THE FOSSILS AND PALAEONTOLOGICAL AFFINITIES OF THE NEOCOMIAN DEPOSITS OF UPWARE AND BRICKHILL, CAMBRIDGESHIRE AND BEDFORDSHIRE; BEING THE SEDGWICK PRIZE ESSAY FOR THE YEAR 1879

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649219933

The fossils and palaeontological affinities of the Neocomian deposits of Upware and Brickhill, Cambridgeshire and Bedfordshire; being the Sedgwick prize essay for the year 1879 by Walter Keeping

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

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WALTER KEEPING

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London: C. J. CLAY, M.A. & SON,
CAMBRIDGE UNIVERSITY PRESS WAREHOUSE,
17, Paternoster Row.

CAMBRIDGE: DEIGHTON, BELL, AND CO.
LEIPZIG: F. A. BROCKHAUS.

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WITH EIGHT PLATES

BEING

THE SEDGWICK PRIZE ESSAY FOR THE YEAR 1879

BY

WALTER KEEPING, M.A. F.G.S.

"Speak to the earth, and it shall teach thee:
And the fishes of the sea shall declare unto thee."
Job xii. 8.

CAMBRIDGE:
AT THE UNIVERSITY PRESS.
1883

Cambridge:
PRINTED BY C. J. CLAY, M.A. AND SON.
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PREFACE.

THE study of the Neocomian faunas of Cambridgeshire and Bedfordshire has occupied much of my time for some years past. I have had the advantage of watching the course of the 'coprolite' workings from their beginning in 1866 up to the present time, and have constantly been familiar with the large collections that have been made by the Woodwardian Museum, by Mr J. F. Walker of Sidney Sussex College, Mr E. Earwaker of Merton College, Oxford, and other Geologists.

In the comparison of the fossils with known species it has always been my endeavour to see the original or, failing that, some typical specimen, and to trust as little as possible to bare figures and descriptions. In this work I am much indebted to a number of Geologists for their kind assistance, for the loan of specimens, &c., amongst whom I must particularly mention Mr J. F. Walker, M.A., F.G.S., Mr C. J. A. Meyer, F.G.S., Mr J. J. Harris Teall, M.A., F.G.S., Mr E. C. Davey, F.G.S. of Wantage, and Mr T. Davidson, F.R.S. of Brighton. In continuing the same work of comparison and identification through Holland and Germany I had the advantage of Professor Judd's Paper[1] as an admirable guide, and I am much beholden to Professors Marten of Leiden, R. Lepsius of Darmstadt, Ulrich of Hanover, and Geinitz of Dresden, and other German Geologists for their kindness and valuable help.

[1] "On the Neocomian strata of Yorkshire and Lincolnshire, with notes on their relations to the beds of the same age throughout Northern Europe." *Quart. Journ. Geol. Soc.* Vol. XXVI. p. 326.

A considerable number of the species from Upware and Brickhill prove to be as yet undescribed, a fact which was to be expected in so isolated and peculiar a deposit—so thoroughly 'episodal' as Mr Blake would express it—as that of Upware and Brickhill.

In working with the already known species the reference to the original figure has always been made; and I have also given, when possible, references to some few other good figures and descriptions such as may be most useful or accessible to working Geologists; but no attempt is made to work out the complete synonymy of each species. Such a work can indeed rarely be quite satisfactory, depending, as it must do, to so great an extent upon the comparison of figures and descriptions only.

In the nomenclature it will be found that I have in several cases adopted names and used them as of varietal value and not as distinct species—e.g., *Ostrea frons*, Park, var. *macroptera*, Sowerby, for it appears to me that such a trinomial system is a growing necessity in many of the larger generic groups, both in recent and fossil organisms.

Amongst the matters of more general interest worked out in these pages will be found:—

(1) The close palæontological relationship of the Ironsand and Phosphatic series as found at Upware, Potton, Brickhill, and Farringdon.

(2) The *special* character of the native forms of life in our Lower Greensand Phosphatic beds:—their richness in Brachiopods, Polyzoa, and Sponges.

(3) The influence of different physical conditions upon the characters of the faunas as illustrated by the Upware and Potton fossils (p. 48).

(4) The presence at Upware of a little batch of species which flourished long afterwards in the Upper Chalk period in the neighbourhood of Dresden (pp. 20, 119).

(5) The curious resemblances of the Upware group of oysters to the well-known Jurassic species *O. dilatata, deltoidea, nana* and *gregaria.*

(6) The profusion of Brachiopod shells, both species and specimens at Brickhill and Upware and the graduation of the various types (species) into one another (p. 22).

(7) The similarity of the Upware and Brickhill fossils to those of the Neocomian beds of the Brunswick area at Shöppenstedt and Berklingen (p. 73).

(8) The existence of a large 'derived' fauna in the coprolite beds, these being to a great extent much worn and otherwise mutilated remains of shells, &c., washed out of the rocks of the old coast lines, of Neocomian to Oxfordian age.

(9) The very general—almost invariable—phosphatization of these remains.

(10) The great similarity of the 'derived' Neocomian phosphatic nodules over wide areas.

(11) The occurrence of a 'derived' Neocomian fauna in beds of very nearly the same age, and the evidence of the rapidity of their fossilization, exhumation and redeposition.

(12) The evidence that the Vertebrate remains of Upware are, in great part, truly Neocomian species, native to the deposit in which they are found; while others are *derived.*

(13) The curious difficulty in determining the age of some of the Fishes' teeth; and the probable identity of form of some of the palatal teeth of Jurassic and Neocomian species; and

(14) The importance of distinguishing the Downham Market Phosphate Bed from the Ironsand and Phosphatic series as belonging to a separate Physical Group (pp. 11, 54).

My general conclusions as to the age of the Ironsand and Phosphatic series are in near accordance with the opinions of MM. Walker, Teall, Meyer and Barrois, all of whom have placed