Note on the remains of small mammals obtained from Aveline's Hole, Burrington Combe, Somerset.

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I am indebted to the Spelæological Society of the University of Bristol for allowing me to examine the small mammal remains obtained by the Society during its exploration of Aveline's Hole. Three parcels of specimens have been sent to me in all; in the first parcel the specimens were merely stated to have come from the cave, but in the second and third they were, in part, accompanied by special numbers or label giving particulars of the positions in whch they were found. The following is a list of the specimens upon which the identifications are based:

1.—MYOTIS MYSTACINUS, Kuhl. (Whiskered Bat).

A skull (2), somewhat crushed, but with all the cheek-teeth present on the right side; total length about 14-mm., tooth-row (Can. *m*.3) 5-mm., p. 4—m. 3.—3.8-mm. This specimen agrees with the remains of the extinct species as regards appearance and mineral condition. In form and size it agrees quite well with recent skulls of *M. mystacinus*.

2.—MYOTIS BECHSTEINI, Kuhl. (Bechstein's Bat).

Part of a skull (1), in which the maxillary tooth-row measured about 6.5-mm., probably belongs to this species.

A left mandibular ramus (3), confirms this determination; length 12.5, canine—m. 3—7.2-mm.; mineral condition and appearance as in the remains of the extinct species.

The specific determinations of these bats must be accepted with a certain amount of reserve; very little is known about the Pleistocene bats, and far more material must be collected before we can make really sound determinations.

3.—SOREX ARANEUS, Linn. (Common Shrew).

Part of a skull (1) with five unicuspid teeth agrees in size and form with that of the Common Shrew. The specimen agrees with the bones of the extinct species as regards condition. Such

a species of *Sorex* is frequently found in late Pleistocene deposits, as in those of the Ightham Fissures.

4.—†Lepus Anglicus, Hinton. (English Varying Hare)

A left maxilla (1), with all the cheek-teeth except m. 3 in place; a right maxilla (2) without teeth; and a part of a left mandibular ramus with all the teeth, afford the most satisfactory evidence of the presence of this species in Aveline's Hole. These remains agree perfectly as regards size and form with the typical series from the Ightham Fissures.

Bones and teeth of hares are common in all the three parcels received by me from the Society; in so far as these remains are determinable specifically, all belong to *L. anglicus* (a characteristic late Pleistocene species), none to *L. europaeus*.

5.—†Ochotona Spelæa, Owen. (Cave Pika)

Represented by portions of two mandibular rami, right and left (1), each with some of the cheek-teeth in place. These agree perfectly with the specimens from other English deposits before me. The species is characteristic of the late Pleistocene in Britain, and is apparently more commonly met with in the caves of the West of England than it is elsewhere.

6.—†Dicrostonyx Henseli ? Hinton. (Hensel's Banded Lemming)

Six right and four left mandibular rami (1); one right and two left mandibular rami (2); "from calcareous cave earth, at depth of 12 inches to 24 inches."

These specimens are all clearly referable to *Dicrostonyx*, but in the absence of upper cheek-teeth it is not possible to say definitely whether the species represented by these remains is *D. henseli*, Hinton, or *D. gulielmi*, Sanford—the former is, in my opinion, the more probable. *Dicrostonyx*, in British deposits, is diagnostic of the late Pleistocene.

7.—*Lemmus Lemmus, Linn. (Common Lemming)

Five left and three right mandibular rami (1); part of a skull and two right mandibular rami (3), left ramus (2); left ramus (1); two right rami (3) and a right ramus (2; "found at depth of 2 feet from surface in a crack between two halves of a very large boulder previously covered with stalagmite 7 inches thick, and a layer of undisturbed red earth—not far from the entrance of cave").

In Britain remains of *Lemmus* are only met with in the later Pleistocene deposits. Whether the fossil species is identical with its modern Scandinavian ally or not, is still doubtful—it will remain so until tolerably complete skulls have been discovered in our deposits.

8.—EVOTOMYS GLAREOLUS, Schreber. (Bank Vole)

Eight right and seven left mandibular rami (1); of these one or two are probably to be regarded as recent introductions, but others are exactly like the lemming remains in appearance. Right ramus (3); part of a skull (3); two rami, left and right (2; "from calcareous cave earth"); and a left ramus (2).

Remains of *Evotomys* occur abundantly in all the stages of the British Pleistocene; the Bank Vole is, of course, one of our commonest living species. The fossil species are, however, still imperfectly known; and "*glareolus*" must, therefore, be regarded as a blanket-name.

9.—*MICROTUS ARVALIS, Pall. (Continental Field Vole)

Four left mandibular rami (1); in these the m. 1 shows the pattern seen in this tooth among the voles of the *arvalis-agrestis* groups. These voles are difficult to determine satisfactorily. The material forwarded in the second parcel, however, enables me to refer all definitely to the *arvalis* group—*M. agrestis* being absent. The smaller lower jaws (total length up to 15-mm.) probably represent the small, or normal-sized, species of the *arvalis* group found in the Ightham Fissures; this form, so far as known, is very similar to the living *M. arvalis* of Central Europe. In the second parcel it is represented by a right ramus (3), total length 14.7, m. 1-3—5.3 mm. A larger member of the same group is noted under the next heading.

10.—†MICROTUS CORNERI, Hinton.

Parts of two skulls and a right mandibular ramus (2); from the cracked boulder, *vide Lemmus*; left ramus (2); from calcareous cave earth; left ramus (2); and a right ramus (3).

One of the skull fragments consists of the anterior half with all the teeth in place. It belonged to a rather young individual It agrees perfectly in form and in tooth pattern with young skulls of *M. orcadensis*; but the cheek-teeth are a little lighter, as in

M. corneri—a species described from the Ightham Fissures. The lower jaws are large, their total length being between 17 and 18-mm. I have no doubt that these remains should be referred to *M. corneri*. The latter is a fore-runner of the remarkable members of the *arvalis* group, now inhabiting the Orkney and Channel Islands—the group itself being extinct in Britain.

11.—†Microtus Anglicus, Hinton.

Two mandibular rami, right and left (1); right ramus (2); left ramus (2); from calcareous cave earth; and a left ramus (2); from the "cracked boulder." The anterior cheek-tooth in each of these specimens shows the characteristic pattern of this species. *M. anglicus* is a species peculiar to the late Pleistocene; its closest allies are the remarkable "Stenocranius" voles now living in Central Asia, and for many years it was misidentified with one of these Asiatic species (*M. gregalis*).

12.—*Microtus Ratticeps, Keys and Blasius. (Northern Vole).

Left mandibular ramus (1); right ramus (2). In each of these two specimens the anterior cheek-tooth shows the peculiar features of this species. *M. ratticeps* is common in the later middle Pleistocene deposits of Britain; it becomes rare in the late Pleistocene. No longer inhabiting Britain, it still lingers in Holland and North Germany; it is widely distributed in Northern Scandinavia and Russia.

13.—†Arvicola Abbotti, Hinton.

Part of a skull, portions of two or three lower jaws (2); left mandibular ramus (3); anterior half of a skull (3); part of an adult skull and a right ramus of one individual, together with part of another right ramus (2); fragments of a skull and jaws (3); from the "cracked boulder": and several other fragments and loose incisors.

This species is only known from the late Pleistocene of Britain. The Water Voles forming the genus *Arvicola* are interesting animals. They fall into two groups, by their habits. One section typified by *A. amphibius* dwells on the banks of streams and spends much of its time in the water; the other, now living only on the continent, the *scherman* group, has forsaken the water to live as a burrower in the plains and on the lower mountain slopes, often

in places far removed from any water whatever. These terrestrial water-voles are usually smaller than the aquatic species and sub-species; and their skulls show fossorial specializations, such as straightened and protruding incisors and forwardly sloping occiputs, not found in the species of normal habits. *A. abbotti* is a very well marked member of the *Schèrman* group; but unlike its living representatives, it is fully as large as the living British Water-Vole.

14.—APODEMUS SYLVATICUS, Linn. (Long-tailed Field Mouse)

Right ramus (1); left ramus with all the teeth (2). Species closely allied to, or identical with *A. sylvaticus* are abundantly distributed throughout the British Pleistocene deposits. The second specimen mentioned above is certainly as old as are the remains of the extinct voles.

15.—APODEMUS FLAVICOLLIS, Melchior.

Part of a skull without teeth (1). This specimen agrees with *flavicollis* in size, and is too large for *A. sylvaticus*. It may be a recent introduction.

16.—RATTUS RATTUS, Linn. (Black Rat)

Right mandibular ramus with the three cheek-teeth in place (1). Certainly a recent introduction.

The assemblage described above indicates the age of the deposit in Aveline's Hole very clearly. It is the characteristic late Pleistocene fauna (see *Hinton*, Proc. Geol. Assoc., vol. xxi., p. 497, 1910) and shows that Aveline's Hole is to be correlated with the Ightham Fissures. The deposit is thus more modern than are any of the Middle Terrace brickearths of the Thames Valley; the latest of these latter contain implements of the type of Le Moustier.

NOTE.—The number in brackets following the specimens, as they are enumerated, gives the depth in feet in which the specimen was found, 1, 2, or 3; the notes following the semicolon are transcriptions or abbreviations of the labels accompanying the specimens.
In the list the names of locally extinct species have an asterisk prefixed, and those totally extinct a dagger.