

**MEMOIRS OF THE GEOLOGICAL
SURVEY. ENGLAND AND WALES.
THE GEOLOGY OF THE COUNTRY
AROUND OTTERNBURN AND
ELSDON**

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Memoirs of the Geological Survey. England and Wales. The Geology of the Country Around Otterburn and Elsdon by Hugh Miller

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HUGH MILLER

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Frontispiece.

View into Cottonshope Burn, across Redcliffe from the south (Fell Sandstones and Cement-stones).



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THE GEOLOGY OF
THE COUNTRY AROUND
OTTERBURN AND ELSDON

(EXPLANATION OF QUARTER-SHEET 108 S.E).
(NEW SERIES SHEET 8).

BY

HUGH MILLER, F.R.S.E., F.G.S., Assoc. R.S.M.
(WITH NOTES BY C. T. CLOUGH, M.A., F.G.S).

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NOTICE.

THE area included within this Map was surveyed by Mr. Hugh Miller, with the exception of its north-western part, and also a strip (about one mile wide) along the northern edge. These are the areas included in Sheet 41 (6-inch Northumberland) and the southern parts of Sheets 34, 35, and 36; they were surveyed by Mr. C. T. Clough, who has supplied the descriptive notes relating to them.

The Silurian and Old Red Sandstone rocks with their associated igneous rocks are entirely within Mr. Clough's area.

The whole was surveyed under the superintendence of Mr. H. H. Howell.

This being the first Memoir of the Geological Survey devoted to the Carboniferous Rocks of the English Border, a fuller description of their general characters is given than in most Sheet Explanations. The interesting phenomena connected with the glaciation of the district are also discussed in some detail.

The lower Carboniferous beds (Tuedian), which were hitherto considered to be almost unfossiliferous, have yielded a considerable number of fossils to the Survey Collectors—Messrs. A. Maconochie and J. Rhodes. Mr. R. Kidston has named the plants in the lists of these and other beds; Mr. B. N. Peach has determined the Crustacea, identifying some of the forms as new species, which will be described elsewhere; Mr. J. W. Kirkby has assisted in naming the Ostracoda; all the other fossils having been named by Messrs. G. Sharman and E. T. Newton.

H. W. BRISTOW,
Senior Director.

Geological Survey Office,
28, Jermyn Street, S.W.,
29th July 1887.

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THE GEOLOGY OF
THE COUNTRY AROUND
OTTERBURN AND ELSDON.

CHAPTER I.—INTRODUCTION.

AREA.—PHYSICAL FEATURES.—GEOLOGICAL FORMATIONS.

THIS quarter-sheet of the Geological Survey of England represents 216 square miles of the county of Northumberland, on the scale of one inch to the mile. The upland district thus included is traversed from N.W. to S.E.—almost in a diagonal manner—by the pastoral valley of the river Rede, from within a mile of its source on the east side of Carter Fell, to within 4 miles of its junction with North Tynedale. In its south-west corner, near Falstone, it contains a portion of the North Tyne itself, with a large part of one of its main tributaries, the Tarsset Burn. In the north-east again it includes the river Coquet from Alwinton Church down to Hepple. These four chief streams of the map,—the Coquet, the Rede, the Tarsset, and the North Tyne,—pursue the parallel south-easterly course characteristic of so many North-umbrian rivers.

The general surface of the ground is a gently inclined plateau or plane, sloped in the direction of the flow of the rivers, and sculptured into a variety of confluent hills and dales. At its highest part, *i.e.*, to the right and left of the head waters of the Rede, this tumbled incline rises into moory heights from 1,500 to 1,800 feet above the sea, the chief of which are Oh Me Edge, 1,809 feet, Girdle Fell, 1,739 feet, Hungry Law, 1,642 feet, and Raven's Crag, 2 miles east of Hungry Law, 1,729 feet high. These, with the neighbouring hills, and the hills of the uplands generally, strike the eye upon the whole as curiously equal-topped; it is, in fact, the uniformity of the heights that gives to the district its plateau-like aspect. Towards the south-east the summits steadily decrease, from 1,500 and 1,800 feet, to 1,000 and 1,200 feet.

In their general aspect these billowy uplands are a variegated patchwork of dark heather and "white ground,"—the latter clad in the coarse grasses or "bents" which lie more or less bleached for seven or eight months in the year, and so termed by the shepherds. Hence perhaps such names as White Hill, Whitdees, Whitefield, &c. The prevalence of heather and peat again might be inferred from such names as Black Moor, Black Burn, Black Blakehope, and the like, which occur here and there over the greater part of the map. The Harbottle Hills, west of the Coquet, are perhaps the most savage wilderness of crags, scars, and black moor to be found anywhere in the county, and the whole of the moors ex-

tending south-eastward into the Darden Fell and Simonside Hills are of the same general type. The lower half of the Holystone Burn is more like a heathery Highland glen than a vale of the English uplands. In the great belt of high ground stretching *westward* from the Harbottle Hills to Black Kip and Down Hill, and extending (beyond the deep head valleys of the Rede) to Girdle Fell, Oh Mc Edge, and Little Monkside, the eye meets little but sheets of hill peat, scars of sandstone, and ranges of moory "edge" or escarpment, the extent and extreme solitude of which leave on the mind a sense of impressive desolation. In strong contrast with this dark belt, and lying along the north-east border of the map, and scarcely at all entering it, are the green and finely grouped and high up-arching hills of the Cheviots. From the top of Crigdon Hill the two types of scenery are seen almost at their best, and placed face to face;—to the north—the smooth, green, and rounded,—to the south, the brown, shaggy, and linear. The south-eastern half of the district (occupied by the Upper Limestone Series), is more varied than the sandstone moors. It is much mingled with *white ground*, and relieved by occasional green strips or "gairs" of limestone-grass. Between Elsdon and the classic Otterburn we find a considerable extent of green and undulating downs, at one time under the plough.

Except in some few tracts which are covered with drift and almost featureless, notably the western slopes of mid-Redesdale, which are bare almost to desolation, escarpments and crags form what might be termed the general surface-sculpture of the ground, especially on the west side of Coquetdale,—on the east side of Redesdale north of Rochester—at the head of Hindhope—and on the west side of the Tarsset Burn—and in that fine succession of ascending steps that rises eastward from the Rede into Hartside and Wishaw Pike. The chief valleys, with the exception of the head valleys of the Rede, which are deep and closely bordered by the high fells, are open and pastoral. Passing north-eastward over the fells to the Coquet the character of the country is seen suddenly to change, and looking across that river from the brown verge of the uplands, the eye is cast over a tract of green lowlands gently rising into the Cheviot Hills, laid out in fields and largely arable. In the other valleys the extent of the "arable" is limited to their alluvial flats and lower slopes, especially on the sides facing the sun, on which (very markedly in Redesdale, Tarsset, and Tynedale,) the enclosed grounds rise higher and greener. Some fir plantations, chiefly of the clothes-brush form abhorred by the artist, flourish in their vicinity. But Otterburn resembles a choice bit of the woodlands dropped in its pastoral valley, and "sweet Woodburn's cottages and trees" are worthy of their delineation in a single couplet by Scott. The old birchen shaws, the remains of which abound in the peat mosses, still maintain some footing here and there in the marshy hollows and slopes, especially on the west side of Coquetdale and Redesdale; but their seedlings are destroyed