

at the doubts I have expressed, and which I still entertain, as to the soundness of their speculations. In the interest of geological science, it is desirable, when new and startling theories are propounded, for which public acceptance is claimed, and especially when emanating from quarters entitled to respect, that some one should step forward to weigh the evidence on which these theories rest. Though there are many others who would have discharged this duty much more satisfactorily than myself, still it seemed to me not incompatible with the position I have the honour to hold as President of the Edinburgh Geological Society, to undertake that duty.

VII.—ON SOME DIFFERENCES BETWEEN THE LONDON AND BERLIN SPECIMENS REFERRED TO *ARCHÆOPTERYX*.

By PROF. H. G. SEELEY, F.R.S., etc.

(PLATE XII.)

IN drawing attention to some characters of the Berlin *Archæopteryx*, it should be stated that I only know that specimen from a photograph taken before the slab was fully developed; and therefore while I believe the following results to be trustworthy as indicating specific and it may be generic differences, it is possible they may hereafter be slightly modified.

As stated by Vogt, the Berlin slab is $\frac{1}{3}$ th smaller than the London slab; assuming the photograph to be of natural size, the following measurements may demonstrate the nature of the relation between the two specimens. The femur measures in the Berlin slab 4·8 centim.; in the London slab 6 centim., so that the London specimen is $\frac{1}{3}$ th longer. The tibia in the Berlin slab measures 6·8 cm.; in the London slab it is 8 cm. Therefore in the latter the femur is $\frac{3}{4}$ ths the length of the tibia; but if this proportion obtained in the Berlin specimen, the femur would have measured 5·1 cm.: hence the second specimen is slightly longer-legged. In the metatarsus the difference is nearly $\frac{1}{3}$ th, for the Berlin animal measures 3·5 cm., and the London type 4·4 cm. The digits of the Berlin specimen measure respectively 1·5; 2·9; 3·1 cms.; the measurements in the London specimen are 1·7; 3·5; and 4·5 cms.; so that the longest digit of the London slab is more than a third longer than the corresponding digit of the Berlin slab. Hence in the latter animal the foot is relatively shorter and the drumstick relatively longer.

In the fore-limb the Berlin humerus measures 5·9 cm., the London humerus 7 cm.; the difference is between a sixth and a seventh. The Berlin ulna measures 5·1 cm.; the London ulna 6·7 cm.; the difference is a little less than a fourth, but while the Berlin humerus is about a seventh longer than the ulna, the London humerus is only about a twenty-third longer than the ulna. This difference is more marked than that between the tibia and femur, and shows that the fore-arm was relatively longer in the Berlin animal. The difference in the metacarpus is about one-fifth, the Berlin measurement being 2·7 cm., the London measurement 3·4 cm. Only two digits can be



C. M. Woodward del. et lith.

West Newman & Co imp.

Archæopteryx macrura, Owen.
Lithographic Stone, Solenhofen, Bavaria.
(Original in the Berlin Museum.)

compared; in the London slab they measure 2.5 cm. and 2.9 cm.; in the Berlin slab 1.7 and 2.8, but the longest Berlin digit is 4.3 cm.; so that notwithstanding its smaller size the Berlin animal appears to have had digits as long as the London specimen. The Berlin scapula measures 4 cm. and may be imperfect; the London scapula is 4.2 cm. The London ilium is 4.3 cm. long, in the Berlin slab it does not appear to exceed 3 cm. The ribs appear to be longer in the Berlin slab, some measuring 4.8 cm., while the longest in the London slab is 3.7 cm.

The Berlin tail measures 16.5 cm., and appears to include 21 vertebrae; the London tail measures 20.8 cm., and appears to include 23 vertebrae, of which the first 9 have transverse processes. The London animal probably had 5 sacral and 8 dorsal vertebrae, with a length of 8.5 cm., though number and length are uncertain. In the Berlin animal the length of this region is 8.5 cm. Vogt counts 10 in the back. The neck is imperfect in the London slab, the vertebrae lie in curve, five at least are preserved; a centrum measures 1 cm. In the Berlin slab the neck measures about 6.8 cm. Vogt estimates 8 vertebrae, but there are probably more. The head of the London animal as preserved measures 4 cm. in length; the Berlin head to the occipital articulation is 4.7 cm., and to the limit of the occipital crest about 6.1 cm. These differences are supported by details in the forms of the bones, which also prove the species to be distinct.

NOTICES OF MEMOIRS.

I.—BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, FIFTY-FIRST MEETING, 31ST AUGUST, 1881.

[SIR JOHN LUBBOCK, Bart., M.P., D.C.L., LL.D., F.R.S., etc., *President.*]

1.—TITLES OF PAPERS READ IN SECTION C. (GEOLOGY).

President: Professor A. C. RAMSAY, LL.D., F.R.S., etc.

Address by the President. (See p. 459.)

Prof. E. Hull, LL.D., F.R.S.—On the Laurentian Beds of Donegal and of other parts of Ireland.

G. H. Kinahan, M.R.I.A.—On the Laurentian Rocks of Ireland.¹

C. Moore, F.G.S.—Life in Irish and other Laurentian Rocks.

A. R. Hunt, M.A., F.G.S.—On the Occurrence of Granite *in situ* about 20 miles S.W. of the Eddystone.

Professor J. Prestwich, M.A., F.R.S.—Some observations on the causes of Volcanic Action.

Professor W. J. Sollas, M.A., F.G.S.—The connexion between the Intrusion of Volcanic Rocks and Volcanic Eruptions.

Baldwin Latham, M. Inst. C.E., F.G.S.—On the Influence of Barometric Pressure on the Discharge of Water from Springs.

J. E. Clark, B.Sc.—Glacial Sections at York.

G. W. Lamplugh.—On the Bridlington and Dimlington Glacial Shell Bed.

J. R. Mortimer.—On Sections of the Drift obtained by the new drainage works of Driffield.

¹ See *GEOL. MAG.* Sept. p. 427.