

**MEMOIRS OF THE GEOLOGICAL  
SURVEY. ENGLAND AND WALES.  
THE GEOLOGY OF THE SOUTH-  
WEST PART OF LINCOLNSHIRE**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649465637

Memoirs of the Geological Survey. England and Wales. The Geology of the South-West Part of Lincolnshire by A. J. Jukes-Browne

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.  
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

[www.triestepublishing.com](http://www.triestepublishing.com)

**A. J. JUKES-BROWNE**

**MEMOIRS OF THE GEOLOGICAL  
SURVEY. ENGLAND AND WALES.  
THE GEOLOGY OF THE SOUTH-  
WEST PART OF LINCOLNSHIRE**



**MEMOIRS OF THE GEOLOGICAL SURVEY.**

**ENGLAND AND WALES.**

**THE GEOLOGY OF THE  
SOUTH-WEST PART OF  
LINCOLNSHIRE,**

WITH

**PARTS OF LEICESTERSHIRE AND  
NOTTINGHAMSHIRE.**

(EXPLANATION OF SHEET 70.)

BY

**A. J. JUKES-BROWNE, B.A., F.G.S.,**

(PARTS BY W. H. DALTON, F.G.S.)

~~~~~  
PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF HER MAJESTY'S TREASURY.  
~~~~~



LONDON:

PRINTED FOR HER MAJESTY'S STATIONERY OFFICE,  
AND SOLD BY

LONGMANS & Co., Paternoster Row; TRÜBNER & Co., Ludgate Hill;  
LETTIS, SON, & Co., Limited, 83, King William Street;  
EDWARD STANFORD, 55, Charing Cross; J. WYLD, 12, Charing Cross;  
B. QUARITCH, 15, Piccadilly; and T. J. DAY, Market Street, Manchester;

ALSO BY

Messrs. JOHNSTON, Edinburgh; HODGES, FIGGIS, & Co., 104, Grafton Street, and  
ALEX. THOM & Co., Limited, Abbey Street, Dublin.

1885.

*Price Four Shillings.*

---

## NOTICE.

---

THE area represented on Sheet 70 of the Geological Survey of England contains a considerable portion of the Jurassic escarpments of Lincolnshire and is not unfamiliar to general readers, inasmuch as the line of the Great Northern Railway runs through it for nearly 30 miles, passing by Grantham and Newark. The rocks embraced in it range from the Keuper Marls up to the Kimmeridge Clay. Among these the Lincolnshire Limestone attains its greatest thickness and covers a considerable breadth of ground, while the Marlstone also is locally well developed but presents a remarkable inconstancy of thickness.

As the area is a continuation of that described in the Geological Survey Memoir on the "Geology of Rutland" (Sheet 64) by PROFESSOR JUDD, wherein the characters and classification of the Jurassic Strata of the Midland districts, and their correlation with those to the south-west and north, were fully discussed, the reader is referred to that Memoir for general questions which it has not been deemed necessary to re-open here. The present Explanation is confined to a description of the rocks that occur within the limits of the Map.

The Glacial and Post-glacial deposits, which play so important a part in the geology of the area, are represented on a separate edition of the Map. As they were only briefly discussed in the Rutland Memoir, and as they here present features of special interest, they are described in some detail in the following pages, references being also made to their extension into neighbouring districts.

Some features of economic importance are likewise enumerated. One of the most noticeable of these is the occurrence of no fewer than four distinct platforms of ironstone, two in the Lias, one in the Inferior Oolite, and one in the Great Oolite.

Geological Survey Office,  
11th July 1885.

ARCH. GEIKIE,  
Director General.

## NOTICE.

---

THE preparation of this Explanation would naturally have devolved upon the late Mr. W. H. Holloway, who surveyed the greater part of the Map, had he lived to complete the work upon which he had been so long engaged.

In conjunction with Messrs. W. H. Penning and W. H. Dalton, Mr. Jukes-Browne assisted in mapping the area that remained unsurveyed on Mr. Holloway's death, and was subsequently entrusted with the task of arranging the materials for the explanation of the district comprised in the sheet.

The MS. notes left by Mr. Holloway were not so numerous as might have been expected; but he probably felt that it was unnecessary to repeat in detail descriptions of beds which had been so fully illustrated in Professor Judd's Memoir on the adjoining Map (Sheet 64). In the preparation of the following pages Mr. Jukes-Browne has taken that Memoir as his guide, compiling therefrom a general description of each formation, and appending the accounts of such sections as had been observed in Sheet 70 by Messrs. Holloway, Skertchly, Penning, Dalton, and himself. Notes recently taken by Mr. H. B. Woodward and W. A. E. Ussher on the Middle Lias, are inserted.

Chapters III. and VII., Trias and Oxford Clay, together with Appendices II. and III., have been written by Mr. W. H. Dalton, who has also assisted in the preparation of Chapters IV. (Lias), VI. (Great Oolite), and XIII. (Mineral Resources). Appendix IV. (Bibliography) has been compiled by Messrs. Whitaker and Dalton.

The lists of fossils and the tables in Appendix I. have been revised by Messrs. Sharman and Newton.

H. W. BRISTOW,  
Senior Director.

Geological Survey Office,  
28, Jermyn Street,  
July 1885.

---

## CONTENTS.

	Page
NOTICE by the Director General - - - - -	iii
NOTICE by the Director - - - - -	iv
CHAPTER I.—GENERAL DESCRIPTION OF THE ROCK-GROUPS OCCURRING IN THE DISTRICT, and of such of their sub-divisions as are indicated by different colours or signs on the map - - -	1
CHAPTER II.—PHYSICAL FEATURES AND GEOLOGICAL STRUCTURE OF THE DISTRICT.—General Description, Structure of the Country, Faults, Flexures - - - - -	8
CHAPTER III.—TRIAS AND RHÆTIC.—1. The Keuper Marls. 2. Rhætic or Penarth Beds - - - - -	17
CHAPTER IV.—THE LOWER LIAS.—General Description. A. Strensam series. B. Clays below the Ironstone. C. Ironstone Beds. D. Clays above the Ironstone - - - - -	22
CHAPTER V.—MIDDLE AND UPPER LIAS.—1. Middle Lias. A. Clays and sand. B. Marlstone Rock Bed. 2. Upper Lias - - - - -	33
CHAPTER VI.—THE NORTHAMPTON SAND.—General Description. A. Ironstone. B. Lower Estuarine Series - - - - -	45
CHAPTER VII.—THE LINCOLNSHIRE LIMESTONE.—General Description, details, outliers, and inliers - - - - -	52
CHAPTER VIII.—THE GREAT OOLITE SERIES.—General Description, details. A. Upper Estuarine Series and Great Oolite Limestone. B. Great Oolite Clays and Cornbrash - - - - -	61
CHAPTER IX.—THE OXFORD CLAY (with Kellawys Beds).—1. Main outcrop. 2. Outliers. THE KIMERIDGE CLAY - - - - -	70
CHAPTER X.—GLACIAL DEPOSITS.—1. The Older Boulder Clay. Distribution, nature and contents, details of sections, mode of formation. 2. Glacial Gravels. 3. The Newer Boulder Clay. 4. Plateau Gravels - - - - -	74
CHAPTER XI.—POST-GLACIAL DEPOSITS.—RIVER GRAVELS.—1. Ancient Courses of the Rivers. 2. Details of sections. 3. Alluvium, Rainwash, and Tufts - - - - -	90
CHAPTER XII.—POST-GLACIAL DEPOSITS (continued).—THE FEN DEPOSITS.—Sands and Gravels along the border of the Fens. A. Gravels of the ancient Estuaries. B. Marine Gravels and Sands. 2. The Silts, Clays, and Subterranean Peat Beds (general succession, Bicker Haven, Estuary of the Witham). 3. The Surface Peat. 4. Summary and inferences - - - - -	98
CHAPTER XIII.—MINERAL RESOURCES.—Building stones, Ironstones, Gypsum - - - - -	117
APPENDIX I.—Lists of the Fossils found in the district - - - - -	123
APPENDIX II.—Well-Sections - - - - -	139
APPENDIX III.—Mineral and other waters - - - - -	158
APPENDIX IV.—Lists of Heights - - - - -	160
APPENDIX V.—Rainfall - - - - -	163
APPENDIX VI.—List of works on the Geology of Lincolnshire - - - - -	164
INDEX - - - - -	177



### LIST OF FIGURES.

	Page
FIG. 1.—Diagrammatic section across the Vale of Belvoir to the edge of the Oolitic escarpment . . . . .	10
„ 2.—Diagrammatic section from Goadby Marwood to Salthby, showing faults, &c. . . . .	12
„ 3.—Diagrammatic section from Great Humby to Edenham . . . . .	15
„ 4.—Section along the railway near Plungar . . . . .	29
„ 5.—Section through the village of Allington . . . . .	31
„ 6.—Section in the railway cutting, east of Scalford . . . . .	43
„ 7.—Section along the working-trench of the Holwell Iron Company, near Waltham-on-the-Wold, extended to the Oolite escarpment . . . . .	48
„ 8.—Section in the railway cutting west of Ancaster . . . . .	51
„ 9.—Section at the south end of the Great Ponton cutting . . . . .	56
„ 10.—Section along the Couthorpe cutting on the Great Northern Railway . . . . .	65
„ 11.—Section through the cutting and tunnel, S.W. of Great Ponton on the Great Northern Railway . . . . .	80
„ 12.—View of the mass of rock in Boulder Clay, shown in Fig. 11 . . . . .	80
„ 13.—Section in the Old Town Pit at Bourn . . . . .	104
„ 14.—Section in a brickyard at Donington . . . . .	109
„ 15.—Filled-up channel of old River Witham . . . . .	110
„ 16.—Section along part of the Skirt Dyke, near Digby Dam . . . . .	121

THE GEOLOGY  
OF THE  
S.W. PART OF LINCOLNSHIRE,  
WITH  
PARTS OF LEICESTERSHIRE AND  
NOTTINGHAMSHIRE.

---

CHAPTER I.

GENERAL DESCRIPTION OF THE ROCK-GROUPS OCCURRING IN  
THE DISTRICT.

THE rocks which rise to the surface within the area of Sheet 70 include representatives of three of the great systems into which the Geological series is divided. These three are the Triassic, the Jurassic, and the Pleistocene. They fall naturally, however, into five well-marked groups, as below :—

1. The Trias.
2. The Lias.
3. The Jurassic Limestones.
4. The Jurassic Clays.
5. The Pleistocene Beds.

The series commences with the uppermost member of the Trias and the passage beds (Rhætic) between the Triassic and Jurassic systems, which are so persistent in their occurrence. The Lias is very fully developed, both in its Lower, Middle, and Upper divisions. It is succeeded by the two groups of the Lower Oolites, viz., the Inferior and the Great Oolite; the former of these, however, is only partially represented, and seems to have suffered some erosion and disturbance before the deposition of the latter upon it. There is here, therefore, a local break and unconformity. The Great Oolite is displayed in four subdivisions, which may be correlated with those of the south-western counties.

This upper member of the Lower Oolite is succeeded by the lowermost division of the Middle Oolites, viz., the Oxford Clay, which passes up into the Kimeridge Clay, the episode of the Coral Rag being here absent.

The Kimeridge Clay is the highest member of the Secondary Series found within the limits of the map, the Portland and Purbeck Beds being unrepresented, while the whole of the Cretaceous, and the greater part of the Tertiary strata lie entirely outside its area. Consequently there is an enormous gap and great unconformity between the older Secondary rocks and the Pleistocene deposits which spread over their edges.

The following is a tabular view of the rock-groups above-mentioned, exhibiting also such of their sub-divisions as have received a distinct colour on the map, and the maximum thickness attained by each division in the district we are about to describe.

TABLE of ROCK-GROUPS in Sheet 70.

Group.		Divisions indicated by different Colours or Signs on the Map.	Maximum Thickness in Feet.
PLEISTOCENE.	Post-Glacial.	River Deposits - - -	Alluvium - - - -
			Loam - - - -
	Glacial Deposits		Gravel and Sand - - -
			Fen Peat - - - -
			Marine Silt - - - -
	Marine Gravel - - -		
	Newer Boulder Clay, with Sand and Gravel.	50 ?	
	Older Boulder Clay, with Sand and Gravel.	80 ?	
JURASSIC SYSTEM.	Upper Oolites.	Upper Oolite - - -	Kimberidge Clay - - -
		Middle Oolite - - -	Oxford Clay - - - -
	Great Oolites.		Cornbrash - - - -
			Great Oolite Clay - - -
			Great Oolite Limestone - - -
			Upper Estuarine Series - - -
	Lower Oolites.	Inferior Oolite - - -	Lincolnshire Oolite - - -
			Northampton Sand - - -
	The Lias.	Upper Lias - - -	Upper Lias Clays - - -
		Middle Lias - - -	Marlstone Rock - - -
		Middle Lias Clays and Sands - - -	
		Lower Lias Clays - - -	
Lower Lias - - -		Ironstone Beds - - -	
TRIAS.	Rhætic - - -	Lower Lias Clays - - -	
		Limestone Series - - -	
		Rhætic Shales - - -	
	Keuper - - -	Upper Keuper Marls - - -	

## THE TRIAS.

The Trias, or New Red Sandstone, consists, in England, of two members—the Bunter and the Keuper, and the latter has been sub-divided as follows in the neighbouring Sheet 71 :—

- KEUPER - {
3. Red Marls and thin Sandstones.
  2. Soft Brown Sandstones and thin Marls.
  1. Fine and coarse Sandstones.

Only the Upper Keuper Marls come to the surface within the limits of Sheet 70. These consist of thick red and bluish-grey marls, containing layers and nodules of gypsum, and interbedded with thin courses of red and white sandstones. The total thickness of this series near Newark appears to be about 840 feet.

The Melton Mowbray boring of 1883 penetrated nearly 250 feet into these beds, several miles from their outcrop, in Sheet 64. (See Appendix II., p. 147.)