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ON IRISH ELK AND OTHER ANIMAL REMAINS  
FOUND AT HOWTH AND BALLYBETAGH,  
CO. DUBLIN.

BY HENRY STOKES, M.D.

MY first attempt to search for the remains of Irish Elk (*Cervus giganteus*) was prompted by the accidental discovery of the head and antlers of that creature in the Bog of the Loughs at Howth in 1906. Anxious to know whether further remains could be unearthed, some friends and myself commenced operations shortly afterwards which resulted in our finding in this locality an almost perfect skeleton of an Irish Elk, and also three vertebrae which have since been identified as belonging to the same species. Encouraged by this satisfactory result of our labours, and knowing that the head and skeleton of a female Elk had been taken in this bog about twenty years previously, I engaged a labourer in 1911 to renew the excavations and discovered a second skeleton close by. In the following year operations were conducted on a more extensive scale. Three men were engaged to dig for five weeks continuously, but except a few odd vertebrae, a few shed antlers and a nearly pulverised skull, nothing was found.

The experience thus gained in the explorations of peat deposits however proved of much benefit in subsequent researches which were commenced in 1913 on Ballybetagh Bog, near Kiltarnan, Co. Dublin. Thirty-five years previously, Mr. Moss and later on Mr. Williams had discovered there a large quantity of Irish Elk remains, and it seemed likely therefore that the ground should yield further material. The land on which this bog lies belongs to Mr. Roe, and arrangements were made with his permission for further excavations. After consulting Dr. Scharff, he allowed James Duffy, one of his staff in the Museum, to superintend the work, and the latter conducted the operations with skill and great care. The exceptionally dry summer aided us in our work, which proved not only to

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be interesting but most successful. Altogether the remains of twenty-eight Elks, of several Reindeer, and of a few birds and beetles were found in Mr. Roe's bog and in a neighbouring one in the County Wicklow belonging to Mr. Mulligan. The great majority of these remains were, of course, in a very fragmentary condition, but it may be of interest to give the results of all the excavations in a tabulated form as follows :—

#### HOWTH, BOG OF THE LOUGHS.

##### Irish Elk.

- 1886-87. Skull of Female, and skeleton.  
 1906. Skull of Male, and skeleton of young animal, 2 very large shed antlers, and 3 vertebrae (probably) of a female.  
 1911. (1) A skeleton of a young animal; (2) 2 shed antlers of a very young animal; (3) A pulverised male skull which did not belong to skeleton.

The depth varied from 4 to 8 feet, the strata were arranged as follows from above :—

Peat	..	..	1½ feet.
Peat and Marl	..	..	1-2 feet.
Marl	..	..	1-3 feet.
Sand	..	..	¼-2 inches.
Large stones and thick marl to unknown depth.			

All remains were found on or in the layer of sand. The upper layer of marl contained remains of trees. The bones were wrapped and often lined by an envelope of vegetable matter.

#### BALLYBETAGH, SOUTH-EAST BOG.

(Worked for seven weeks).

##### Irish Elk.

1913. 22 skulls (mostly broken).  
 14 shed antlers (all broken).  
 1 skeleton (made up of the bones of many Elks).

8 1st cervical vertebrae.  
 2 2nd     "     "  
 2 4th     "     "  
 2 5th     "     "  
 3 7th     "     "  
 1 1st dorsal     "  
 1 2nd     "     "  
 2 coccygeal     "  
 4 scapulae, 1 pelvis, 1 1st phalanx, 1 radius,  
 1 metacarpal, 1 tibia, 6 hyoids, several costal  
 cartilages and a large number of ribs.

Also remains of Reindeer, including part of a skull, bird bones, and bones of Red Deer were found.

The depth of the pits varied from 3 feet 6 inches to 11 feet. The strata were usually arranged as described by the late Mr. W. Williams,<sup>1</sup> *i.e.*, from below :—

- A. Boulder-clay.
  1. Fine tenacious clay.
  2. Yellowish grey clay.
  3. Brownish clay
  4. Greyish clay.
  5. Peat.

The remains were all found in layers 1, 2, or 3, the great majority lying on No. 2.

Nearly all the bones were sound but badly broken, with the exception of lower jaws and feet bones. The heads were also much broken but sound. The majority of the heads were found 4-6 feet deep, the majority of the bones 5-7 feet. The bones were scattered and arranged in no order. The proportion of 1st cervical vertebrae and hyoid bones was high and the proportion of large long bones was low. Pits were sunk in the centre of the bog to the depth of 11 feet down to the Boulder-clay (Williams), but little or nothing was found. All the remains, with the

<sup>1</sup> *Geological Magazine*, August, 1881.

exception of 2 shed antlers were of large male animals. The 2 shed antlers belonged to a very young animal.

#### BALLYBETAGH, NORTH-WEST BOG.

(Worked for three days in 1913.)

Four pits were sunk, the deepest to 14 feet. Fragments of bone, which could not be identified except one which seems to be a rib of Irish Elk, shells and wood were found.

The strata from above were in the following order :—

Peat	..	..	3 feet.
Peat and Marl	..	..	3 feet.
Sandy Marl			to unknown depth.

In this bog the bones of domestic animals recently buried were also met with.

#### MULLIGAN'S BOG.

This bog (which is situated about 500 yards east of Ballybetagh S.E. bog) was worked for three weeks in 1913, the following specimens of Irish Elk being obtained :—

- 6 skulls of males.
- 5 shed antlers.
- 2 complete skeletons.
- Many ribs and various odd bones.

The strata consisted of the following deposits from above downward :—

1. Peat.  
Peat and clay.
2. Brownish clay (Williams No. 3).
3. Fine tenacious clay (Williams No. 1).

The depths of the deposits varied between 3–6 feet. The skulls were found in the shallow parts, whilst complete skeletons were beside them in two cases. The skulls were not broken but very fragile. The bones were entire, one skeleton being in perfect order. The second was absolutely

soft in fact so much so as to make its removal impossible. The remains, except for one small shed antler, belonged to large male animals.

In digging these bogs, one is struck by the fact that in all the localities examined the formation is different. Apart from the peat which covers all, we found that at Howth, the bones lay on sand while no layers of yellowish-grey clay or brown clay existed. At Ballybetagh S.E. bog, all the deposits were present. At Ballybetagh N.W. bog (where we found no definite remains of Elk, but Mr. Williams in his paper implies that remains have been found, and local information tends to confirm this) to a depth of 14 feet we found only sandy clay with shells. At Mulligan's bog there was no greyish clay lying over the bones, but the peat and brownish clay (Williams 3) were directly superimposed.

The fact that at Howth three skeletons and three skulls have been found is a striking contrast to Ballybetagh, where twenty-two heads and one skeleton were discovered, the latter being made up from several animals. Again in the Mulligan bog, six skulls and two perfect skeletons were found, each skeleton lying in a small area with the bones often still articulated. At Howth the bones were not broken though rather soft; at Ballybetagh the bones were all broken though sound; at Mulligan's some bones were perfect and sound, while others were perfect but quite soft.

A curious fact that we found at Ballybetagh was that whenever the points of the antlers would have stuck up into the overlying greyish clay, they were broken off and were usually to be found on the tenacious layer beneath. In the three bogs in which Irish Elk was met with we also discovered the remains of other animals at the same depth and sometimes actually in contact with the Elk remains. In all places the remains were more plentiful in the shallower parts.

I am convinced that the skeletons in Ballybetagh Bog S.E. have been removed away, and are not in the bog as in every case we sank down to the Boulder-clay (Williams). I mention this because some previous diggers had not sunk

all their pits so far, as is proved by the fact that we found a very good pelvis underneath a previous digging, and also a workman (Ned Kavanagh) told me that this was so. In one place many of the points of the antlers and some of the bones showed curious markings caused probably by rubbing against stones, but generally there were no signs of friction on the specimens.

In conclusion, I may mention that caution must be taken in sinking pits near old diggings, as the walls are apt suddenly to fall in. Water seems to lie in an old pit indefinitely and often leaks through cracks and hinders or prevents further work.

Dublin.

## REVIEW.

### MARINE ZOOLOGY.

**Animal Life by the Sea-shore.** By G. A. BOULENGER, LL.D., D.Sc., F.R.S., and C. L. BOULENGER, M.A., D.Sc. Pp. xii. + 84, with 91 illustrations. London: Offices of "Country Life." Price 5s. net.

In their modest preface to this admirable little book the distinguished authors tell us that "they have only tried to provide those untrained in Zoology with a means of identifying the principal of the innumerable forms of animal life" to be observed on the beach or between tide-marks. Yet the naturalist will find in these pages many interesting notes on structure and life-history of members of the shore fauna. Except for the Protozoa and a few other very minute animals all great groups of animal kingdom are included in the survey. There are but few "objects of the sea-shore" whose nature could not be at least approximately determined from the descriptions and illustrations. Necessarily some omissions will be noticed by the student of special groups; Flustra is the sole representative of the Polyzoa; among the insects it is surprising to find two species of *Aepus* mentioned, while nothing is said of the interesting bug *Aepophilus*, nor of the midge *Clunio*, one of the most completely marine of all insects. The Pycnogonida, several species of which may be found in rock-pools are not mentioned at all. There are classificatory statements which may be open to criticism, such as the inclusion of the Chitons among the Gastropoda and one absolute mistake is the designation of the marine Geophilid centipedes as "millipedes." All lovers of the shore and its inhabitants will feel indebted to the authors, whose descriptions are supplemented by many excellent illustrations, some being photographs well reproduced and others line-drawings.

G. H. C.