

Notes on the Rodent Remains from Aveline's Hole.

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Owing to unforeseen circumstances I have been unable to complete, in time for this part of the *Proceedings*, the full and illustrated account which I intend to give of the remains of small mammals found by the Society during its exploration of Aveline's Hole. The work of identifying the more important specimens has, however, been finished; and since I have now reached a pretty definite conclusion as to the age of the deposits so far examined it may be helpful to publish the following note on the results of the investigation. The names of totally extinct species are preceded by a †; those of species extinct in Britain, though living elsewhere, by an asterisk.

† *Lepus anglicus*, Hinton.

Some further material, including a lower jaw, many detached teeth, and some bones, has been found since the publication of my first paper on the mammals of Aveline's Hole. (*Proc. Spelaeol. Soc.* Vol. I, No. 2, p. 74, 1921).

† *Ochotona spelæa*, Owen.

The anterior half of a skull, lacking the nasals, but with most of the cheek-teeth in place, and three mandibular rami, of which one still retains the milk premolar, supplement the material previously described. These specimens, and especially the skull, will be of great use in connection with a comparative study of British Pika remains now in hand.

† *Dicrostonyx gulielmi*, Sanford.

The material collected since my first note was published comprises parts of 9 skulls, each with one or more of the characteristic upper cheek-teeth in place, 24 right and 17 left mandibular rami. The upper cheek-teeth in this species are slightly more complex than they are in *D. henseli*, and as no fewer than 9 out of the 10 skull fragments of *Dicrostonyx*, so far found, show teeth of this complex type, it is clear that the majority of the lower jaws also must be referred to *D. gulielmi*, and not to *D. henseli* as was at first thought by me to be the more probable allocation. Although occasionally the two species are found associated in one deposit. *D. gulielmi* is a distinctly older and more primitive form than *D. henseli*, which replaced it in the latest Pleistocene times. Its occurrence in abundance in the deposits of Aveline's Hole indicates that the deposits in question are at least somewhat older than those of the Ightham Fissures in which *D. henseli*

alone occurs. As shown below this conclusion is in harmony with the evidence given by the other microtine species.

† *Dicrostonyx henseli*, Hinton.

The only clear proof of the presence of this species in Aveline's Hole is afforded by part of a palate from the Rodent Rift, with the right M.1 in place, and the empty alveoli of the right M.2 and left M.1 and M.2. In this specimen M.1 is exactly as in typical *D. henseli*; the hinder wall of its fourth inner prism is convex and destitute of thick enamel; there is no postero-internal "accessory angle," while the postero-external "accessory" is very small.

* *Lemmus lemmus*, Linn.

Remains of a species, at present indistinguishable from the Common Lemming, are very abundant in Aveline's Hole. In addition to those previously recorded, parts of 68 skulls, 116 right and 102 left mandibular rami have now been found. Most of these specimens were obtained from the Rodent Rift, but a few came from the "2nd foot," and one jaw from the "3rd foot." I have estimated that 125 individuals at least are represented in the entire collection. The abundance of this species tends to confirm the inference drawn from the prevalence of *D. gulielmi*; for while remains of *Lemmus* are frequent in the later Middle Terrace deposits of the Thames (Crayford and Erith, Mousterian), they are rare in the Ightham Fissure deposit, and apparently absent from later horizons, such as the Third Terrace of the Thames.

Evotomys glareolus, Schreber.

The material collected at Aveline's Hole since the publication of my first note comprises parts of 5 skulls, 39 right and 27 left mandibular rami. The material is not sufficiently perfect to enable me to carry the determination further at present; and as the genus has a long range in time in Britain the specimens, pending a more accurate knowledge of the species, do not throw any important light upon the age of the deposit.

* *Microtus arvalis*, Pallas.

† *Microtus corneri*, Hinton.

Several fragmentary skulls, 75 right and 65 left mandibular rami have been added to the material representing these two species previously described. All clearly belong to this group of species, but in many cases precise determination is impossible. Both the smaller *M. arvalis* and the larger *M. corneri* are represented. These two species are commonly associated in our later Pleistocene deposits, and for present purposes they may be treated together.

Microtus agrestis, Linn.

A fragmentary palate, from the Rodent Rift, with the right **M.1** and **M.2** in place, is the only definite trace of this species so far discovered in the cave, although a few of the lower jaws referred to the *M. arvalis* group may belong to it in reality. In condition the specimen resembles the Lemming and other undoubted Pleistocene remains. Its **M.2** has a well developed third inner angle as in living members of the *agrestis* group.

† *Microtus anglicus*, Hinton.

Parts of 3 skulls, 19 right and 22 left mandibular rami have been added to the material previously described. This and *Dicrostonyx henseli* are the two most characteristic microtine species of the latest Pleistocene in Britain; they appear together in the horizon represented by the Langwith Cave, are associated in the slightly later deposit of the Ightham Fissures, and survive in the Third Terrace deposits of the Lea Valley at a date when all the other Pleistocene microtine species have, so far as is known, disappeared.

* *Microtus ratticeps*, Keys and Blasius.

The further material comprises several skull fragments, 28 right and 27 left mandibular rami. During the later portion of the Pleistocene period, from Mousterian times onwards, this species was gradually replaced, and finally completely ousted from Britain by *M. anglicus*. In Aveline's Hole, as will be seen from the table on p. 37, it is rather more abundant than *M. anglicus*, a fact which confirms the evidence given by *Dicrostonyx gulielmi* and *Lemmus lemmus* to the effect that the deposits of this cave so far explored, are older than those of the Ightham Fissures. In the latter *M. ratticeps* and *Lemmus* are very rare, and there is no trace at all of *D. gulielmi*; on the other hand at Ightham *D. henseli*, so rare in Aveline's Hole, is comparatively common, while *M. anglicus* is abundant. The Aveline's Hole deposits cannot be so old, however, as the later Middle Terrace of the Thames (Crayford and Erith) because although they share with the latter *D. gulielmi*, *L. lemmus* and *M. ratticeps*, they lack the nivaloid voles so characteristic of the later Middle Terrace, and they possess *D. henseli*, *M. anglicus*, and the voles of the *arvalis* groups which are not known to occur in the Crayford and Erith deposits. Aveline's Hole would seem to me now to find its nearest parallel in the Langwith Cave; restricting my comparison to those Pleistocene assemblages of which I have had personal experience.

† *Arvicola abbotti*, Hinton.

Since my first account was published, parts of 6 skulls, 16 right

and 17 left mandibular rami have been found. The species is known from several late Pleistocene deposits, and was described by me from materials collected in the Ightham Fissures.

Apodemus sylvaticus, Linn.

Apodemus flavicollis, Melchior.

Several mandibular rami referable to one or other of these species have been found since my first note was written, but they call for no comment.

SUMMARY.

Most of the specimens mentioned above were found in the Rodent Rift, but with the exception of *D. henseli* and *M. agrestis* (each represented by a single specimen), traces of all have been detected in the "2nd foot" and in the "3rd foot." There is no evidence of any zoological difference between these various horizons, and therefore in drawing up this note I have not troubled to distinguish between them, although in working through the specimens I have, of course, paid the closest attention to possible differences of age.

The following table summarizes what is known of the microtine fauna of Aveline's Hole, and for comparison's sake I have given corresponding data relating to the cave at St. Brelade, Jersey—a very typical late Pleistocene deposit, approximating in age to that of the Ightham Fissures (Hinton, *Bull. Ann. Société Jersiaise*, 43, p. 355, 1918).

Species.	Aveline's Hole.		St. Brelade.	
	Number of individuals.	Percentage of total.	Number of individuals.	Percentage of total.
† <i>Dicrostonyx gulielmi</i> ...	38	10.1	0	0
† <i>Dicrostonyx henseli</i> ...	1	0.26	15	9.9
* <i>Lemmus lemmus</i> ...	125	33.3	0	0
<i>Eutamias glareolus</i> ...	49	13.1	0	0
*† <i>Microtus arvalis</i> group	79	21.1	24	15.9
(*† <i>arvalis</i> v. † <i>corneri</i>)				
<i>Microtus agrestis</i> ...	1	0.26	0	0
† <i>Microtus anglicus</i> ...	28	7.5	102	67.3
* <i>Microtus ratticeps</i> ...	32	8.5	5	3.3
† <i>Arvicola abbotti</i> ...	22	5.9	5	3.3
Total ...	375	100.02	151	99.7