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Stephanorhinus kirchbergensis (Mammalia, Rhinocerotidae) from Middle Pleistocene levels of the Ob' River at Krasnyj Jar (Tomsk region, Western Siberia)

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Some isolated teeth and a third metacarpal, which may confidently be attributed to *Stephanorhinus kirchbergensis* (JAEGER, 1839), recently discovered in Middle Pleistocene levels along the Ob' river at the village of Krasnyj Jar (Tomsk region, Western Siberia), are described here. Unlike *Coelodonta antiquitatis*, which abounds on Russian territory, *S. kirchbergensis*, as well as other Plio-Pleistocene rhinoceroses, seems to be rare in Russia, being only reported from a limited number of localities. This is the case of one of the very few records of this species from Siberia, and a second one from the Tomsk region. The co-occurrence, in the Krasnyj Jar area, of *S. kirchbergensis* with other *taxa*, such as *Mammuthus* ex gr. *trogontherii-chosaricus*, *Bison priscus*, *Equus* ex gr. *mosbachensis-germanicus* suggests a palaeoenvironmental landscape dominated by extensive grasslands and sparse trees.

Es wird eine Neuentdeckung in Mittel-Pleistozänen Schichten am Ob'Fluss beim Dorfe Krasnyj Jar (Tomsker Gegend, Westsibirien), von einzelnen Zähnen und einem Metakarpalen bekanntgemacht, welche ohne Zweifel einem *Stephanorhinus kirchbergensis* (Jaeger, 1839) zugeschrieben werden kann. Anders als der im Russischen Territorium reichlich vorhandene *Coelodonta antiquitatis*, ist *S. kirchbergensis* (wie auch andere Plio-Pleistozäne Nashörner) dortzulande scheinbar selten, und nur an wenigen Ortschaften festgestellt worden. Dies ist der Fall von einem ersten unter sehr wenigen Befunden dieser Art in Sibirien und von einem zweiten in der Tomsker Gegend. Das festgestellte Vorhandensein - an derselben Schicht - dieser Art, wie auch anderer taxa (*Mammuthus* ex gr. *trogontherii-chosaricus*, *Bison priscus*, *Equus* ex gr. *mosbachensis-germanicus*) lässt im Krasnyj Jarchen Gebiet eine durch ausgedehnte Grasebene und mehr oder weniger baumreiche offene Oberflächen gekennzeichnete Paläoumwelt vermuten.

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Keywords: Middle Pleistocene, Krasnyj Jar, Tomsk region, *Tobol'skij gorizont*.

INTRODUCTION

Five isolated rhinoceros teeth and a third rhinoceros metacarpal were found during excavations in the brown quartz-arkose medium-grained 'Tobol'skij gorizont' level sands (Siberian stratigraphy = isotope stage 10 in the Alpine stratigraphy) outcropping along the right bank of the Ob' river, at the village of Krasnyj Jar (about 50 m a.s.l.; 57º 05' N - 84' 30' E; Tomsk region, Western Siberia).

The locality, commonly named 'Krasny Jar-2', is situated about 110 kilometers north of Tomsk (Fig. 1), and is described by Shpanskij (2000). The material is found together with other skeletal remains found in the lower part of the deposit, referred to *Mammuthus* ex gr. *trogontherii-chosaricus*, *Bison priscus* and *Equus* ex gr. *mosbachensis-germanicus*.

MATERIAL

The five isolated teeth (PM TGU 5/1251, PM TGU 5/1067, PM TGU 5/1087, PM TGU 5/2878, PM TGU 5/2883) and the third metacarpal (PM TGU 5/2723) recovered are preserved in the collections of the Palaeontological Museum of the Tomsk State University at Tomsk.

PM TGU 5/1251 Large-sized and brachyodont second upper molar (Fig. 2a, b), rather damaged in the mesio-lingual portion; the metacone appears remarkably bulbous. A thin film of cement covers almost all the surface of the crown, whereas the interior valley shows some traces of it only; where the cement is absent, the enamel appears rather smooth and opaque. Only one *stylus* is present in the interior valley.

PM TGU 5/1067 Very well preserved, large-sized, and remarkably brachyodont second lower molar (Fig. 2c, d). The enamel is smooth and semi-bright, coronal cement is absent, roots are still present, both mesial and distal valleys are drastically reduced, mesial and distal cingula are present.

PM TGU 5/1087 Large-sized, very brachyodont first lower molar (Fig. 2e, f); slightly damaged in its mesial and distal portions. The dimensions are very close to those of the molar 5/1067; as on 5/1067, the enamel is smooth and semi-bright, the coronal cement is absent. Roots are still present; mesial and distal valleys are drastically reduced.

PM TGU 5/2883 Large-sized, very brachyodont third (or fourth) upper deciduous molar (Fig. 3a, b, c), damaged in its lingual portions;

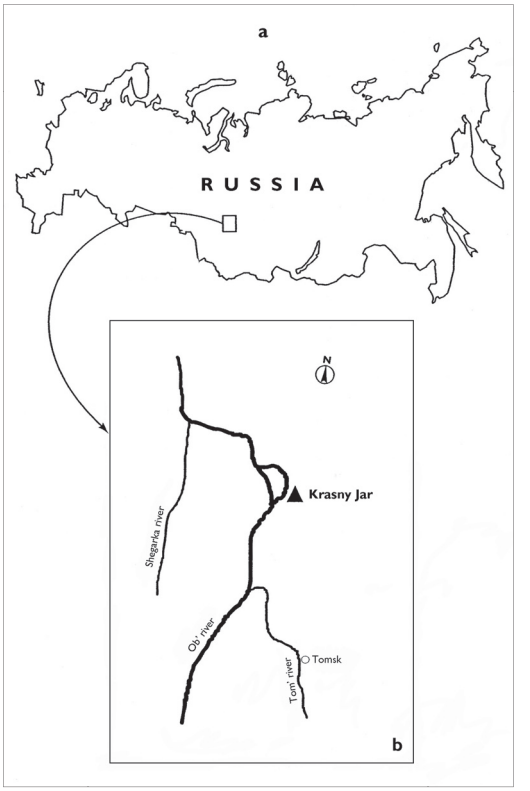

Figure 1 Index maps of the Tomsk region (**a**) and localization of the village of Krasnyj Jar in the same area (**b**).

semi-opaque, slightly rough enamel, uniformly spread on all the surface of the crown; the metacone is remarkabky bulbous; even if seriously damaged, the protocone allows to have an inkling of a remarkable bulbosity. A distal *cingulum* is present.

PM TGU 5/2878 Well preserved, large-sized and rather hypsodont fourth upper premolar (Fig. 3d, e); bright, slightly rough enamel, uniformly spread on all the surface of the crown; the interior valley appears narrow; the protocone and metacone are bulbous (particularly the protocone); mesial and lingual *cingula* are also present; even if damaged, roots are still present.

PM TGU 5/2723 An uncommonly well-preserved and remarkably large-sized, rather slender third metacarpal (Fig. 3f, g). In *norma proximalis*, the proximal articular surface

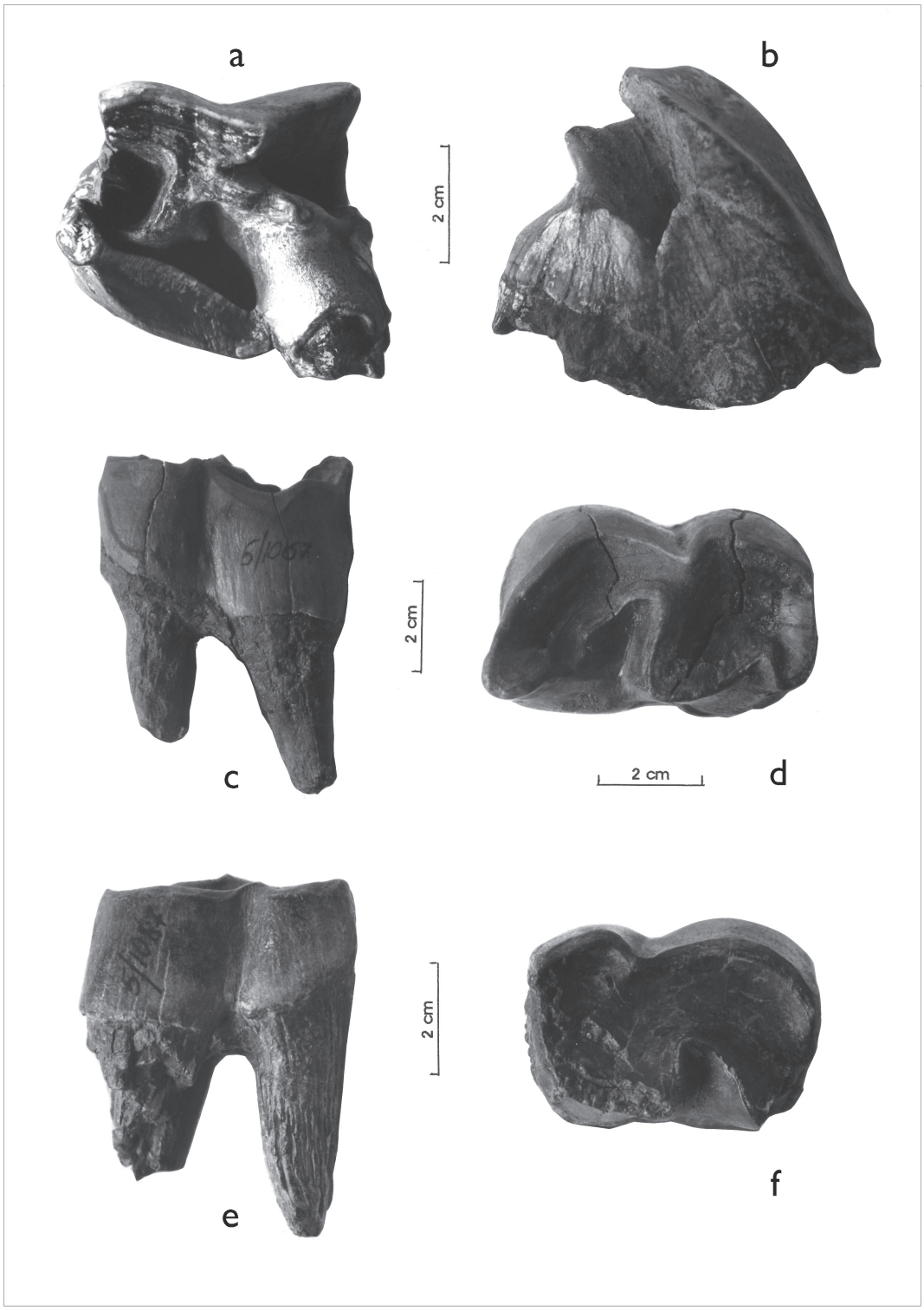

Figure 2 *Stephanorhinus kirchbergensis*; tobol'skij gorizont level (=Middle Pleistocene); Ob' river at Krasnyj Jar (Tomsk region, Western Siberia); second upper molar, (**a**) occlusal-lingual view and (**b**) distal view; second lower molar, (**c**) occlusal view and (**d**) vestibular view; first lower molar, (**e**) occlusal and (**f**) vestibular view.

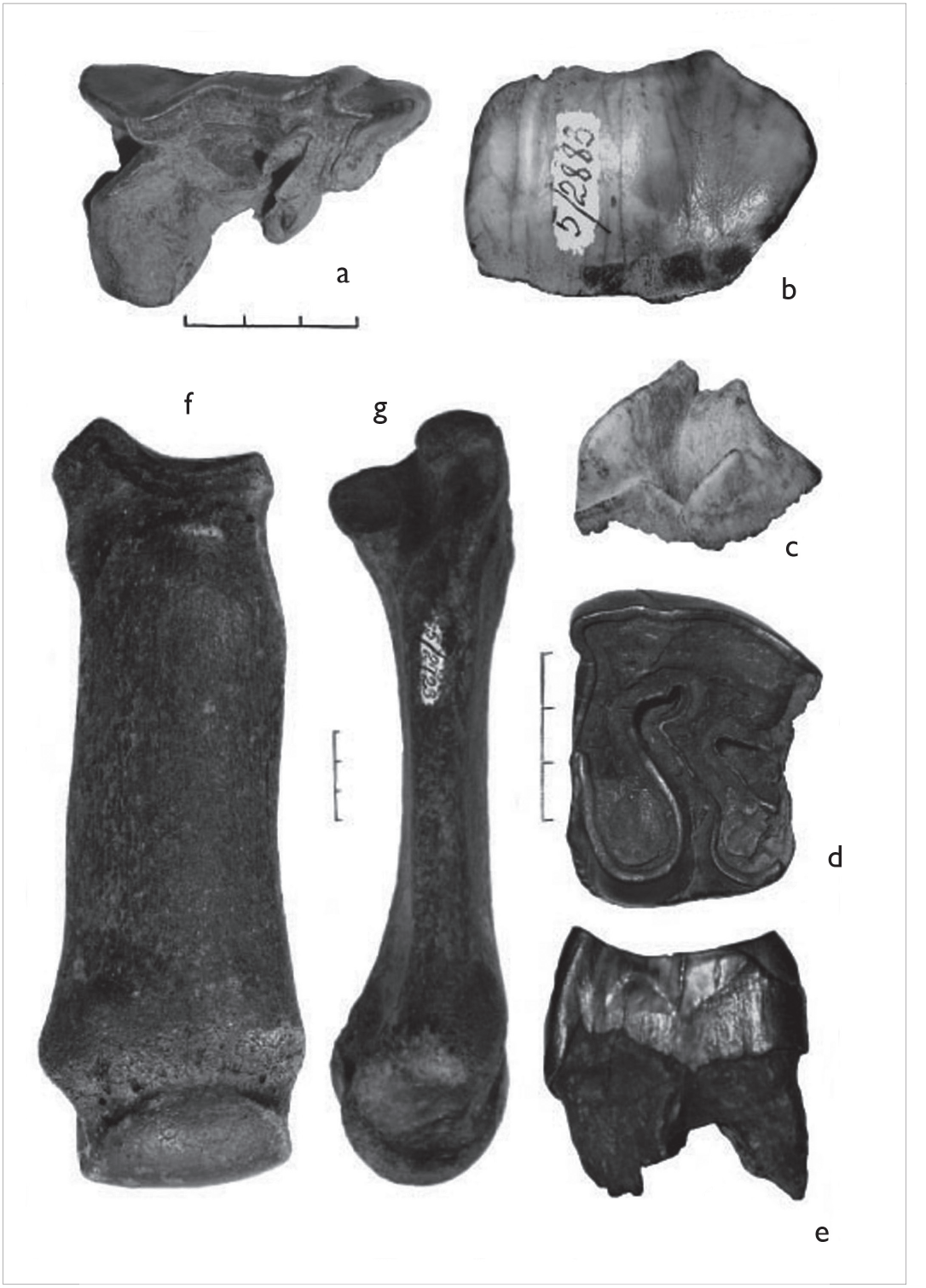

Figure 3 *Stephanorhinus kirchbergensis*; tobol'skij gorizont level (=Middle Pleistocene); Ob' river at Krasnyj Jar (Tomsk region, Western Siberia); third (or fourth) upper deciduous molar, (**a**) occlusal view , (**b**) buccal view, and (**c**) distal view; fourth upper premolar, (**d**) occlusal view and (**e**) mesial view; third metacarpal, (**f**) cranial view and (**g**) lateral view.

appears, proportionally, more stretched dorso-palmarly than latero-medially; in *norma cranialis*, the bone shows distally a progressive enlargement followed by a drastic contraction immediately before the distal articular surface; therefore, the width of the distal epiphysis is remarkably wider in comparison with the distal articulation. In *norma lateralis* (and/or medialis), the diaphysis appears narrow and flat through all its extension; in *norma caudalis*, it is flat and almost smooth, only the mean *crista* shows a slight distal relief.

Measurements of the five teeth are given in Table 1. Those of the third metacarpal are given in Table 2. By comparison, the taphonomical features of the third metacarpal are the same as those of the dental elements.

RESULTS

Teeth

The bulbous metacone, the remarkable brachyodonty, and the undulation of the ectolophes of 5/1251 and 5/2883, the hypsodonty and the bulbous protocone and metacone of 5/2878, the much reduced valleys and the remarkable brachyodonty of 5/1067 and 5/1087 are morphological traits suggestive of *Stephanorhinus kirchbergensis* (JAEGER, 1839). The five isolated teeth attest to the occurrence of at least two individuals. Together with these remains, a whole buccal portion of a second upper molar (PM TGU 5/2602) has also been recovered; the profile of its ectolophe appears as typical for *S. kirchbergensis*.

Third metacarpal

The morphological characteristics of the skeletal remains also suggest *Stephanorhinus kirchbergensis* as an identification.

DISCUSSION

Unlike *Coelodonta antiquitatis*, which is widespread throughout Russia, S. *kirchbergensis* seems to be rare in Russia (Billia 2005a, Billia 2005c, Billia, in press), like other and Plio-Pleistocene rhinoceroses, and like the

Table 1 Dimensions (in mm) of the Krasnyj Jar *S. kirchbergensis* teeth.

Second upper molar PM TGU 5/1251	
maximum length	63
Second lower molar PM TGU 5/1067	
maximum length	60
mesial width	41
distal width	42
First lower molar PM TGU 5/1087	
maximum length	> 54
mesial width	36.5
distal width	38.5
Third (or fourth) upper deciduous molar PM TGU 5/2883	
buccal length	61.2
lingual length	=
mesial width	=
distal width	44.1
Fourth upper premolar PM TGU 5/2878	
buccal length	46
lingual length	41.2
mesial width	64.5
distal width	40.5
max diam. base of the protocone	19.2

Table 2 Dimensions (in mm) of the Krasnyj Jar *S. kirchbergensis* third metacarpal.

Third metacarpal PMTGU 5/2723	
maximum length (in sagittal plane)	229
antero-posterior diameter of proximal epiphysis	56
transverse diameter of proximal epiphysis	62
antero-posterior diameter of distal epiphysis	55.5
transverse diameter of distal epiphysis	80
transverse diameter of the distal joint	64
minimum transverse diameter of the diaphysis	61.5

situation in Western Europe (Billia 2005b). In the Russian Federation, remains of *S. kirchbergensis* are recorded from at least nine other localities. In the specific case, four of these are located in the Russian-European area (Beljaeva 1939, 1940; Gromova 1932, 1935). Two of these are referable to the *Lihvinskij gorizont* level (Eastern European stratigraphy = isotope stage 10 in the Alpine stratigraphy); the other two sites are referable to the Dneprovskij gorizont level (eastern European stratigraphy = stage 8 in the Alpine stratigraphy). The accompanying faunal complexes include also *Mammuthus chosaricus*, *Elephas antiquus*, *Elasmotherium sibiricum*, *Bison priscus*, *Megaloceros giganteus*, *Cervus elaphus*, *Saiga tatarica*, *Camelus knoblochi*, *Canis lupus*, *Ursus spelaeus*, *Equus* sp.

S. kirchbergensis remains are recorded also from other five localities in the Siberian area: at Krasnyj Jar-1 (Tomsk region, Alekseeva 1980); from two localities at the Kemerovo region (Billia, in prep.); along the Viljuj river near its confluence with the Chebydy river (Jakutia region, Dubrovo 1957). Finally, the Zoological Museum of the Russian Academy of Science at Saint Petersburg keeps a complete skull from an unknown locality near Irkutsk (Cherskij 1874; Brandt 1877; Billia 2005d; Billia, in press)

Some other localities that supposedly provided remains of *S. kirchbergensis* are also described in the literature, but unfortunately the material is not traceable at present (Billia 2005c; Billia, in press). In any case, the rarity of this species - despite of its being widespread in the Eurasian continent - is noted on Russian territory as well as in the western European area. Therefore, *S. kirchbergensis* is still little investigated and, consequently, not well known as yet.

The presence of *S. kirchbergensis*, *Mammuthus* ex gr. *trogontherii-chosaricus*, *Bison priscus*, and *Equus* ex gr. *mosbachensis-germanicus* altogether suggests that an ecosystem with widespread grasslands and sparse trees existed in the Krasnyj Jar area.

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