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To Prof. L'Abbé Breuil

WITH THE AUTHOR'S COMPLIMENTS.

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BY

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MR. A. SAVIN, of Cromer, has been kind enough to send me for examination a large number of small vertebrate remains which he has recently collected from the Upper Freshwater Bed of the Norfolk Forest Bed Series at West Runton. Among these there is one little specimen which deserves to be recorded, as it represents a genus not hitherto recognized in the 'Forest Bed'. The specimen is a right maxilla with three grinders in place, indubitably belonging to the genus *Cricetus*; in size it is distinctly larger than the common Hamster *Cricetus vulgaris* (= *C. frumentarius*), which is the largest species of the genus living at the present day. Only once before has *Cricetus* been recognized in Britain, W. A. Sanford [1] having identified from the Hutton Cave, Mendip Hills, remains of a small mouse-like species which he referred to *Cricetus songarus*.

Mr. Savin's specimen is a right maxilla, which, in its present condition, measures 14·5 mm. in length; it has the three molars in place and in an excellent state of preservation. Towards the front of the bone, on the outer side, is seen the base of the jugal process, and on the inner side the palatal plate, which, though not quite perfect, shows much of its oral surface and the floor of the right nasal passage. The greatest length of the crowns of the three teeth is 9·3 mm., the alveoli measuring a little more (10·3 mm.). The grinding surfaces of the teeth are just sufficiently worn to show their patterns in a remarkably clear manner (see Figure), and when examined with a strong lens, or, better still, with a low power under the microscope, the series of islands formed by the enamel, which extend along the middle of each tooth, form a very striking feature. One's attention is also attracted to the deep and sharply defined pits, which are seen between the cusps, both on the inner and outer sides of the crown. The outer cusps are more prominent than the inner ones, and this feature is most marked on the anterior tooth and least on the posterior one. The anterior tooth has evidently had the usual six cusps, but the greater part of the anterior inner one is wanting. The anterior and outer cusp is somewhat larger than either of the others (or those on the other teeth), and this causes an outward projection of the front of the crown unlike what is seen in the living Hamster. The second tooth has four cusps approximately equal in size, and the third tooth has four cusps, the hindermost pair of which are markedly smaller than the others, and consequently this tooth is reduced in width posteriorly. The inner cusps are all a little in advance of the outer ones, so that on the worn surface they seem to

[1] W. A. Sanford, Quart. Journ. Geol. Soc., 1870, vol. xxvi, p. 128, and Proc. Somersets. Nat. Hist. Soc., 1870, vol. xv, p. 56.

form oblique transverse ridges, which are, however, interrupted in the middle by a deep depression, which is in part due to wearing away by the attrition of the lower grinders, and which runs from front to back along the middle of the three teeth. The anterior molar has a distinct cingulum running along the inner side of the crown, and a similar cingulum, but much less distinct, is also to be seen on the second and third molars.

Cricetus vulgaris Runtonensis, n.subsp. From the Norfolk Forest Bed at West Runton. Grinding surfaces of three molars of right maxilla, enlarged six times. The specimen is in the possession of A. C. Savin, Esq., of Cromer.

A comparison of this little maxilla with a number of recent specimens in the British Museum at South Kensington and in the Museum of the Royal College of Surgeons, Lincolns Inn Fields,[1] leaves no doubt as to its generic identity with the common Hamster *Cricetus vulgaris* (= *frumentarius*). The main characters of the teeth are the same; but in none of the recent specimens is the anterior outer cusp of the first molar larger than the others, and there is no outward expansion of this region which would correspond with a larger anterior cusp. The teeth of the 'Forest Bed' specimen are likewise larger than those of any of the recent specimens examined, in which the length of the series of three upper crowns varied from 7·4 to 7·7 mm. Dr. Nehring[2] in his paper on Pleistocene Hamsters gives the extreme measurements of the three upper teeth in recent Hamsters as 7·4 and 8·0 mm.

The large size and difference in structure of these 'Forest Bed' teeth, as well as the age of the beds from which our fossil was obtained, make it highly probable that it represents a form specifically distinct

[1] I am pleased to have this opportunity of thanking the officers in charge at both these institutions for the courteous assistance so kindly rendered on this as on many other occasions.

[2] "Ueber pleistocäne Hamster-Reste aus Mittel- und Westeuropa": Jahrb. k.k. geol. Reichsanst., 1893, Band xliii, Heft ii, p. 179.

from the living *Cricetus vulgaris*. M. C. Depéret[1] has described two lower jaw rami of a *Cricetus* from the Pliocene of Perpignan under the name of *Cricetus angustidens*.[2] These are said to agree as nearly as possible with the living *C. vulgaris*, but the species is distinguished by the narrowness of the anterior molar tooth and by the obliquity of the tubercles, which are compressed and directed forwards so as to join the external tubercle of the pair next in front; also the two anterior tubercles are small. It is obvious that the structure of these teeth is unlike what obtains in the 'Forest Bed' specimen.

Dr. Nehring,[3] in the paper above referred to, discusses the affinities of the larger and smaller species of *Cricetus* found in the Pleistocene deposits of various localities in Middle and Western Europe, and draws special attention to the large jaws described and named by Dr. Woldřich[4] *Cricetus frumentarius major*. These large specimens seem to agree very closely in size with our 'Forest Bed' form, but the series of upper grinders are not quite so large. Dr. Woldřich gives the alveolar measurements of his two largest specimens as 8·8 and 9·5 mm. The same measurement of the 'Forest Bed' specimen is 10·3 mm. The description of these large Hamsters is not sufficiently detailed to allow of a close comparison with the peculiarities observed in the 'Forest Bed' example, and the figures of the teeth are not large enough to give the smaller details of structure; it seems, however, from Dr. Woldřich's figure (loc. cit., pl. ii, fig. 23), that the anterior tubercles of the front tooth are somewhat narrower than the others.

Dr. Nehring (loc. cit., p. 185) seems to think Dr. Woldřich hardly justified in giving the subspecific title *C. frumentarius major* to these fossil forms, as he says there is much variation in size among living Hamsters; but, according to Dr. Nehring's own measurements, no recent Hamster has attained to the size of Dr. Woldřich's fossils, and Dr. Nehring himself includes them under his own subspecies *C. vulgaris fossilis*. If a third name is to be used, that of Dr. Woldřich should be adopted.

During the last few years several living forms of *Cricetus* have been described and provided with subspecific or race names, but for the most part these are distinguished by external characters, and make no nearer approach to our fossil than does the common Hamster itself. I am not aware that any fossil Hamsters have been described other than those already alluded to; but there are two or three papers [5, 6, 7]

[1] "Les Animaux pliocènes du Roussillon": Mém. Soc. Géol. France, 1890, vol. i, Mém. No. 3, p. 54.

[2] See also Dr. Woldřich, "Uebersicht der Wirblethierefauna des Böhmischen Massivs während der anthropozoischen Epoche": Jahrb. k.k. geol. Reichsanst., 1897, Band xlvii, p. 393.

[3] See note 2, p. 111.

[4] "Diluviale Fauna von Zuzlawitz bei Winterberg im Böhmerwalde": Sitzb. d. k. Akad. d. Wiss. in Wien, 1880, Band lxxxii, p. 30.

[5] J. Kafke, "Recente und Fossile Nagethiere Böhems": Arch. Landesdf. Böhem, 1893, vol. viii, No. 5.

[6] J. Nüesch, "Das Schweizersbild, eine Niederlassung aus paläolithischer und neolithischer Zeit": Denkschr. schweiz. Gesellsch. Naturw., 1896, Band xxxv, pp. 1–334.

[7] Dr. A. Nehring, "Ueber die pleistocäne Fauna der Belgischen Hölen": Sitz. Gesellsch. Naturf. Freunde, Berlin, 1897, p. 74.

on fossil rodents, including the genus *Cricetus*, to which reference may profitably be made, that by H. J. Nüesch having an account of the small mammals by Dr. A. Nehring.

If the 'Forest Bed' specimen were of the same age as those described by Dr. Woldřich, one would have had little hesitation in referring them provisionally to the same subspecies; but the evidence in favour of these Norfolk deposits being of Pliocene age is becoming stronger. Dr. Forsyth Major's[1] study of the Forest Bed Voles has led him to think that most of the 'Forest Bed' mammals now referred to living species will eventually prove to be extinct forms, and recent investigations seem to lend strength to his opinions.

A name is needed by which this unique Hamster from the 'Forest Bed' may be known, and under the circumstances it would scarcely be wise to adopt the name of a Pleistocene form, as this would seem to imply affinities for which we have no grounds. It is very unlikely that additional evidence will be obtained for a long time to come, and I suggest that we regard this fossil as representing a peculiar race and call it *Cricetus vulgaris Runtonensis*.

1 "The Mammalian Fauna of the Forest Bed": Geol. Mag., 1908, p. 329.

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