The Cretaceous rocks of Britain

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OF THE
UNITED KINGDOM

THE
CRETACEOUS ROCKS
OF
BRITAIN.

VOL. I.—THE GAULT AND
UPPER GREENSAND OF ENGLAND.

BY
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WITH CONTRIBUTIONS BY
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E.V.
PREFACE.

The present volume is the first of two in which the Upper Cretaceous Rocks of England will be described. It deals with that portion of these rocks which includes the strata known as the Gault, Red Chalk, and Upper Greensand. Our present knowledge of this subject is the outcome of a long series of observations commencing with those of William Smith, who was followed by Thomas Webster, William Phillips, Fitton, Murchison, and Mantell. Of these great workers we are especially indebted to Fitton. In later years the formations received much attention from Godwin-Austen, while their palaeontological contents were studied in more detail by Mr. C. J. A. Meyer, Mr. F. G. H. Price, Dr. Charles Barrois, and others.

The mapping of the Upper Greensand and Gault by the Geological Survey on the scale of one inch to a mile has long been finished and published. When a revision of the ground for the purpose of tracing the superficial accumulations on maps on the scale of six inches to a mile was decided upon, advantage was taken of the opportunity to make such revisions of the published maps as time had shown to be desirable. In this way detailed surveys have now been made of the Upper Cretaceous rocks over a large part of the south of England.

In pursuance of the scheme for issuing a series of descriptive monographs of the various rocks of Britain by the Geological Survey, the task of preparing one on the Cretaceous System was entrusted to Mr. Jukes-Browne. It was eventually found needful to divide the labour between two officers of the staff. Mr. Jukes-Browne retained the Upper Cretaceous rocks as his share. He has himself been personally engaged in mapping the rocks and has also devoted much time to the study of the literature attached to them. He has more specially examined various parts of the Cretaceous tract from Lincolnshire and Norfolk to Devonshire, and has revised some of the published maps, in particular inserting the outcrops of the Melbourne Rock and Chalk Rock.

The accumulation of the material for the present Memoir was begun by Mr. Jukes-Browne as far back as the year 1884. But in the earlier years comparatively little time could be spared from other official duties for the actual preparation of the memoir. Eventually his health began to fail and it became no longer possible for him to undertake all the field-journeys that were necessary for completing the information that was required. He was fortunate in finding in his friend Mr. William Hill an able and experienced coadjutor who, thoroughly familiar with the formations, most kindly undertook those journeys and supplied the author with the material which he was no longer able himself

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to gather. He traversed the outcrops of the formations through Kent and Surrey, and also through parts of Hampshire, Sussex, and the Isle of Wight. The Geological Survey is deeply indebted to Mr. Hill for his laborious and helpful assistance.

In the present volume the author has begun his description with a general account of the Upper Cretaceous series and of the flexures to which the present disposition and alignment of the members of that series are due. The history of the names which have been given to the several formations is next narrated, and it is explained that the whole might be grouped under one general designation for which the term Selbornian has been proposed. A short discussion is then given of the value of zones in stratigraphy with special application to those of the Cretaceous Rocks. The three chapters in which these several subjects are treated may be regarded as in some measure introductory to the completed monograph on the Cretaceous System, and not merely to the description of that portion of the system to which the present volume is assigned.

In the fourth chapter a general account is given of the Selbornian Stage as a whole, and of its three groups or sub-stages,—(1) The Lower Gault; (2) The Upper Gault and Devizes Beds; (3) The Warminster Beds. The more important of the fossils found in each of these groups are mentioned and some of them are illustrated by figures.

In arranging the stratigraphical particulars and in describing the exposures of the beds the author has made his chapters as far as possible coincide with the division of the country into counties. These details occupy Chapters V. to XXII. Mr. Hill's contributions to these are chiefly in Chapters V. VI. VII. VIII. and IX., and the account of the Red Chalk of Yorkshire is mainly taken from Mr. Hill's description in the Quarterly Journal of the Geological Society, vol. xliv.

Some information and illustrations have been taken from previously published Memoirs of the Geological Survey, especially those on the Isle of Wight (by A. Strahan), on the Isle of Purbeck (by A. Strahan), those on West Suffolk and West Norfolk (by W. Whitaker and A. J. Jukes-Browne), and that on the neighbourhood of Cambridge (by W. H. Penning and A. J. Jukes-Browne).

In Chapter XXIII. are collected most of the analyses which have been made of Selbornian rocks. They include some not previously published, which have been made by Prof. J. B. Harrison, Mr. R. A. Berry, and Dr. W. Pollard.

Chapters XXIV. and XXV. have been written almost entirely by Mr. Hill and embody researches made by him into the mineral and organic constituents of the deposits, ascertained partly by the washing of samples, partly by examination of residues after treatment with acid, and partly from slides cut for the microscope. During the course of this work Mr. Hill isolated many Foraminifera, and we are indebted to Mr. F. Chapman for examining and naming these, the results thus obtained being embodied in a table on p. 351. In the identification of the minerals of the residues Mr. Hill received valuable assistance from Mr. J. J. H. Teall.
In Chapter XXVIII. the author has discussed the probable geography of the British area during the Selbornian period, as well as the bathymetrical conditions under which the deposits seem to have been formed.

Economic aspects are dealt with in Chapter XXIX. and Palaeontology in the Appendices A and B, the first containing some critical remarks on certain species and the second being a general list of Fossils.

Although Mr. Jukes-Browne is chiefly responsible for the Palaeontological portions of this memoir, Mr. G. Sharman and Mr. E. T. Newton have exercised a general supervision, and to them also has fallen the task of rectifying numerous obscure points of synonymy and nomenclature. The specific determination of the fossils collected by the Survey has likewise been carried out by these officers, assisted by Mr. H. A. Allen and Dr. F. L. Kitchin. The fossils obtained by the Survey have for the most part been collected by Mr. J. Rhodes under the superintendence of Mr. Jukes-Browne and Mr. A. Strahan.

In addition to the great services rendered by Mr. Hill the author desires to acknowledge the valuable assistance, as to sections and fossils obtained from them, given to him by Mr. R. M. Brydone, Mr. F. Chapman, Mr. William Cunnington, Dr. W. Curtis of Alton, Dr. G. J. Hinde, F.R.S., and Mr. J. B. Hue of Ventnor.

The second volume in continuation of the present deals with the Chalk and is nearly ready for the printer. Considerable progress has been made in the preparation of the material for the Memoir on the Lower Cretaceous formations.

ARCH GEIKIE,
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