

**MEMOIRS OF THE GEOLOGICAL
SURVEY OF GREAT
BRITAIN AND THE MUSEUM OF
PRACTICAL GEOLOGY**

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Memoirs of the Geological Survey of Great Britain and the Museum of Practical Geology by H. H. Howell

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H. H. HOWELL

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MEMOIRS
OF THE
GEOLOGICAL SURVEY
OF
GREAT BRITAIN,
AND OF THE
MUSEUM OF PRACTICAL GEOLOGY.

THE GEOLOGY OF
THE WARWICKSHIRE COAL-FIELD
AND THE
PERMIAN ROCKS AND TRIAS OF THE SURROUNDING
DISTRICT.

BY
H. H. HOWELL, F.G.S.

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NOTICE.

THE following Sketch of the Geology of the Warwickshire Coal-field and the surrounding district will be found, I trust, to be of use to the proprietors of the district, not only as developing the mineral resources actually in work, but specially in indicating the probable range and extent of the Coal-formation beneath the red deposits, whether they be of the age of the Permian rocks or New Red Sandstone.

RODEBICK I. MURCHISON,
Geological Survey Office, Director-General.
Jermyn Street, S.W., Aug. 1859.

THE district to which the following Memoir refers was surveyed by Mr. Howell and myself between the years 1851 and 1854, during the life of Sir Henry De la Beche, the late Director-General. The map of the Coal-field and all the sections are by Mr. Howell, and I only occasionally assisted in tracing its boundary faults, and in mapping parts of the surrounding Formations. I also first determined the true age of the Permian rocks of this area, and helped, when the other duties of the survey would permit, to map these strata, and a considerable part of the New Red Sandstone and Marl. The whole, as usual, was superintended by myself.

A. C. RAMSAY,
Geological Survey Office, Local Director.
August 1859.

CONTENTS.

CHAP.	PAGE
I.—PHYSICAL FEATURES OF THE DISTRICT, AND GENERAL DESCRIPTION OF THE ROCKS	5
II.—CARBONIFEROUS ROCKS.	
<i>The Millstone Grit</i>	7
<i>The Coal Measures</i>	8
<i>Limestone</i>	26
III.—PERMIAN ROCKS	30
IV.—THE TRIAS, OR NEW RED SANDSTONE; AND LIAS	34
NEW RED SANDSTONE.	
<i>Conglomerate or Pebble Beds</i>	34
<i>Upper Red and Mottled Sandstone</i>	36
<i>Lower Keuper Sandstone</i>	37
<i>Red Marl and Upper Keuper Sandstone</i>	41
LIAS	45
V.—IGNEOUS ROCKS AND FAULTS	46
APPENDIX.	
<i>On Dasyceps Bucklandi</i>	52
<i>On a Fragment of a Lower Jawbone of a large Labyrinthodont from Cubbington</i>	56

THE GEOLOGY OF THE WARWICKSHIRE COAL-FIELD
AND THE PERMIAN ROCKS AND TRIAS OF THE
SURROUNDING DISTRICT.

BY H. H. HOWELL, F.G.S.

CHAPTER I.

PHYSICAL FEATURES OF THE DISTRICT, AND GENERAL DESCRIPTION
OF THE ROCKS.

THE area included within the district to which this memoir refers is contained within the limits of the quarter sheets of the survey 62 N.E. and S.E., 63 S.W., 54 N.E., 53 N.W., and part of 63 N.W., extending northwards about 4 miles north of Lichfield, between Brereton and Barton-under-Needwood, and on the west, south, and east as far as Birmingham, Warwick, and Rugby. The greater portion of this area is in the county of Warwick, the remainder being within the adjacent counties of Staffordshire and Leicestershire.

The most prominent physical features of the district are formed by the Carboniferous and Permian formations, which form a tract of country slightly elevated above the plain of New Red Sandstone which surrounds it. The most marked of these features occurs between Nuneaton and Merevale, where the lower Carboniferous rocks form an abrupt ridge rising to an average height of 500 feet above the sea, the north-east side being bounded by a fault, beyond which the New Red Marl stretches in a gently undulating plain, toward Charnwood Forest and Leicester, and the escarpment of the Lias between the latter place and Rugby.

On the west side of this tract the Carboniferous and Permian formations form a rising ground, sloping to the west. This is also bounded by a fault, beyond which the New Red Marl extends towards Birmingham.

The Permian rocks at one point, viz., at Corley, rise to a height of 625 feet above the sea.

Another well-marked feature occurs in the neighbourhood of Warwick, where, on account of the north and south fault which runs to the west of that town, the Lower Keuper Sandstone is

thrown to a much higher level than the Red Marl, and forms an abrupt ridge along the east side of the fault, which runs through the low ground on the west side of Warwick to Kenilworth. Between Warwick and Coventry the Lower Keuper sandstone forms a low escarpment along its boundary with the Permian rocks.

The principal rivers are, the Tame, which flows east from Birmingham to near Coloshill, at which place it suddenly bends round, and taking a northerly course through Tamworth, falls into the Trent at Alrewas, about five miles north-east of Lichfield. The Avon, from Rugby, flows south-west to Leamington and Warwick, and eventually joins the Severn at Tewkesbury. The water-shed in this district may be said roughly to run in a line between Bromsgrove Lickey, Kenilworth, Meriden, Corley, Bedworth, and Shilton. On the north of this line the drainage of the country falls into the Tame and Trent, and thus flows into the German Ocean, and that on the south side into the Avon and Severn, and so into the Bristol Channel.

The following formations enter into the structure of this district.

Stratified rocks	-	{ 1. The Lias. 2. The Trias or New Red Sandstone. 3. The Permian rocks. 4. The Coal-measures.
Igneous rocks	-	Greenstone.

The Warwickshire coal-field, where it rises to the surface, occupies a long, narrow strip of country, which commences on the south near the Hawksbury railway station, and from thence strikes north-east to Baddesley Ensor, maintaining an average width of from one to two miles. At Baddesley Ensor it suddenly widens to about four miles from east to west, and continues about the same width as far north as Shuttington.

The rocks in and around this area, in ascending order, belong to the Palæozoic and Mesozoic periods. The Palæozoic is represented by the Carboniferous formation, consisting of Millstone Grit and Coal-measures, and by a part of the Permian strata; and the Mesozoic by the New Red Sandstone and the Lias.

The Millstone Grit lies on the east side of the coal-field, between Nuneaton and Atherstone. The Coal-measures succeed this grit on the west, and consist of the usual assemblage of strata characteristic of that formation, together with one bed of limestone.

The Permian formation, which immediately overlies the Coal-measures, is sometimes apparently conformable to them, and is composed of alternating beds of white, purple, and red sandstone and marl. The sandstones in some places become hard calcareous breccias and conglomerates, which generally do not continue in regular beds over large areas. There is, however, one

mass of conglomerate which is continuous for a considerable distance, and forms a marked horizon about the middle of the Permian beds. This conglomerate is often calcareous, being principally composed of Carboniferous Limestone pebbles cemented together in a calcareous matrix.

The New Red Sandstone in this district is not so extensively developed as in other parts of the country, in Worcestershire, Shropshire, and Cheshire; some of the subdivisions which occur in those counties being absent. There are, however, four distinct subdivisions, viz., the conglomerate beds at the base, and the Upper red and mottled sandstone, belonging to the Bunter series; and the Lower Keuper sandstone or waterstones overlaid by the New Red Marl, containing the Upper Keuper sandstone. When we come to examine the New Red Sandstone more in detail, we shall find that even in this district the whole of these subdivisions are not constant, but thin away rapidly from west to east.

The Lias in this district belongs entirely to the lower beds of that formation, consisting of alternate layers of blue limestone and clay. It lies conformably on the Keuper marls, and on account of the limestone beds just above the junction, the boundary is generally well marked by an abrupt escarpment, formed by the outcrop of those beds above the softer marls.

CHAPTER II

CARBONIFEROUS ROCKS.

The Millstone Grit.

THIS rock, the lowest part of the Carboniferous formation seen in this district, occupies a high ridge between Nuneaton and Atherstone, about two and a half miles in length, by half a mile in width. It consists of a hard silicious quartz rock, with thin bands of interstratified shale, the whole exceedingly altered, and being traversed along the strike by intrusive lines of greenstone. Two of these trap dykes can be seen in actual contact with Millstone Grit; one in a quarry by the canal near Tuttle Hill at the north-west end of the town of Nuneaton; and the other, which is not more than a yard in thickness, is exposed in a quarry near Hartshill. There is also another mass of greenstone below these two, but at no place can its junction with the Millstone Grit be seen. It lies between the lowest bed of that rock, exposed at the surface, and the boundary fault of the coal-field, which brings the New Red Sandstone against the Carboniferous rocks. The greenstone is probably intrusive in the same way as