



# On the Rodentia of the Somerset Caves.

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ALTHOUGH at first sight the addition of the knowledge of a few small animals in the fauna of a given period in a particular country may not be, in the opinion of many, of general interest, I hope to show that it really constitutes a fact bearing on the physical geography, and therefore on the history of the world, during what must, in the present state of our knowledge, be deemed an early portion of the history of our race; and which therefore

## EXPLANATION OF PLATE.

- Fig. 1. *Arvicola ratticeps*. Upper jaw, lateral aspect.  
1 a. Dentition of the upper jaw, magnified six diameters.  
1 b. Lower jaw, external aspect.  
1 c. The same, internal aspect.  
1 d. Dentition of the lower jaw, magnified six diameters.  
2. *Arvicola Gulielmi*, n. s., lower jaw, external aspect.  
2 a. The same, internal aspect.  
2 b. Dentition of the same, magnified six diameters.  
3. *Lemmus norvegicus* (var.), lower jaw, external aspect.  
3 a. The same, internal aspect.  
3 b. Dentition of the same, magnified six diameters.  
4. *Lemmus torquatus* (var.), anterior part of the skull, lateral aspect.  
4 a. Dentition of the same, magnified six diameters.  
5. *Lepus diluvianus*, skull, natural size, lateral aspect.  
6. *Cricetus songarus*, anterior portion of skull, lateral aspect.  
6 a. Dentition of the above, magnified six diameters.  
6 b. Lower jaw, external aspect.  
6 c. The same, internal aspect.  
6 d. Dentition of the lower jaw, magnified six diameters.

equally belongs to both departments which occupy the attention of our society.

It has been long known that the mammoth is found in great abundance in Siberia, which country may indeed be considered the metropolis of the animal, as well as its last retreat. It is therefore of the highest importance for us to know, while investigating the climate of its existence, what animals were co-existent with it in other countries as well as in Siberia itself.

Our knowledge in this respect in Siberia is singularly defective, but it is hoped that energetic naturalists like Brandt may devote themselves to this study and carry on a series of observations parallel to those which are now being worked out by many observers in this country, Germany, and France.

The observations I am about to make are confined to one order, the Rodentia, comprising such animals as hares, rats, squirrels, voles, and the like, and the information they afford is singularly important.

Naturalists have hitherto reckoned three species of hare as post-glacial forms ; the common hare, the Irish hare, and the rabbit ; besides a closely allied animal, the pika or tailless hare of Siberia. I believe all these to be of great rarity in the cave deposits ; I have never seen but one, or at most, two specimens of the rabbit, which I could in any way consider as fossil, and even with respect to these I have considerable doubt. It is now well known that bones in contact with particular earths and rocks rapidly acquire the condition of ordinary cave bones, and when the burrowing habits of the animal and its highly southern distribution are considered, as well as its probable non-existence during the early historical period in Europe, we may well doubt whether the rabbit really co-existed with the mam-

moth in this country. Bones greatly resembling those of the common hare are also extremely rare, their size is such as to render them conspicuous fossils; and in my recent report to the British Association, I have mentioned that in the earlier deposits in Kent's Hole they are of extreme rarity, whereas in these deposits are animals I am about to mention, which evidently represent this species. With regard to the Irish hare, I have seen but half a lower jaw which I can with some confidence ascribe to this species, this is from Hutton cave. But I have found the bones of a hare which must have been one of the most abundant animals of the period; its presence is universal in all the caves which contain any of the extinct mammoth fauna. It was much larger and more powerful than any wild hare with which I have been able to compare it—the skull pretty equal in size to that of the largest lop-eared tame rabbit I have seen. It is also distinguished by some slight but very constant anatomical peculiarity; it is closely related to the black hare of the Altai mountains, but is nearly double the size of that animal. I believe it to be extinct as a species, and to be that which the French naturalists have described under the name of *Lepus diluvianus*. I have recognised its bones as very rarely occurring in the upper black bed of Kent's Hole, which contains abundant remains of domestic animals and of man. It therefore became extinct in this county during the period of domestic animals, at the same time the common hare became abundant; so that as I said before, we have evident proof of the replacement of one closely allied species by another, and some intermediate specimens give us some reason to suspect that we have here an instance, not only of replacement, but also of transition.

With regard to the many species of *Leporina*, the cave

pika—I can only repeat Professor Owen's observation—which the more abundant materials we now have enable me to confirm, that the cave tailless hare, which was little larger than a mouse, was most closely related to, but possibly not absolutely identical with, the *Lagomys pusillus* of Siberia. A jaw from Kent's Hole more closely resembles this Siberian animal than either of the Hutton specimens at Taunton. On the whole I am inclined to consider it a local variety rather than a distinct species. It will be however convenient to retain Professor Owen's specific name *Lagomys spelæus*.

The next division of Rodentia are the voles, best known to non-naturalists by our common water rat, which appears to have been abundant in the caves. There are three other species, or sub-species, which inhabit Europe—to which of these our animal belongs may be doubtful, as we have no entire skulls, by which alone they can be discriminated.

Our common short-tailed field mouse is also represented with a singular variation, the anterior portion of the lower jaw is invariably longer and straighter than that of our own little animal. This approximates it to a Siberian and North European form—*Arvicola ratticeps*. We have here also a trace of a transition of species.

This *A. ratticeps* I have also found in the Hutton collection. It has not hitherto been described as fossil, but it does not appear to have been a rare animal, it is larger than our short-tailed field mouse, and the teeth differ constantly but not to any great degree. It may be easily recognised by the figure in the plate which accompanies this paper. I have found this animal also in Kent's Hole.

The other British species—the little bank vole—is also represented in the Hutton collection by a single lower jaw. It is rare, but from its small size it has probably been overlooked.

But I have found five jaws in the Hutton collection, and one or two in Kent's Hole, of a fifth species which I believe to be undescribed. Among the European species there is a very small animal having very complicated teeth—*Arvicola subterraneus*. This is represented in our cave deposits by an animal which must have been nearly as large as our water rat, and therefore of comparatively gigantic size. It resembles nothing with which I have been able to compare it either in size, or figure of the jaw. I give figures of the lower jaw, no other part of the animal having occurred. I call it *Arvicola Gulielmi* after Mr. Williams, to whom we owe the collection of the specimens on which the species is founded. I have met with no notice of the discoveries of the Norway or migratory lemming as a fossil, but in the Hutton collection several upper and lower jaws occur which are indistinguishable from that species. A smaller lemming closely allied to, but possibly not identical with, the White Sea *Lemmus torquatus* has occurred at Fisherton near Salisbury, in company with the mammoth, and has been described by Dr. Blackmore.

Dr. Falconer has described the jaws of a ground squirrel, closely resembling a Siberian species, which he has named *Spermophilus erythrogonoides*. The original specimen figured by him is in our collection ; a second was erroneously named by a former curator *Spermophilus citellus*, and the mistake was transferred to the catalogue of Pleistocene fossils published by Mr. Dawkins and myself in the preface to our monographs on *Felis spelæa*, and a third has since been discovered in a box of fossils which belonged to Mr. Williams. We have reason to believe that these fossils are from Hutton.

The last animal that I shall mention belongs not only to



a species, but also to a genus, which has not hitherto been recognised as a fossil in Great Britain, namely, the hamster. But the size of our specimens is much smaller than of the animal now found in central and western Europe. It closely agrees in every respect with *Cricetus songarus*, a minute representative of the genus which now inhabits Western Siberia.

We have therefore, extinct animals—*Lepus diluvianus*, *Lagomys spelæus*, *Arvicola Gulielmi*, *Spermophilus erythro-genoides* : animals now found in Norway, Russia, and Western Siberia, and not in England—*Arvicola ratticeps*, *Lemmus Norvegicus*, *Cricetus songarus* : animals still living in Great Britain—*Lepus timidus* (very rare), *Lepus Hibernicus* (very rare), *Lepus cuniculus* (very doubtful), *Arvicola amphibius* (common), *Arvicola agrestis*, *Arvicola glareolus* = *pratensis* (rare.)

Putting aside therefore, the common hare, and Irish hare, as too rare, and of too doubtful occurrence in their deposit to afford any certain indication of climate, and the rabbit, of which I very much doubt the co-existence with the mammoth, we have only three species of rodents which appear to be identical with those now living in Great Britain—the water rat, the short-tailed field mouse, and the bank vole ; the second shews an evident variation in the direction of a more northern and eastern form. With regard to the rest, the three species which I had recently described for the first time as fossil are all Siberian or North European forms and of the four extinct, or quasi extinct species, three are most closely allied to, though in size and some other slight particulars differing from, Siberian forms. All these are found in the Hutton and in Kent's Hole caves, where the mammoth is the only species of elephant, but as far as we know they are absent

from those deposits in which the *Elephas antiquus* has been discovered.

We can hardly then refuse our assent to the proposition that the climate of England at the period when the mammoth was the characteristic mammal, as far as these animals throw light upon it, resembled that of Eastern Europe and Siberia, that is, that it was extreme and continental, and the migratory habits of the Norway Lemming require an uninterrupted communication with a northern continent, so that in all probability the North Sea did not exist except as a strait or estuary between us and Norway. We also have in the cases of the larger and smaller hare, in *Lagomys spelæus* and *pusillus*, in *Arvicola ratticeps* and *agrestis*, in *Spermophilus erythrogonoides* and *erythrogonys* apparent traces of the transition of one of those forms which we call a species to another.

I may mention that no trace of the beaver has, as yet, occurred in the Somerset caves, though several specimens have been found in Kent's Hole, near Torquay, indicating species resembling both the *Castor faber* of Europe and *Castor Canadensis* of America.

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