adjacent teeth distinct on both the anterior and posterior sides. $\overline{M2}$ slightly worn, also oblong, quadrangular in outline, bilobed, and two rooted; anterior lobe slightly wider than the posterior, but both the metalophid and hypolophid slightly curved backwards; paraconid very feeble; the cingula and marks of compression against the adjacent teeth similar to those of the preceding tooth.

Measurements in mm.

$\overline{M1}$	{	antero-postero	21
		transverse	16.5
		height of crown on buccal side	8+
		height of crown on lingual side	11
$\overline{M2}$	{	antero-postero	23
		transverse	18
		height of crown on buccal side	10
		height of crown on lingual side	12

Transverse thickness of ramus at anterior side of $\overline{M1}$	21.5
Transverse thickness of ramus at anterior side of $\overline{M2}$	23.5
Transverse thickness of ramus at anterior side of $\overline{M3}$	24

Remarks:—So far as the dental characteristics are concerned, the present material is identical with the Hiramakian species. As MATSUMOTO has already stated, it is questionable, if the present species is conspecific with any European species, such as *Palaeotapirus helveticus* (MEYER)⁷⁾, *P. douvillei* PILHOL⁸⁾, or *P. meyeri* KAFKA⁹⁾.

7) H. v. MEYER: Die fossilen Reste der Genus *Tapirus*. Palaeontogr. bd. 15, pls. 16-18, 1867.
 8) H. FILHOL: Description d'un Nouveau Genre de Mammifère Fossile. Bull. Soc. Philom., ser. 7, tome 12, pp. 56-58, 1888.
 9) J. KAFKA: Rezenten und fossile Huftiere Böhmens. Arch. Natur Wiss. Ld Durchf. Böhmen, bd. 14, nr. 5, pp. 1-86, 1913.

MATSUMOTO's opinion that Hiramakian species is more archetypal than the European, seems to the writer unauthentic.

Chilotherium pugnator (MATSUMOTO), 1921

Pl. XII, Figs. 2 a-c.

- 1921. *Teleoceras* (*Brachypotherium*) *pugnator* MATSUMOTO, Sci. Rep., Tôhoku Imp. Univ., 2nd ser. (geol.), vol. 5, no. 3, pp. 80-82, pl. 14.
- 1926. ?*Teleoceras kamiensis* TOKUNAGA, Proc. Imp. Acad., vol. 2, no. 6, pp. 290, 291.
- 1926. ?*Teleoceras tokiensis* TOKUNAGA, ibid., vol. 2, no. 6, pp. 290, 291.

Material:—Fragment of left lower jaw with the second and third premolars; deposited in Katabira primary school; plaster model stored in the Museum of Geological Institute, Faculty of Science, Tokyo University.

Description:— $\overline{P2}$ moderately worn, bilobed, and two-rooted; the anterior lobe and a part of the posterior broken away; the enamel layer about 1.5 mm thick; the cingula present, but very feeble except along the posterior side. $\overline{P3}$ also moderately worn, bilobed, and two-rooted; the anterior lobe slightly broader than the posterior; the paraconid, protoconid, metaconid, and entoconid fairly prominent; the mark of compression against the adjacent teeth recognized on the anterior side; the cingula well-developed along the posterior side only.

Measurements in mm.

	Present material		“?Teleoceras tokiensis”			“?Teleoceras kamiensis”		
	$\overline{P2}$	$\overline{P3}$	$\overline{P3}$	$\overline{P4}$	$\overline{M1}$	$\overline{M1}$	$\overline{M2}$	$\overline{M3}$
antero-postero	—	45.5	44.5	49.0	51.5	53.0+	57.0	62.5
transverse	27.5	28.0	29.5	31.5	32.0	35.0	34.5	35.0
height of crown on buccal side	15.5	28.0	36.0	33.5	37.5	25.5	24.5	18.0
height of crown on lingual side	—	25.5	31.5	25.5	31.5	21.0	23.0	18.0

Remarks:—Judging from the molar pattern and size, the present material is identical with the Hiramakian species,¹⁰⁾ and is intimately related to *Aceratherium aurdalianense* NOUEL,¹¹⁾ one of the European Burdigalian representatives, but is not

10) F. TAKAI: The Mammalian Faunas of the Hiramakian and Togarian Stages in the Japanese Miocene. Jubilee Publ., Comm. Prof. H. Yabe, vol. 1, pp. 192, 193, 1939.
 11) A. A. NOUEL: Mémoire sur un nouveau Rhinocéros fossile. Mém. Soc. Agric. Sci., Orléans, tome 8, pp. 241-251, pls. 1-5, 1866.

close to the Indian species such as *Aceratherium blanfordi* LYDEKKER¹²⁾ and *Teloceras fatehjangense* PILGRIM.¹³⁾

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Plate XII

12) R. LYDEKKER: Additional Silwalik Perissodactyla and Proboscidea. *Palaeont. Indica*, ser. 10, vol. 3, pt. 1, pp. 2-11, pl. 1 figs. 1, 2, 6; pl. 2 figs. 1-5, 1884.

13) G. E. PILGRIM: Notices on new Mammalian Genera and Species from the Tertiaries of India. *Rec. Geol. Surv. India*, vol. 40, pt. 1, p. 66, 1910.

—: The Vertebrate Fauna of the Gaj Series in the Bugti Hills and the Punjab. *Palaeont. Indica*, new, ser., vol. 4, no. 2, p. 30, pl. 11, fig. 4, 1912.

Explanation of Plate XII.

Palaeotapirus yagii MATSUMOTO

- Fig. 1a. Buccal view of right lower jaw with first and second molars. $\times 0.85$.
- 1b. Crown view of same. $\times 0.85$.
- 1c. Lingual view of same. $\times 0.85$.

Chilotherium pugnator (MATSUMOTO)

- Fig. 2a. Lingual view of left lower jaw with second and third premolars. $\times 0.85$.
- 2b. Crown view of same. $\times 0.85$.
- 2c. Buccal view of same. $\times 0.85$.

