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Handbook of Instructions for Collectors. London: The Trustees of the British Museum. 1902.

This little volume will undoubtedly prove a boon to collectors both at home and abroad.

In the space of some fourteen chapters the whole duties of a collector of natural-history specimens are set forth, so that in the compass of a small pocket-book he will find directions for the preservation, and often identification, of all kinds of specimens, from an elephant to microscopic organisms, fossils, plants, and minerals.

The capture and, where necessary, the killing of animals is also thoroughly dealt with. Furthermore, a complete list of the tools required, with many figures thereof, has also been included.

In a future edition, which is certain to be required, we should like to see special attention called to the need for the collection and preservation of birds' skeletons, and to the use of the alcoholometer not only as a test for spirit containing specimens, but also for the determination of the strength of clean spirit. It is not always possible to get reliable information as to the strength of spirit. With the help of the alcoholometer the collector can set all doubts at rest and save, perchance, most precious specimens.

This little work is well illustrated, well printed, and strongly bound.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

November 5th, 1902.—Prof. Charles Lapworth, LL.D., F.R.S., President, in the Chair.

The following communications were read:—

1. 'The Fossil Flora of the Cumberland Coalfield, and the Palæobotanical Evidence with regard to the Age of the Beds.' By E. A. Newell Arber, Esq., M.A., F.G.S.

The succession of Upper Carboniferous rocks in the region in question is apparently twofold: an essentially arenaceous series, at least 600 feet thick, consisting of massive sandstones alternating with shales and fireclays, overlying argillaceous and carbonaceous deposits; the latter forming the productive portion of the coalfield and containing three great coal-seams, traceable throughout the district, although known locally under different names. The Upper or Sandstone Series has yielded very few plant-remains from its upper division, but from the lower division a long list is given of plants collected by the Author, or preserved in the Woodwardian Museum. A second list of plants, from the upper division of the Carbonaceous Series, is also given, nearly all the specimens having been collected

by the Author. The consideration of the palæobotanical evidence enables him to classify the rocks as follows:—

Permian.	Brockram.		Lower Permian.
Upper Carboniferous.	Sandstone Series.	Upper	(?) Transition Coal-Measures.
		Lower	
	Productive measures.	Upper (Bannock and Main Bands).	Middle Coal-Measures.
		Lower (?)	(?) Lower Coal-Measures and Millstone Grit.

2. 'Some Remarks upon Mr. E. A. Newell Arber's Communication: On the Clarke Collection of Fossil Plants from New South Wales.' By Dr. F. Kurtz, Professor of Botany in the University of Córdoba, Argentine Republic.

The Author agrees with Mr. Arber's identification of *Rhiptozamites Gœpperti*, which he takes to be a synonym of *Nœggerathiopsis Hislopi*. *Podozamites elongatus*, however, he regards as different from *Nœggerathiopsis Hislopi*. Reasons are given for holding this opinion. Further, the Author does not consider that there is sufficient evidence to warrant the separation of *Otopteris ovata* from *Rhacopteris inœquilatera*, in which species it may be retained, perhaps as a variety. *Rh. inœquilatera* has been found in the Argentine, and was described by Geinitz as *Otopteris argentina*. A bibliography is appended.

December 17th, 1902.—Prof. Charles Lapworth, LL.D., F.R.S., President, in the Chair.

The following communication was read:—

'The Elk (*Alces machlis*, Gray) in the Thames Valley.' By Edwin Tulley Newton, Esq., F.R.S., F.G.S.

During the construction of the Staines Reservoirs some mammalian remains were obtained from the alluvium of the Wraysbury River, near the Thames at Youveney. At the request of Mr. T. I. Pocock, of the Geological Survey, who is working in the district, the engineers, Messrs. Walter Hunter & R. E. Middleton, courteously submitted their specimens to the Author, who recognized among them the skull and antlers, with other parts of the skeleton, of a true elk (*Alces machlis*). These are described; allusion is made to the earlier records of this animal in Britain; and its distribution in time in this country, on the continent of Europe, and in North America is also discussed. It appears that *Alces machlis* has been frequently found in peaty deposits in many parts of Great Britain and on the continent of Europe, but never in Britain in association with the mammoth; and it seems probable that in Europe and North America it was a rare

animal in Pleistocene times, if indeed it was present before the close of that period.

January 7, 1903.—Prof. Charles Lapworth, LL.D., F.R.S., President, in the Chair.

The following communication was read:—

'On the Discovery of an Ossiferous Cavern of Pliocene Age at Dove Holes, Buxton (Derbyshire).' By William Boyd Dawkins, M.A., D.Sc., F.R.S., F.G.S., Professor of Geology in Owens College, Victoria University (Manchester).

The Carboniferous Limestone, riddled with fissures and potholes, in the neighbourhood of Dove Holes, has from time to time, in the course of the working of the quarries, yielded remains of extinct mammalia of Pleistocene age. The latest discovery of a group of mammalia, of far higher antiquity than the Pleistocene, is now brought before this Society. The Victory Quarry, Bibbington, in which the discovery was made, is excavated in a rolling plateau of Carboniferous Limestone, from 1100 to 1200 feet above Ordnance-datum, and forming at this spot the water-parting between the tributaries of the Goyte, flowing past Chapel-en-le-Frith westward into the Mersey, and those flowing southward and eastward, past Buxton, to join the Derwent. It is a little to the north of the centre of the divide. On the western side the limestone dips at an angle of 15° underneath the Yoredale sandstones and grit, which form the lower half of a range of hills, extending southward to Buxton and beyond. The upper half is composed of shales and sandstones of the Millstone Grit Series, that rise in Black Edge to a height of 1662 feet. The drainage of the eastern slope of these hills passes downward, until it arrives at the limestone, where it sinks into the rock, through the many swallow-holes which mark the upper boundary of the limestone. There are no surface-streams in the limestone in the immediate neighbourhood of the Victory Quarry, which, from its position on the divide, could not, under existing geographical conditions, receive the drainage from this western range of hills, or any other source.

In the course of working the quarry, in the beginning of 1901, a cave was discovered, and fully exposed in the course of 1902. It was about 90 feet long, 15 feet high, and 4 feet broad. It ran nearly horizontally north and south, and consisted of a large chamber and a small passage, both eroded in a master-joint. On the south it contracted to a dead end, now quarried away. Its continuation to the north is obscured by a great accumulation of broken rock and clay, which has not yet been removed. It was filled with a horizontally stratified red clay, containing angular and rolled pebbles of limestone, and a few sandstone-pebbles from the Millstone Grit and Yoredale rocks. There were also a few pebbles of white vein-quartz and of quartzite. Scattered through the mass were mammalian bones and teeth: some waterworn, and others

with sharp fractures. The contents had clearly been introduced into the cave by water, flowing under geographical conditions which no longer exist.

The mammalian remains belong to the following species :—

Machairodus crenatidens, Fabr.	*Rhinoceros etruscus*, Falc.
Hyæna sp.	*Equus stenonis*, Nesli.
Mastodon arvernensis, Croiz. & Job.	*Cervus etueriarum*, Croiz. & Job.
Elephas meridionalis, Nesli.	

All these species are found in the Upper Pliocene deposits of France and Italy, and undoubtedly belong to that age. The *Mastodon*, elephant, rhinoceros, and horse occur also in Britain in the Upper Pliocene deposits of the Crag.

Some of the bones present the characteristic teeth-marks of the hyænas; and the preponderance of the remains of the young over the adult mastodons points to the selection by the hyænas, who could easily master the calves, while they did not as a rule attack the large and formidable adults. The Author has observed a similar selection in the case of mammoths in hyæna-dens, into which the remains had been brought by those cave-haunting animals. He therefore concludes that the animal-remains have been washed out of a hyæna-den, which then existed at a higher level, and carried down deep into the rock, into the cave in which they were found, along with the clay and pebbles brought down in flood-time from the Yoredale and Millstone-Grit hills.

The area of the Victory Quarry must then have been at the bottom of a valley, instead of in its present position on the divide. The denudation of the limestone which has taken place since that time is estimated at not less than 330 feet—an amount sufficient to destroy the ravine formed by the stream above the bone-cave, and all the caves and rock-shelters in the district, which were accessible to the Upper Pliocene mammalia.

The Author appends a map illustrating the physical geography of the British Isles in Upper Pliocene time. In it the British area is represented as joined to the Continent by a barrier of land, extending from the Straits of Dover, westward, as far as the 100-fathom line in the Atlantic, which sweeps southward from Scandinavia, off the West of Ireland, into the Bay of Biscay. There were then no physical barriers to forbid the migration of *Machairodus*, *Mastodon*, *Elephas meridionalis*, and the rest, from Central and Southern France into Britain. They could find their way freely from the valleys of the Loire and the Garonne, across the valley now occupied by the English Channel, into England and, it may be added, Ireland. Over this area the animals migrated in the Upper Pliocene age. The discovery of a few of them in Derbyshire is to be looked upon as a monument of their former existence over the whole of this region. It is also a striking example of the great destruction of the surface which has taken place since that time, and of the imperfection of the geological record. It is the only cave in Europe that has yielded remains of the remote Pliocene Epoch.