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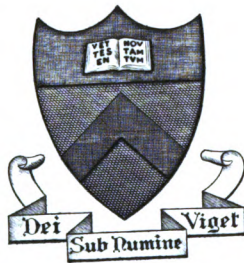




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THE  
RIVERS,  
MOUNTAINS,  
AND  
SEA COAST  
OF  
YORKSHIRE.

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THE  
RIVERS,  
MOUNTAINS AND SEA-COAST  
OF  
YORKSHIRE.

WITH ESSAYS ON THE  
CLIMATE, SCENERY, AND ANCIENT INHABITANTS  
OF THE COUNTY.

BY  
JOHN PHILLIPS, M.A., F.R.S.,  
DEPUTY READER IN GEOLOGY IN THE UNIVERSITY OF OXFORD:  
AUTHOR OF ILLUSTRATIONS OF THE GEOLOGY OF YORKSHIRE,  
AND OF A GEOLOGICAL MAP OF THE COUNTY.

*With Thirty-Six Plates.*

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TO  
THE FRIENDS  
WHO HAVE SHARED AND PROMOTED MY INVESTIGATIONS  
INTO THE  
NATURAL HISTORY AND ANTIQUITIES OF YORKSHIRE,  
THIS WORK  
IS MOST RESPECTFULLY AND GRATEFULLY  
DEDICATED.

2-13-67-1542



## P R E F A C E

TO THE FIRST EDITION.

---

FROM childhood my attention has been fixed on the great County in which most of the labours and enjoyments of my life have been experienced. Long before my eyes rested on the mountains of the north of England, the mighty form of Ingleborough was engraved in my imagination by many a vivid description; and when I crossed the old Gothic bridge, and beheld the glorious Church, which is the pride and veneration of Yorkshire, it was but the realization of a long-indulged dream of boyhood.

Few, I hope, will censure the grateful feeling which accompanies this record of some of the thoughts which have filled my mind, while renewing health and strengthening hope, on the mountains and in the dales, by the rivers and ruins of Yorkshire, and while seconding or prompting the efforts of many dear friends to unfold the Natural History and Antiquities, so richly spread round the great Towers of the Minster.

There exists, I believe, nothing in print, which professes to do what is here attempted;—to win from the

hasty traveller an hour's delay at the station, a day's wandering by the waterfalls, a week's ramble over rocky hills. Valuable works, indeed, there are of Local Topography and Antiquities, but not much of a general character, to plead with the Residents of the County for a better knowledge of its natural beauties, and the memorials of its old inhabitants.

There is, indeed, a large harvest to reap, and much inducement to gather it. The Physical Geography and Scenery of the County have been too little considered; the various elements of Climate which reign on its long line of romantic coast, its broad fertile valleys, and ranges of barren mountains, but little inferior to their neighbours in Cumberland, have not been recorded; the vast spaces of new land which Art and Nature have conquered from the sea, have yielded more rents than reflections; the roads and camps of the Romans, and the earlier sites of Brigantian tribes, are travelled over with little thought of the ages to which they belong.

With the hope of supplying some of these desiderata, of inciting Residents to *study*, and visitors to *explore*, this magnificent County, I venture to add this volume of general description to those larger works on the Geology of Yorkshire, for the indulgent reception of which the Author is profoundly grateful.

St. Mary's Lodge, York,  
November 1, 1852.

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**ERRATA.**

On page 289, in Table of Mean Temperature of Months at Scarborough, right-hand column, *for* 1848, 1849, &c., *read* 48°, 49°, &c.

On page 290, in Table of Mean Monthly Temperature of Sea at Scarborough, at bottom of third column, *for* 40·73, *read* 49·73.

THE  
RIVERS, MOUNTAINS, AND SEA COAST  
OF  
YORKSHIRE.

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CHAPTER I.

PRINCIPAL FEATURES OF PHYSICAL GEOGRAPHY.

**YORKSHIRE**, once the home of the most powerful British Tribe, and now the largest of English Counties, is marked by Nature with boundaries befitting such distinction: the sea on the east, rivers on the north and south, mountains on the west. In this latter quarter, the area of the County does indeed stretch beyond the summit of drainage, to embrace portions of the Dale of Ribble, and the short glens of Garsdale and Dentdale, whose waters flow to the Irish Channel; but, with these exceptions, all the streams which gather in the valleys of Yorkshire find their way to the eastern sea at points which do not pass beyond the limits of its territory.

The rivers of Yorkshire are emphatically its own: born among its mountains, they give life and beauty to its numerous dales, and transport the fruits of its busy population to estuaries worthy of such tributaries. The greatest of these, the Humber, admits a vast body of sea-water to meet the abundant contributions of the rivers Dun, Calder, Aire, Wharfe, Nid, Ure, Swale, Derwent, and Hull. Tees and Esk have their own outfalls to the sea\*.

\* In Yorkshire we commonly speak of our rivers and mountains, as Tees, Swale, Ingleborough, Penyghent, &c.



One well acquainted with Yorkshire finds it easy to picture to his mind the main features of its physical geography by reference to the lines of the rivers, for most of these, in their earlier courses, sweep through deep valleys, between ranges of elevated or mountainous land, and gather into fewer channels in one great central vale, which was in primæval times a channel of the sea.

We may with equal facility arrange our ideas of the physical geography of Yorkshire by reference to the ranges of its hills, which group themselves naturally into four assemblages, occupying the north-western and south-western, the north-eastern and south-eastern parts of the County. The two groups of western hills are separated from the two groups of eastern hills by the great central Vale of York, from which ramifications sweep round and run between the hilly districts of the east, constituting the low tracts of Cleveland, Vale of Pickering, and Holderness; and a less marked depression which proceeds westward to the pasture lands of Craven, and separates the north-western from the south-western hills. Thus we have the following natural districts marked out by their relative elevation and geographical position:—

NORTH-WESTERN HILLS.  Ribblesdale*.  SOUTH-WESTERN HILLS.	Vale of York.	Cleveland.  NORTH-EASTERN HILLS.  Vale of Pickering.  SOUTH-EASTERN HILLS.  Holderness.
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The tracts thus distinguished have geological characters as strongly marked as their inequalities of elevation: great differences of climate, scenery, and natural productions correspond to these varied physical conditions; and there are important facts in the history of Man in this part of the island which acquire a

\* The comparatively low region between the hilly grounds above Settle, Skipton, Colne and Clitheroe,—of which Gisburn may be regarded as the centre,—is here meant.

just meaning only by connecting them with these unalterable features of Nature.

It may be convenient to arrange in a small compass some of the characteristic differences of the several districts which have been named.

#### NORTH-WESTERN DISTRICT.

1. Greatest elevation.—2580 feet in Mickle Fell.
2. Principal Rivers which rise in the District.—Tees, Swale, Ure, Nid, Wharfe, Aire, Ribble, Lune, Hodder, Eden.
3. Average depth of Rain in a year at Settle, 43 inches.
4. Geological constitution.—Millstone grit, Yoredale rocks, Scar limestone, Slate rocks, and Greenstone.
5. Valuable Minerals, &c.—Lead ore, Zinc ore, Ironstone, Coal, Slate, Limestone, Flagstone, Building stone, Peat.
6. Dialect.—The high lands are called 'Fells'; the limestone cliffs 'Scars'; the gritstone cliffs 'Craggs'; the valleys 'Dales' and 'Gills'; the rivulets 'Becks'; the waterfalls 'Forces'; small lakes 'Tarns'; tumuli 'Hows'; a heap of stones on an elevated point, 'Man.'

#### SOUTH-WESTERN DISTRICT.

1. Greatest elevation.—1859 feet in Holme Moss.
2. Principal Rivers which rise in the District.—Calder, Dun, Dearne.
3. Average depth of Rain in a year at Halifax, 33 inches.
4. Geological constitution.—Coal formation, Millstone grit, Yoredale rocks.
5. Valuable Minerals, &c.—Coal, Ironstone, Fire clay, Flagstone, Building stone, Peat.
6. Dialect.—The peaty mountains are often called 'Mosses'; ranges of gritstone 'Edges'; rugged glens 'Cleugh's.' The term 'dale' is not so frequently used as 'dean' or 'den.'

#### NORTH-EASTERN DISTRICT.

1. Greatest elevation.—1485 feet in Burton Head.
2. Principal Rivers which rise in the District.—Esk, Wisk, Derwent.
3. Average depth of Rain in a year at Brandsby, 28½ inches.
4. Geological constitution.—Oolitic and Lias formations.
5. Valuable Minerals, &c.—Coal, Ironstone, Alum shale, Jet, Building stone, Cement stone, Whinstone, Peat.
6. Dialect.—The high ground is called 'Moorland'; the valleys receive the names of 'Dales' and 'Gills'; the rivulets are called 'Becks'; the waterfalls 'Forces'; tumuli 'Hows'; a stone or heap of stones is sometimes called 'Man'; abrupt hill-edges are 'Nabs.'

## PRINCIPAL FEATURES

## SOUTH-EASTERN DISTRICT.

1. Greatest elevation.—805 feet in Wilton Beacon.
2. Principal Rivers.—Branches of Derwent and Hull.
3. Average depth of Rain in a year at Huggate, 30 inches.
4. Geological constitution.—Chalk with a red base, resting on Speeton clay, and various members of the Oolitic and Lias series.
5. Valuable Minerals, &c.—Flints, traces of Phosphate of Lime.
6. Dialect.—The hills are 'Wolds'; the valleys are 'Dales'; rivulets (very rare) are sometimes called 'Gypseys' (the G hard).

## RIBBLESDALE DISTRICT.

1. Greatest elevation—generally below 600 feet: Ryeloaf on the northern border (a detached hill of the north-western district) is 1796 feet high.
2. Principal Rivers.—Branches of Ribble and the Lancashire Calder.
3. Average depth of Rain in a year at Bolton by Bolland, 47 inches.
4. Geological constitution.—Yoredale rocks, with Scar limestone rising through them, and detached caps of Millstone grit on the borders.
5. Valuable Minerals, &c.—Limestone.

## CLEVELAND.

1. Greatest elevation—generally below 300 feet: Rosebury Topping, a detached hill of the north-eastern district, is 1022 feet or more.
2. The principal streams are branches of the Leven.
3. Average depth of Rain in a year at Upleatham, 22 inches.
4. Geological constitution.—Lias and New Red formations much over-spread by 'northern drift.'
5. Valuable Minerals, &c.—Alum shale, Ironstone, Whinstone, Gravel.

## VALE OF YORK.

1. Greatest elevation—generally below 200 feet: Craike Hill, detached from the north-eastern district, is 400 feet.
2. The Vale of York is traversed by most of the great rivers of Yorkshire.
3. Average depth of Rain in a year at York—24 inches.
4. Geological constitution.—Lias, New Red, Magnesian Limestone, much covered by 'northern drift,' marsh, and 'warp' land.
5. Valuable Minerals, &c.—Limestone, Gypsum, Gravel, Peat.
6. Dialect.—One detached hill is called 'Barf,' another 'Haugh.' Low marshy grounds are called 'cars' and 'moors'; river sediment is called 'warp.'

## HOLDERNESS.

1. Greatest elevation generally below 100 feet. Dimlington Height is 159 feet.
2. The river Hull is the principal stream.
3. Average depth of Rain in a year at Keyingham, 18 inches.
4. Geological constitution.—Tertiary sands at Bridlington; detrital gravel, clay, sand; lacustrine and river sediments: buried forests.
5. Valuable Minerals, &c.—Gravel and Peat abound.
6. Dialect.—Some detached hills are called 'Barfs.' A lake is called 'Meer'; the synonym 'sea' is found in many names.

## VALE OF PICKERING.

1. Greatest elevation generally below 100 feet.
2. The Derwent is the great drain of the Vale.
3. Average depth of Rain in a year at Scarborough, 23 inches.
4. Geological constitution.—Kimmeridge Clay, covered by lacustrine and river sediments.
5. Dialect.—The low grounds are called 'Marshes,' or 'Marishes.'

The great features of the earth's surface, the ranges of mountains, the extended plains, the long promontories and retiring bays, depend mainly on the position of the subjacent mineral masses; while the minuter physiognomy of hills and valleys, the sinuosity of rivers, the character of waterfalls, and the inequality of caverns, have a further and very important dependence on the internal structure and degree of consolidation of rocks. These are fundamental propositions in physical geography, and demand our earliest attention.

The lands of Yorkshire rise in masses toward the west. This is true whether we regard the area as a whole, or consider the features of its several districts. Thus, from Burton Head in the north-east to Mickle Fell in the north-west, the rise is 1115 feet; and from Wilton Beacon in the south-east to Holme Moss in the south-west, 1054 feet. As a whole, the country rises also from the south to the north; from the hills which border the valley of the Dun, to the 'fells' which give birth to the Tees; from the chalk wolds over Humber to the oolitic moors above the Esk. From Holme Moss, in the south-

western district, we have a rise northward of 641 feet, to the summit of Mickle Fell; and from Wilton Beacon, the culminating point of the Wolds, there is a rise of 680 feet northward to Burton Head.


The explanation of these prevalent eastward and southward slopes of the surface is simple; they correspond to the internal structure of the country. In Yorkshire the constituent mineral masses are for the most part stratified\*; the strata are not horizontal, but inclined to the eastward, or south-eastward, from an 'axis of elevation' (Pl. II. fig. 2, *x*) as it is called, or what is in effect equivalent to it, a great line of dislocation (Pl. II. fig. 1, *x'*) nearly coincident with the western boundary. The most prevalent slope of the surface then is to the east or south-east, because the rocks upon which it is formed are inclined in that direction (Pl. II. fig. 1). As the several strata rise toward the west, the surfaces formed on these strata also rise in that direction; and the surface attains the greatest elevation near the axis of uplifting of the strata. This explanation is fully confirmed by examining the districts separately.

In each of the hilly districts, it is toward the northern and western parts that the greatest average elevation is attained; in each the country grows lower toward the east and the south; and upon a view of the whole country, the most prevalent direction of the streams is from the north and west toward the south and east.

The separate slopes of all the hilly districts to the east follow the inclination of the strata in that direction, and are much more rapid than the average slope of the whole surface: in three of these districts, the north-eastern, south-eastern and south-western, a southward dip of the strata appears along the northern edge, and combines with the eastward dip to give them somewhat of the concave or basin-shaped character. The surface corresponds to this peculiarity of structure: Holderness

\* Only the 'Whinstone Dike' and 'Whin Sill,' and other small dikes and mineral veins, are exceptions.

resting in the 'trough' of the Chalk; Pickering Vale in the hollow of the Oolites; and a great part of the West Riding in the depression of the Coal tract.

If we suppose some of the strata which compose the lands of Yorkshire to appear in their original position in the sea bed, they would lie nearly horizontal, and present, in section, the appearance of the lower part of fig. 2, Pl. II. If next we suppose an upheaving force to be exerted in the direction marked by the arrow  on the same figure, we shall have one of two appearances; either the strata will be uplifted on both sides and bent, as fig. 2, or uplifted on one side and broken, as fig. 1.

Each of these cases occurs in Yorkshire, the axis of uplifting being on or near to the western boundary of the county; and hence the eastward or south-eastward slopes of the strata so uplifted. But the surface is not marked with the uniformity of the slope which belongs to the strata. It is undulated by hills and valleys which cannot be explained by the act of elevation of the strata. These undulations are due to the violent action of the sea upon the rocks as they were raised out of the water and to the subsequent effect of the atmosphere, rains, and streams in the thousands of years during which the elements have been warring against them.

The successive steps by which the originally even and continuous surfaces of the strata have been cut and worn into the irregular forms of hills and valleys, may be understood by descriptions on paper, but more completely represented on models, and may be actually and experimentally witnessed on the sands of the sea-shore, or verified by artificial arrangements. Let us attempt an illustration of the process on paper.

In the section (Pl. II. fig. 2) W W is the level of the sea, under which are the strata marked G, a hard rock, as sandstone,—S, a softer rock, as shale,—and L, a firm limestone. All these rocks are divided by fissures, which have characteristic features in each:—in the sandstone they are somewhat irre-

gular cracks—in the shale oblique cuts—in the limestone nearly vertical joints.

We shall now suppose these strata to be upheaved, by a force acting at  $\uparrow$  so as to come within the power of the waves and currents of the sea, and finally to appear above it. By this elevating force the parts over the  $\uparrow$  will be *first* brought under

the corroding agency of the waves; the cracks being partially opened by the pressure upon the strata, the continuity of these masses of matter is broken, and their power of uniform resistance to the water is destroyed; the weakest parts yield most, and thus *before the strata reach the level of the water, their surface is channelled*, and the land as it emerges above the sea exhibits, not a parallel band as A, but a broken ridge as *b, w, i*, between the points of which the strongest currents flow as represented by arrows.

The rise of the sea bed and the action of the water continuing, the channels for the currents are deepened, the three points of land here indicated are *undermined* by the wasting of the shale below them, the crown of gritstone falls on all sides, and the appearance, after further continuance of the process, is represented in Pl. II. fig. 4, in which (*i*) is Ingleborough, (*w*) Whernside, (*b*) Barfell; and the upper ends of Yoredale, Wharfedale, Ribblesdale, Dentdale, Garsdale, and Edendale, begin to appear out of the sea.

It is needless to follow further the stages by which, under the same conditions of gradual rise of the land and continual battery of the sea on the parts as they successively come near to and reach the surface, the original islands, *i, w, b*, become united to slopes and ridges, until they constitute merely the culminating points of the country, the conspicuous ornaments of a great and varied physical region. On a surface thus constituted, the atmosphere produces further waste—carbonic acid eats away the limestone, moisture softens and crumbles the shale, rains wash

away the loosened grains of every kind, rills collect, and rivers carry away the accumulated detritus, and the rough old sea channels, in some places filled up by these deposits, and in others worn still deeper, are changed into those smooth dales or picturesque glens, which are the boast and charm of the North. *Rivers run in valleys which the sea made for them.*

The rivers, therefore, in their higher parts, for the most part run with the inclination of the strata. Hence easterly and south-easterly courses of the streams are the most common in Yorkshire, but when the dip of the strata is eastwardly in one part and southerly in another, the rivers run in one part to the east, and in the other to the south. The Derwent which rises by many branches on the north side of the Vale of Pickering, is a striking example. The main ridges of hills do not necessarily run *between the rivers*: they more frequently range parallel to the axes of elevation, which are for the most part summits of drainage; but ranges of high ground also, not seldom, cross the courses of many rivers, in terraces which are escarped toward the source of the stream, on the north or the west, but have longer, easier, and less picturesque-slopes to the east or the south. The explanation of this circumstance is found in the nature of the alternating strata. In such hills, the edge of the escarpment is usually the termination of a broad area of *hard* or well-consolidated rock, while softer clay or shale appears below. Such materials being brought by the upward movement of the sea bed within the action of the water, would be wasted unequally—the soft beds more, the hard beds less; so that deep hollows would be produced in a direction across the line of the main channel or sea valley. These hollows often suggest at the present day the notion of former lakes with barriers situated at the gorge formed by continuous rocks, which barriers the river now flowing is supposed to have cut through and thereby to have drained the lake. Such effects may have happened, but the general explanation is that given above.

Thus were formed the remarkable escarpments or 'nabs'



which terminate the 'tabular hills' of the districts of Scarborough and Castle Howard. These hills range east and west, and are escarped to the north across the many branches of the Derwent from Scarborough to Bilsdale; but run south-east from Coxwold to Malton, with escarpments to the south-west. Similarly in the West Riding of Yorkshire, we trace many such lines of escarpment which terminate sloping terraces of sandstone; the sandstone resting on more easily disintegrated shales. Thus have the long cliffs of our Wolds and our Hambletons been formed: thus has a remarkable feature of the physical geography of England been produced—the almost uninterrupted range of our chalk hills from Flamborough to Dorsetshire and Kent, and the many parallel ranges of the oolites which traverse the middle of the island. The simple principle which so fully explains it—the unequal action of water upon a basis of unequally resisting materials—is applicable to almost every individual hill in Yorkshire, and is equally successful when we inquire into the effect of rivers in causing or modifying the cascades which enliven their course.

The features of individual hills and valleys depend mainly on the materials of which they consist, and on the manner in which they are arranged. As an example, we may take the outline of Ingleborough toward the west (Pl. III. fig. 2). The prominent parts of the outline are due to the *hard* millstone grit (*m*) which crowns the mountain; to the *hard* limestone (*l*), and the *hard* sandstone (*s*) which jut out on the side; the steep slope below is formed chiefly of perishing shales, and the broad base which supports the conical mass is a floor of solid limestone. Penyghent, Whernside, Bear's Head, Stag's Fell, Pen Hill, and many other of the most conspicuous hills in the north-west of Yorkshire, exhibit similar outlines due to similar alternations of strata.

In strong contrast with these are the forms in Hougill Fells, which, composed of slaty rocks placed at high angles of inclination, shoot up in pyramidal ridges and obtusely angular summits, like many hills composed of the same rocks in Westmoreland.

And different from either are the rounded knolls of the shale which occur in the country of Ribblesdale.

The combination of these forms into groups occasions quite different pictorial effects. Compare, for example, the scene from the Buttertubs Pass between Muker and Hawes (Pl. IV.), in which alternating limestones and gritstones give the most prominent effects, with contours of the Craven district near Skipton (Pl. III. fig. 1), the bold edges being made of thick gritstone (*g*), and the lower swelling hills of shale (*s*).

Or contrast the abrupt outlines, such as those of Oliver's Mount and the Nabs near Scarborough (Pl. III. fig. 3, *n*), with the easy and flowing curves which everywhere mark the edges of the chalk wolds (*w*).

In the former case a *hard* rock, calcareous grit, guards the brow, and the slope below is clay, alternating with easily disintegrated sandstone; in the latter case, the chalk, in great thickness and full of small fissures, yields rather easily to degradation, and nowhere preserves abruptness of parts, however bold may be the general effect.

The great inland cliffs, which are among the most striking phenomena of Yorkshire, only differ from sea cliffs, because the water no longer beats against them. The Hambleton hills, the Wolds, no less than Giggleswick Scar, were cliffs against a wide sea. Kilnsey Crag was a promontory overhanging the primæval sea-loch, which is now the green valley of the Wharfe; and the mural precipices which gird the bases of Whernside, Ingleborough and Penyghent, formed bold margins to similar branches of the sea, which extended up Chapeldale and Ribblesdale.

The softer strata are more worn away on the slopes of hills than the harder rocks, and for that reason appear in concave surfaces there; for the same reason valleys are often widened into expanded hollows in these strata, and contracted between cliffs where the sides are formed of firmer materials. For the same reason, on the sea-coast, the far-extended promontories

are composed of more solid rocky masses than the bays on either side. Thus Flamborough Head, a mass of rather firm chalk, projects between the sands, clays and gravels of Holderness, and the clays of Filey Bay; the calcareous ledges of Filey Brig in like manner stretch out into the sea, between bays of softer matter; Scarborough Castle Hill is a third example. (See the Geological Map.)

Looking specially to the action of water now running in the valleys, we observe that the very channel is marked by peculiarities of the same kind, and depending on the same conditions. To instance only the most beautiful of the peculiarities of our northern rivers, the 'forces' and rapids, which impart so much interest to the Valley of the Yore. In accompanying many little streams which descend from the moors, several hundred feet before they reach the river, we find at almost every point where limestone beds rest upon shale, and often where sandstone beds take the similar position, a *step* in the channel, over which the water falls a few inches, a few feet, or many yards, according to circumstances. Each of these little cascades is subject to displacement. The limestone beds are slightly worn away and excavated by the sharp sands and pebbles which the stream brings downwards, but this is a feeble element of change. A more powerful effect is occasioned when the rock is *undermined* by the more rapid waste of the shale, and it consequently breaks off at one of the numerous natural joints, and falls. Thus the operation by which Niagara has been removed, and is undergoing removal, which has furnished to Sir C. Lyell most interesting reflections, may be witnessed on hundreds of streams in Yorkshire. The scale is microscopic, indeed, but the results are of the same order, fully as instructive and not less impressive on the mind.

The mere action of the humid and variable atmosphere of England, is wasting, every hour, the surfaces of what are vainly thought to be eternal hills. Even the drop of rain cannot be traced from the cloud, over the surface and through the sub-

stance of rocks to its exit in a spring, without teaching us that these rocks are continually undergoing waste, and that this waste is proportional to the nature of the rocks. Rain-drops bring down carbonic acid, and thus exert a chemical as well as mechanical action. In favourable circumstances, the actual channels which they make are preserved. On the wide and bare surfaces around Ingleborough and Penyghent, and on Hutton Roof Crags, west of Kirkby Lonsdale, these channels are innumerable, of all breadths and depths, and of lengths and direction depending on the slope and continuity of the masses. Where the strata are level, the little ramifications of the rain-channels run deviously, and terminate in the numerous natural joints ; but where, as on Hutton Roof Crags, the strata acquire a steep arched slope, the channels take the direction of the slope, run together as valleys do, and collect into miniature dales, till some great fissure lying across their path swallows them up. Below this joint, other channels commence, to be in their turn swallowed up (see Geol. Proc. 1831, vol. i. p. 323).

The fissures here indicated are natural joints of the rock, produced by contraction during its consolidation ; they are often symmetrically disposed (prevalent directions are N.N.W. and E.N.E.), and by dividing the mass of the limestone present easy passages downward for water. Thus Malham Tarn delivers itself, not by a surface-channel, but by subterranean passages : the river Nid is swallowed up near Lofthouse : streams which gather on the moorland fells, sink into smaller holes of the limestone below, or wind through subterranean caverns. These fissures, by giving passage to water, suffer enlargement so as to become rifts between cliffs, or channels round insulated peaks or jutting crags. Gordale, a good example of these effects, will again attract our attention. (See Pl. XX.)

Where the fissures have one prevalent direction, the rock is split into vertical plates : a second set of joints developes prisms in these. Large joints, thus crossing at intervals, produce huge vertical masses, which, in consequence of the removal of adjoining parts, often stand out like prominent towers of a Cyclopean

fortress. Kilnsey Crag is a well-known example in Wharfedale (see Pl. XV.).

Malham Cove and Giggleswick Scar are examples of grand and noble cliffs—the former 285 feet high—occasioned by the Craven fault, which, running nearly E. and W., causes at several points enormous vertical faces of limestone, which are opposed to quite different strata on the south, and, wherever the ground admits of it, are very clear and prominent above them. From under Malham Cove the Aire issues with a perpetual current. The long range of Giggleswick Scar gives out the feeble intermitting spring, known as the Ebbing and Flowing Well.

The Swallow Holes which have been mentioned offer many curious phenomena. We may see them in action, at the foot of slopes of grit and shale, especially after heavy rains have produced many small rills; for these are often found running into vertical pits, open, or masked by heath, or choked by earthy materials, and the sides of these pits are smoothed and grooved by the water, always more or less acidulated by the shales and the decaying vegetation of the hills.

In dry seasons these pits may be inspected to various depths, and may be followed in rings round the mountain slopes, a little above the upper edge of every limestone bed. The rains and rills thus swallowed up by the dry and fissured and perforated limestones, unite and find their way to underground channels, or caverns, which are nowhere more remarkable than in Yorkshire.

In some cases these are little else than natural fissures, enlarged by the watery currents; in other cases the ground is 'faulty,' or 'shaken,' or in some way weakened along the line of the caverns, where, thus broken, it has suffered a greater amount of waste than usual.

Ingleborough Cave, which has been explored by Mr. Farrer, and preserved from wanton injury, is highly instructive as to the origin of the Craven caverns generally. It is specially rich in illustrations of the varied effects of subterranean currents on its floor; and the endless diversity of sparry stalactites and stalag-

mites which have been accumulated from the drippings of water along fissures of the roof. This interesting cavern will claim more detailed notice in another part of the work.

From this very brief summary, we perceive that the main external features of Yorkshire are strictly explicable on the simplest possible theory; viz. that of the long-continued action of the agitated sea on the strata which composed its bed at the time when this bed was raised to constitute land. These strata, by their various degrees of consolidation and peculiarities of position, offered unequal resistance to the waves, and have been unequally wasted, the softer strata, which suffered most waste, having left the greatest hollows. Thus, the red marls and blue lias have been excavated in the Vale of York, the Kimmeridge clays in the Vale of Pickering, the limestone shales in Craven, and the tertiary sands in Holderness; while harder masses of chalk constitute the Wolds, oolites and sandstones form the moorlands of Whitby, and still firmer sandstones and limestones, with some slaty and some basaltic masses, constitute the higher regions of the west.

To geological differences, on a large scale, we thus clearly trace the main distinctive features of the great natural divisions of Yorkshire. The mineral qualities and positions of rocks, with the accidents to which they have been subjected, give us the clue to the forms of mountains and valleys, the aspect of waterfalls and rocks, the prevalent herbage, and the agricultural appropriation. Even surface colour and pictorial effect are not fully understood without geological inquiry. While limestone 'scars' support a sweet green turf, and slopes of shale give a stunted growth of bluish sedge, gritstone 'edges' are often deeply covered by brown heath, and abandoned to grouse, the sportsman, or the peat-cutter. In a word, geological distinctions are nowhere more boldly marked than in Yorkshire, or more constantly in harmony with the other leading facts of physical geography.

## CHAPTER II.

## MOUNTAINS OF YORKSHIRE.

[In the following descriptions the heights of the mountains are expressed in feet above the sea, as Mickle Fell, 2580 feet. Where O.S. is appended, the authority is the Ordnance Survey, and in like manner N. refers to the careful results of the late Mr. Nixon's Survey. For many other elevations the author and his friend Mr. Gray are responsible. A general table of these measures will be given in the Appendix.]

**MICKLE FELL GROUP.**—Mickle Fell (Teut. *Gr̃at Mountain*), in the extreme north-western angle of Yorkshire, is the highest of some thirty summits which rise more than 2000 feet above the sea, and are scattered along the Penine Chain between Teesdale and the region of Ribblesdale or Low Craven. These well-known points may be designated mountains or hills to suit the general reader, but they are better known locally by the ancient name of 'fell,' which, like the Yorkshire name of waterfall, 'force,' is equally characteristic of Norway\*.

Mickle Fell, situate between Teesdale and Lunedale, rises above the point where these valleys meet about 2000 feet, above the sea 2580 feet. Across the western, which is the highest part of its curved summit, runs the boundary, by agreement, between the Yorkshire and Westmoreland Manors, so that each of these counties may claim a share in this noble hill. The Man† erected here stands on millstone grit; the eastern part of the mountain, which is 2472 feet high, is chiefly formed of the uppermost thick limestone of the Yoredale series, and between this point and the High Force the whole of that series may be traced.

\* Like the Norwegians, the men of Yorkshire place a circumflex accent on the word Fèll (Fjall, Norw.), and in both countries the word for waterfall (*fors* in Norway) is pronounced 'foss.'

† Maen in Cymraic signifies 'rock.' It is not so generally employed to designate the conspicuous stone heaps in Yorkshire as in the Cumbrian country.

To climb this mountain from the High Force Inn is not a difficult, though rather a long walk, whether we cross the bold greenstone of Cronkley Scar, or take the way from Caldron Snout; in either direction some boggy ground must be passed. Arrived on the summit, a magnificent panorama rewards the pedestrian.

Resting for a while in the north on the desolate moorlands which surround the great mound of Cross Fell (2901 feet), the eye speedily turns to the west, and catches, in succession, the far-off peaks of Carrock Fell, Skiddaw, and Helvellyn,—the yet more distant Pikes,—and the Old Man above Coniston. Nearer, to the south-west, are the undulated groups of Hougill Fells; and to the left of them Wild Boar Fell, High Seat, Water Crag, and Shunnor Fell; between whose broad surfaces rise the finer and loftier forms of Whernside and Ingleborough. More to the east we trace the outlines of Penyghent and Great Whernside; and over a hundred hills of less conspicuous character, which grow lower and lower toward the Vale of York, the Hambleton and Cleveland Hills swell into a long, but, even at this distance of forty miles, by no means formal or uninteresting range.

Far below, on the north, is the valley of the Tees, expanded into the long dark tarn called the Weel; the waterfall of Caldron Snout; and the greenstone cliffs of Cronkley; to the south lies the wild and dreary region of Lunedale. The country slopes easily eastward, but breaks down toward the west by a precipitous wall of rocks, overlooking with a magnificent survey the Vale of Eden, beyond which rise with uncommon grandeur the Cumbrian Alps.

In making the ascent by Cronkley Scar, the geologist may be interested by the metamorphic condition of the limestone which rests on the thick mass of the 'Whin Sill.' It is in fact converted to a crystallized white rock of very large grain, which easily disintegrates into loose crystalline sand. It is sometimes called 'Sugar limestone.' On this peculiar surface *Cistus marifolius*, *Hippocrepis comosa* and *Arenaria verna* may be gathered



in July, and *Draba incana* at an earlier period of the year. In neighbouring situations occur *Gentiana verna*, *Bartsia alpina*, *Dryas octopetala*, *Thalictrum alpinum*, and *Lycopodium alpinum*\*.

**STAINMOOR** (Teut. *Stony Moor*).—The whole country sinks from Mickle Fell to the southward, so as to form a broad depression in the great Penine ridge. It is through this depression that the great Roman road was carried from Eboracum (York) to Luguwallium (Carlisle). The title of Stainmoor applies well enough to this broad surface of gritstone and shales diversified by many picturesque craggy summits, which are sometimes capped by erratic blocks of granite, brought by some uncommon natural force from Shap Fell in Westmoreland. One of these blocks rests on the millstone crags of Goldsborough which rise to the east of the summit of Stainmoor, 1360 feet above the sea: another at about the same height west of the summit, which is 1440 feet above the sea.

From the last-mentioned block we may look back across the Vale of Eden, over many other such scattered erratics, almost to the very point of the Fell from which they were torn, and speculate on the power employed, and the ancient condition of land and sea which could render possible this almost miraculous transport of heavy rocks across deep valleys and over lofty hills. On the line of the Roman military road over Stainmoor, and on the summit of the pass, is an ancient Camp of considerable dimensions, and singular construction. Its general figure is rhomboidal, with the angles rounded; those to the north-west and south-east being most acute. The sides are about 300 yards long, and approximate in direction to the cardinal points.

The enclosure is formed by a vallum, nowhere much elevated except on the south side, where it is partially double. On this side and toward the west the ground is precipitous and rocky. Toward the north, west and east, the vallum is pierced by three openings in each face, and toward the south by two original

\* Baines's Flora of Yorkshire.

openings, making in all eleven. Besides these are two others, in the east and west faces, through which the Roman road is carried. Ten of the eleven openings are guarded by mounds on the outside of the depression or ditch; the eleventh, in the south-east corner, is also guarded, but by what appears a natural elevation of ground. In the Camp on the south side of the road, toward the south-west angle, stands the famed Rey Cross, sometimes called Rere Cross, which gives name to the Camp. The base remains *in situ*, but the shaft was thrown down when I last saw it (1851).

The road between Verteræ (Brough) and Lavatræ (Bowes) appears to cut through the Camp, as if of later date. Moreover the names of these places seem to recognise the previous existence of a fort (Rha) to which they were both related. Perhaps the 'fine square tumulus' which is mentioned by Roy within the Camp, may lay claim to this distinction. 'The stone of King Marius formerly stood in this Camp, now succeeded by Rey Cross' (Gough). (See Plate XXXIV. fig. 1.) The Plan of this Camp is rare among Roman works, no other example being known, except on Kreigenthorp Common, near Kirkby Thure, in Westmoreland.

Looking from Mickle Fell over Stainmoor, along the summit of drainage or 'heaven-water boundary,' as it is called, we behold a large group of fells about the sources of the Eden, Lune, Swale, Ure, Nid, Wharfe, Aire, and Ribble. To each of these fells belongs some characteristic form by which it is easily and joyfully recognized, at the source of some favourite stream or among the crowning features of some lovely dale. They may be said all to rest on *one* general basis or tract of elevated land, which sinks gradually to the east, but is truncated sharply to the west. This mass is, however, ramified in so intricate a manner among diverging dales, and so broken by glens and undulated by prominent scars and crags, as to present little of that monotony which belongs to the higher grounds of Derbyshire, Durham, and Northumberland.

**HOUGILL FELLS** (Celt. *Uchel*, elevated).—Lying west from this series, and contrasting with them in every respect, is the tract of Hougill Fells,—divided between Yorkshire and Westmoreland. Naturally it belongs to the latter, being composed of the slaty rocks usual in that county, and separated from the limestone and gritstone of Yorkshire by a line of valley and a line of fault. In accordance with the nature of the rocks is the character of the scenery; intersecting slopes in angular masses of grey rock, breaking through steep green surfaces, give to this district a very different aspect from the broad swells, rough craggy edges, and brown or purple heath, which mark the greater part of the Yorkshire Fells. The waterfall of Codley Spout, a cascade of several hundred feet, is in this group, whose culminating summit, the 'Calf,' is 2188 feet, according to the Ordnance Survey, or 2220 feet, according to the measure of Mr. Nixon, above the sea. Hougill Fells are on the east bank of the Lune, which embraces them in its wandering and beautiful course.

**WATER CRAG GROUP.**—A few miles within or to the east of the line of 'heaven-water' drainage, between Swaledale and Arkendale (which is a branch of Swaledale), three broad moorland surfaces rise to heights exceeding 2000 feet. These are Roggan Seat, 2207 feet (Nixon), Water Crag, 2184 O. (2191 N.), and Pin Seat, 2125. Between Arkendale and Greta Dale, Hoove and Baxton Knab are the highest points, the former being 1823 feet. These are hills of millstone grit, with thin coal seams, resting on the Yoredale limestones, which form magnificent scars along Arkendale and Swaledale. Calver, a limestone hill, and Healaugh Crag, composed of rough millstone grit, near Reeth, are conspicuous objects. The famous Auld Gang, and Arkendale mines, on veins which run for many miles east and west, are in this group of mountains. They were probably worked by the Romans.

**SWALEDALE HEAD.**—A singular crescent of gritstone summits encircles all the first feeders of the Swale, and thus hides from the wanderer in the upper part of the dale every thing but

the peaty moors and dreary rocks, among which a multitude of dark waters find a rapid descent. Nine Standards, the most northern of these summits, is, according to Mr. Nixon, 2153 feet. This is followed by Fell End and High Seat, which are about equal to Hugh Seat (2330 feet), and Lady's Pillar closes the remarkable range with a height of 2261 feet by the same authority. These are very uninviting summits as seen on the Swaledale side, but they hang with a dreary magnificence over the road from Kirkby Stephen to Hawes, and combine with the opposing crags of Wild Boar Fell to deepen the gloom of Mallerstang.

**SHUNNOR FELL GROUP.**—Shunnor Fell (2329 O.S., 2351 N.) and Lovely Seat are the two highest points of land between Swaledale and Yoredale; and their gritstone summits, situated amidst the wide expanse of moorland, offer little that is interesting. But the glens which descend 1200, 1400, or 1600 feet on either side are full of beauty, and on the southern slopes varied with some of the finest waterfalls in the north of England. The mass of land of which they are the culminating summits sinks eastward by Blackstone or Bakestone Edge 1923 feet, Whitea Fell, Sattron Hangings, and Cross of Greet, toward the great Vale of York.

Though it is hardly worth the trouble to climb Shunnor Fell, or Lovely Seat, the road that runs between them from Muker to Hawes should be followed by every pedestrian who enjoys the mountain air, and can appreciate wild and striking combinations of moorland summits. This pass is called the 'Buttertubs,' and should by no means be taken in the contrary direction to what is here recommended. The evening view toward the south, on gaining the summit, is of the utmost grandeur—Ingleborough, Whernside, and other fine outlines, coming boldly out beyond the broad undulations about the head of Yoredale (see Pl. IV.).

**WILD BOAR FELL GROUP.**—Swaledale Head, as we have said, is fairly enclosed and insulated by a dreary crescent of lofty gritstone hills; Yoredale, on the other hand, opens by two romantic

glens right through these hills, to the Vale of Eden, at Kirkby Stephen, by Mallerstang, and the Vale of the Lancashire Lune, by Garsdale. Embraced by these glens, and separated from Hougill Fells by Rothersdale, is a singular group split into the three distinct summits of Wild Boar Fell, 2327 feet; Swarth Fell, 2237 N.; and Bar Fell (or Bow Fell), 2226 N. The former is in Westmoreland, the two latter in Yorkshire. These bold and picturesque mountains are rarely traversed by tourists, though they are very worthy of attention. Insulated from all the other masses of land, they offer to the geologist many excellent sections through the millstone grit and Yoredale rocks, and on their western slopes the line of the great Penine fault is very distinct. Wild Boar Fell, perhaps the finest of the three in boldness of form and ruggedness of surface, may be crossed with pleasure in fine weather (the author once crossed it in a terrific storm), from Pendragon Castle toward Sedbergh.

**WIDDALE FELL GROUP.**—Less deeply divided from its congeneric hills by Garsdale, Dentdale, and Widdale (a branch of Yoredale), is the irregular group of which Widdale Fell Top (composed of millstone grit) is the summit. It is 2205 feet high according to Mr. Nixon, who calls it Knoutberry Hill. A lower part of the hill, called Whaw Fell, or Woe Fell, is 1833 feet N., and to the long continuation westward, called Rysell, Nixon gives an elevation of 1823 feet. The views from Widdale Fell are varied, pleasing, and extensive, and it is within a moderate distance of Hawes, with a difference of level of 1500 feet.

**DOD FELL GROUP.**—In the small rhomboidal area enclosed between the two branches of Yoredale, called Widdale and Simmerdale, is a fine group of mountains, in which the limestone element, so productive of beauty in precipices and cascades, is predominant, though, as in many other cases, the highest summit is formed of gritstone. This is the 'Dod'—a name which occurs again in one of the buttresses of Skiddaw; its height is 2189 N. North-east of it is Bear's Head, or Weather

Fell, 2019 N.; and north of it a point called Ten End, 1919 feet. All these are small areas of gritstone. Cam Fell, which runs out S.W. of Dod, is a fine mountain swell of the highest thick Yoredale limestone, 1926 feet N. Wharfe springs on the S.E. side of this mountain, which may also claim some share in the parentage of Ribble. The prospect to the south is very fine and extensive. We may take Cam as a Teutonic element, signifying 'crest': in Celtic it would signify 'crooked.'

**BETWEEN YOREDALE AND WHARFDALE.**—Above the sources of Simmer\* Water is a small group of heights, of which Yokenhwaite Moor, 2114 N., is the highest. Between Simmer Water and Bishopdale, on the south side of Yoredale, is the little group, of which Addleburgh and Stake Fell are the highest points. Addleburgh, 1565 feet N., is a limestone hill, but on its summit are some blocks of gritstone, perhaps monuments of Druidical times. It is, as its Teutonic prefix, 'Edel,' signifies, a 'noble' mountain, though of such moderate elevation. Stake Fell, 1843 feet N., is a less interesting summit of gritstone, over the romantic pass by which communication is made from Askrigg to Kettlewell. Wasset Fell is between Bishopdale and Wassetdale.

Between Wassetdale and Coverdale are the three summits of Buckden Pike, Harlen Fell, and Penhill.

Penhill, 1817 N., a prolongation of Harlen Fell, 1765 N., as this is an extension from Buckden Pike, 2304 N., 2245 O.S., is one of the finest of the summits visible from Wensleydale; the effect of its bold craggy head being heightened by the deep valleys which on three sides surround it. Its elevation above the Valley of the Yore is about 1400 feet. Buckden Pike (also called Carn Fell, and West Sattronside) is, next to its neighbour Great Whernside, the highest point of land on the east side of the Wharfe. It is separated from the last-named hill by the deeply excavated pass which leads from Kettlewell to Cover-

\* This combination of words, each signifying 'lake,' occurs again at Seamer, near Scarborough.

dale. The views from this pass and the sides of Buckden Pike, down the rocky length of Wharfdale, are superb. The easy ascent from Kettlewell to this pass should on no account be omitted.

**BETWEEN WHARFDALE AND NIDDERDALE.**—Great Whernside (2310 N., 2263 O. S.) is the culminating point; a huge mass, on whose northern face one of the young streams of the Nid gathers in a wide sweeping hollow. Not far to the N.E. is Little Whernside (1985 N.), to the S.E. Mewpha (1891 N.). A distinct, but much lower group is found further south, clustered about the limestone of Greenhow Hill (1441 N.), and Nursa Knot (1274 N.); and about the gritstone of High Crag (1325 N.), Poxstones Moor (1517 N.), Barden Fell East (1471 N.), Blueber Fell (1332 N.), and Beamsley Rock (1314 N.).

The east side of Nidderdale is bordered by bold edges, which have been but little subject to measurement. Their height perhaps nowhere reaches 1500 feet. These hills sink southward, so that Brimham Rocks measure only 990 feet N., and eastward they subside by easy slopes to the general level of the Vale of York.

**GROUP OF WHERNSIDE.**—In the south-western angle of the mountainous district, on which we are now occupied, rise several elevated fells, which in grandeur and variety of interest are second to few in the kingdom. These are Whernside (anciently Quernside), Ingleborough (anciently Ingleburg), and Penyghent, once fondly imagined by the surrounding rustics to be the highest hills in England. On the old and in some respects excellent county map of Jeffreys, Ingleborough is said to be a mile high; Whernside is complimented with an additional height of 20 feet, and Penyghent humbled by the same quantity. The real height of Whernside is stated by the Ordnance Survey at 2384 feet, of Ingleborough 2361, and of Penyghent 2270; but Nixon gives them 2414, 2384, and 2351 feet. While Mickel Fell reigns supreme over the solitary wastes in the north of Yorkshire, Whernside, Ingleborough and Penyghent shine with

milder glories over magnificent scars of limestone, penetrated by numerous and beautiful caverns, and give birth to sparkling waters which enliven the greenest of valleys.

They are all easy of access from a country full of comforts; amongst which pedestrians and equestrians will not overlook the establishments for feeding and resting man and horse. Yet how few of those Yorkshiremen who glory in their county have set foot on the rocky summit of Ingleborough!

The names of Whernside, and Ingleborough or Ingleburg, are usually accepted as of Teutonic origin. The Quern (the hand-mill of antiquity) might be cut from the millstone grit of Whernside and Quorn Moor near Lancaster: Ingleburg is frequently translated 'the fire or beacon mountain':—the element Ingle has no doubt the signification here assigned in Scotland and the extreme north of England, but it seems referable to a Gaelic synonym. Penyghent is purely Celtic—the point or head of the ascent; not, as sometimes said, the head of the winds, which would have fitted Penygwynt.

The mass of Whernside is insulated by valleys which embrace it in a large circumference. The ascent is easy on the east or south-east, but the fell breaks down with a stern and formidable descent to the wild and secluded little dale of Dent, the birthplace of our Sedgwick, who,

. . . . . long as yonder hills  
Shall lift their heads inviolate,

will be named among the worthies of Yorkshire, and honoured among the most eminent geologists of the age. Whernside has a thick mass of millstone grit on its summit, and throws out wide buttresses of the Yoredale rocks, over great scars of bare limestone. In a part of these scars, lying S.S.W. of the summit, is the famous Cavern of Yordas, and not far below it the pretty waterfall of Thornton Force. On the summit are two foundations of British houses (see Appendix).

Lying due west of Whernside is the point called Colm or



Dent Crag, or County Stone (2253 N.), at the junction of Yorkshire, Westmoreland and Lancashire; and south-west of the summit is the broad heavy mass of Graygarth or Gragreth, 2060 N. (Celtic, Grug, Rock, Arth, promontory).

*Yordas Cave*, in the parish of Thornton in Lonsdale, is at the foot of the upper slopes of Graygarth or Gragreth. Its narrow opening in the limestone rock is closed by a door,—a precaution not to be censured, by those who know what wanton destruction has been caused to many miracles of nature by her irreverent worshipers. The Cavern expands within to a large and lofty chamber (60 yards long and above 20 high), in which water dropping from the roof and sides has formed the numerous and fantastic stalactites and stalagmites, which visitors so often beat to pieces for pleasure!

Farther in, a circular chamber appears, its roof supported by spirally aggregated pillars of stalactite, the sides adorned with smaller deposits of like nature, and in wet seasons a cascade adds its effect to this beautiful scene. This water is, no doubt, derived from the stream which, a little farther up the glen, plunges into the subterranean grottoes of the limestone rock.

Yordas, the mythical tenant of this Cave in early days, had, like Poole the Robber of Buxton, his chamber, oven, &c. in the solid limestone, or rather marble, for the firm rock, full of beautiful encrinites, is worthy of the name.

Easgill Kirk, a remarkable scene of wasted rocks and caverns whose mysteries are opened to the day, lying west of Gragreth, may be more conveniently described in connection with the water (Leck Beck) which runs by it.

INGLEBOROUGH, standing on the same basis as Whernside, and almost rivalling it in height, is a far more conspicuous mountain, especially to all the south and west. Its conical mass is crowned by a nearly flat cap of millstone grit, and is founded on a vast tabular surface of time-worn limestone rocks, these being in their turn supported by huge cliffs of massive and slaty Silurian strata. Magnificent caverns penetrate into

the substance of Ingleborough, and on every side large cavities swallow up the moisture collected about the summit. Purified by trickling through the subterranean clefts of rocks, the water issues from the clearest of fountains with a constant temperature, often depositing on the surface the calcareous earth which it had dissolved in its passage, and had refused to give up to the stalactites which are always growing in the caverns.

The easiest access to Ingleborough—that most requiring to be guarded by defenders of the summit—is on the south side by Crina Bottom. On this line, about a quarter of a mile west-south-west of a farm called Yarlsber, on an open limestone surface, is a small Camp of no great strength, perhaps held as an outpost. In figure it is an irregular polygon, with a peculiarity about the banks which deserves notice. The fossa is irregular, but continuously traceable; the bank interrupted at two points in such a manner as to make two awkwardly covered entrances not quite opposite. There is a natural mound of limestone very near it on the west, round which marks of trenches appear. The vallum is nowhere more than four feet above the level of the fossa. There is no internal peculiarity, nor are any tumuli seen near to it. The average diameter is about 300 feet; the top of Ingleborough is visible from it.

Ingleborough, on all sides girt with a rocky edge, is most abrupt to the north and the west; drier on the summit than most of the Yorkshire fells; and exposed in a remarkable degree to violent 'north-westers.' How strange to find this commanding height encircled by a thick and strong wall, and within this wall the unmistakable foundations of ancient habitations! When resident many years since at Kirkby Lonsdale, it was for me an easy morning's walk to the summit of Ingleborough; and some traces have always been in my memory, of some kind of wall round it, mingled with incredible traditions of 'Roman camps' on the top. But in 1851 the Rev. Robert Cooke, looking on this old wall, with a knowledge of similar structures in North Wales, came to a conclusion which appears to me sound, that

Ingleborough was a great hill-fort of the Britons, defended by a wall constructed like others known in Wales, and furnished with houses like the 'Cyttiau' of Gwynedd. It is but a slight objection to this view that the enclosure contains no spring; the same defect is observed on the Herefordshire Beacon, and in many other cases: there is indeed a very small spring on the west side about fifty feet below the summit, and what seems like a covered way leading down to it.

The area enclosed by the walls of the Camp on Ingleborough is ascertained from Mr. Farrer's Plans to be 15 acres 1 rood 37 perches. The figure is irregular, and parallel in a general sense to the outline of the precipitous gritstone brow of the hill, so that between the wall and this brow there are generally a few yards of clear ground. If we disregard the small irregularities, the figure may be described as quadrilateral; the face presented to the north-north-east is something less than 400 yards long, that opposite to it about 250 yards; the face which looks to the south-east is about 270 yards, and that which fronts the west about 220. There are three openings through the wall; one at the south-west corner seems to be connected with a covered way down the steep brow; another in the middle of the east face admits the path now used, which was probably an ancient track; a third, on the northern face, leads to a tremendous precipice. Each of the two last-named openings is 50 feet wide. The wall is remarkably low for about 30 yards at the north-east corner, and there the hill runs out into a sort of natural bastion.

The wall is constructed after a regular plan, which seems to be substantially that of the large cairns which have been opened on the north-eastern moorlands, as, for example, Obtrush Roque near Kirkby Moorside. There is along the inner side a series of broad, thin gritstones set upright, edge to edge, so as to make a thin vertical face-wall or limit. From these at right angles proceed outward many other such rows of broad stones, also set on edge, forming 'throughs,' at intervals of 6 feet; the intervening spaces being filled in with a dry built wall; the openings in the

wall already described are vertically faced, but the outer front of the wall is not so guarded ; there are no buttresses. The enclosed area is generally and remarkably bare and dry, and shows the millstone grit at the surface frequently. In this space are nineteen horse-shoe-shaped low wall foundations, about 30 feet in diameter, each ring-like foundation having only one opening, which is always on the side looking toward the south-east. They are evidently the foundations of ancient huts (Cyttiau), each probably designed to bear a conical or dome-shaped roof of heath or sod—"congestum cæspite culmen"—with an opening turned away from the north-west, which is the quarter for violent wind and snow-storms. No traces of fire have yet been found in any of these areas. The place for a Beacon on Ingleborough is clearly the site of the present "Man." (See Pl. V.)

**THE CAVERNS.**—As already observed, the thick limestone rock which spreads so widely at the base of Ingleborough is deeply penetrated by caverns, which, whatever their origin, have derived many of their actual features from the passage of running and the percolation of dripping water. In the upper part of Greta Dale, between Whernside and Ingleborough, are several of these 'Holes,' 'Pots' or 'Coves,' as they are often called (probably from the Cymraic *Ogof*), which betray, by actual pools and currents, or by abundance of pebbles heaped on the floor, the powerful agency of water. The drainage of the valley, in fact, passes through these and other undiscovered subterranean passages, and only in great floods are they so gorged as to run over. Gingle Pot, Hurtle Pot, and Weathercote Cave are near together, about four miles from Ingleton ; in the two former are pools of water ; in Gingle Pot, the farthest up the dale, are heaps of pebbles ; and Hurtle Pot nourishes black trout. But Weathercote, by far the most magnificent cavern, has the uncommon ornament of a violent cascade,—a subterranean waterfall of 25 yards in height,—which fills the area with deafening noise, and raises a shower of spray, on which the morning sun pictures a rainbow. Just over the 'force' of the water, a huge rock, sus-

tained between vertical cliffs, has long been the admiration of tourists, and appears in the drawings of many artists\*. The water has no sooner fallen than it is swallowed up among the pebbles which it has heaped over the fissures in the rocks below. After passing underground it reappears at a considerable distance below the Chapel. The mouth of this cave, like that of Hurtle Pot, is adorned with trees, over which Ingleborough makes a grand appearance. Whernside looks well from below the little Chapel in the dale. Douk Hole, nearer to Ingleton, shows a smaller waterfall.

Gatekirk Cave, situated about a mile above Weathercote, is in the same valley. The principal feeder of the Greta runs through both. This cave has two entrances, one towards the north, the other towards the south. The cave is probably 300 feet long, traversed by the stream, and richly ornamented by stalactites hanging from the roof—(Westall).

Gauber Hole, on the north side of Ingleborough, and another cavern opened by Mr. Farrer, may be added to the list, which probably will be augmented hereafter. But it is necessary to hasten to a more careful description of that great and beautiful subterranean grotto in Clapdale, which has been appropriately termed the 'Ingleborough Cave' (see Pl. VII.).

From Mr. Farrer's plan and description, as given in the 'Proceedings of the Geological Society,' June 14, 1848, and from information since obligingly communicated to me, a clear notion of the history of this most instructive spar grotto may be formed. For about eighty yards from the entrance the cave has been known immemorially. At this point Josiah Harrison, a gardener in Mr. Farrer's service, broke through a stalagmitical barrier which the water had formed, and obtained access to a series of expanded cavities and contracted passages, stretching first to the N., then to the N.W., afterwards to the N. and N.E., and finally to the E., till, after two years spent in the interesting

\* See Pl. VI. Westall's views of the Ingleton Caves may be commended.

toil of discovery, at a distance of 702 yards from the mouth, the explorers rested from their labours in a large and lofty irregular grotto, in which they heard the sound of water falling in a still more advanced subterranean recess. It has been ascertained, at no inconsiderable personal risk, that this water falls into a deep pool or linn at a lower level, beyond which further progress appears to be impracticable. In fact, Mr. James Farrer explored this dark lake by swimming,—a candle in his cap, and a rope round his body.

In this long and winding gallery, fashioned by nature in the marble heart of the mountain, floor, roof and sides are everywhere intersected by fissures which were formed in the consolidation of the stone. To these fissures and the water which has passed down them, we owe the formation of the cave and its rich furniture of stalactites. The direction of the most marked fissures is almost invariably N.W. and S.E., and when certain of these (which in my geological works I have called 'master fissures') occur, the roof of the cave is usually more elevated, the sides spread out right and left, and often ribs and pendants of brilliant stalactite, placed at regular distances, convert the rude fissure into a beautiful aisle of primæval architecture. Below most of the smaller fissures hang multitudes of delicate translucent tubules, each giving passage to drops of water. Splitting the rock above, these fissures admit or formerly admitted dropping water: continued through the floor, the larger rifts permit or formerly permitted water to enter or flow out of the cave. By this passage of water, continued for ages on ages, the original fissure was in the first instance enlarged, through the corrosive action of streams of acidulated water; by the withdrawal of the streams to other fissures, a different process was called into operation. The fissure was bathed by drops instead of streams of water, and these drops, exposed to air-currents and evaporation, yielded up the free carbonic acid to the air and the salt of lime to the rock. Every line of drip became the axis of a stalactitical pipe from the roof; every surface bathed by thin films of liquid became a sheet

of sparry deposit. The floor grew up under the droppings into fantastic heaps of stalagmite, which, sometimes reaching the pipes, united roof and floor by pillars of exquisite beauty.

To a marvellous specimen of this kind the 'Pillar Hall' owes its name. When the Cave was opened, its floor was very uneven, and many little pools were found in hollows of the rock or in basins, guarded by walls of stalagmite. These pools remain as they were found. The sides of these basins are usually undulated stalagmite, and there is often a bright plate of this sparry deposit spreading widely from the side over the surface of the water like a sheet of snowy ice or the leaf of a crystal plant, narrowing the area of these fairy lakes. The explanation of this is simple. The water charged with calcareous matter, and trickling down the stalagmitic sides of the Cave, is sufficiently freed from carbonic acid when it reaches the level of the water to deposit the earth, and thus by continual accretion the edge spreads out into a surface, and the sheet of spar appears to float on the water. Below the surface of the water the aggregation goes on in coralloidal or botryoidal masses, which are coherent, but much less solid than the subaërial deposit.

The calcareous sheet which is at the surface of the water appears to lose its original pure white colour when the water ceases to flow over it, and it is observed in many other places that the beauty of the surface is soon injured when it is exposed to constant or long-continued dryness.

The surface of stalagmite is generally undulated or excavated in little nests, of which the floor is formed by little bushes of calcareous spar, and the edges are crusted with that substance. This partly arises from the dropping, but is more dependent on the rippling of the thin films of water which readily yield up their earth to prominent points and ridges, and smooth the larger but sharpen the smaller inequalities of surface. In the small hollows the crystallization is less rapid and more individualized. The stalactites and pillars show usually a spirality of structure; this is probably the effect of the air-currents.

In the course of the Cave are only two places where the roof descends so low as to compel the visitor to unusual stooping. In the first of these passages it was found necessary to blast the solid rock in order to let off the water from the gallery beyond this low part of the Cave, and persons of moderate stature can easily pass through by stooping. In one part where the line of the Cave crosses the direction of the fissures, the passage is like a tunnel; it is in fact *bored out* by the water, which here escapes from one great fissure to another. Following, probably, some transverse rent, and aided by sand, of which abundance appears on the floor, the water escaping from great pressure has worked for itself an evenly arched passage, free from stalagmite, except where great fissures cross it. Sand is not the only grinding material. Pebbles derived from the hills above lie plentifully in certain parts of the Cave, and particular chambers were once filled with them to certain levels, where some of them still remain attached to the sides by stalagmitic incrustations formed at the then level of the water.

What is the source of the water which flows through the Cave? whence come those heaps of sand and pebbles? what other opening can be traced to the surface? To answer these questions we must return to the upper air and ascend the slope of Ingleborough. Above the Cave in all its length is a thick scar of limestone, which by absorbing the rains may contribute to swell the little underground river. On much higher ground we see many small rills collected into a considerable beck—not devoid of finny life (trout). The beck, extremely variable with season and weather, is swallowed up by a large and deep cavity or Pothole in the great Scar limestone, called Gaping Gill (ghyll). This hole is an enlargement of the natural fissures of the limestone, which, here and in the Cave, range nearly N.W. The stream in times of flood transports plenty of sand and sandstone pebbles from the upper slopes of the hill, and pours them into this gulf of about 150 feet in depth. There is no other known opening to the Cave from the upper ground, nor any other great

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efflux of water which can be supposed to be fed from Gaping Gill than that which is seen near the Cave mouth. In floods, this opening, a broad depressed cavern, called in the country 'Little Beck head,' is not sufficiently large for the body of water, which rushes from the hills above through the fissures and hollow interior windings in the rock; and it then forces itself a passage through the larger (supposed to be the original) mouth.—(*Geol. Proceedings*, 1848.)

Probably not one but many threads of water unite Gaping Gill and Little Beck head; probably the lines of subterranean current vary from time to time; stalagmites choke the old channels, while others are formed in new directions. When Mr. Birkbeck descended the fearful gulf of Gaping Gill, he found at about 80 feet a rush of water from the side—a subterranean stream emptying itself into this great opening.

Through what periods of time, since first the rill issued in some part of Clapdale, the excavation of limestone and formation of stalactite have been continued, we cannot say. The time consumed in the formation of even one stalagmitical boss is not easily determined. One of these in Ingleborough Cave, of a remarkable form, called the Jockey Cap, is fed by one line of drops. It measures about 10 feet in circumference at the base. The height is about 2 feet. It appears to contain about 8 cubic feet, or 9,450,000 grains, of carbonate of lime. The drops were collected by Mr. Farrer on the 9th of October 1851, after a rather wet period, and it required  $14\frac{1}{2}$  minutes to fill 1 pint, say 100 pints in a day. In this pint was found only 1 grain of calcareous earth, or 100 grains a day. If the water were supposed to yield up all its contained salt of lime, the number of pints of water consumed in producing this boss of stalagmite = 9,450,000; and the years which elapsed in its formation =  $\frac{9\cdot450000}{100 \times 365} = 259$ . In drier seasons the water is probably richer in carbonate of lime.

I am indebted to Mr. Farrer for the following notes, made in 1839 and 1845 :—

“The Jockey Cap is 9 feet 10 inches in circumference at the base; the height is 1 foot 9 inches. Measuring from the lowest side, it is 2 feet 8 inches in height. Water continues dropping upon it from the roof; in the centre is a hole into which the water continually falls, and overflowing its sides is unceasingly at work in increasing the stalagmitic accumulation.—30 Oct. 1845. We measured again the Jockey Cap, and found it at the base 10 feet, showing an increase of 2 inches (if our measurements are correct, but it is not easy to be accurate).

“The height from the lowest side is 2 feet 11 inches, being a growth of 3 inches. We also measured from the junction of the stalactite at the roof from which the water drops into the top of the Jockey Cap to the rim of the cup or hole into which it falls, 7 feet  $1\frac{1}{4}$  inch, and the stalactite, from the roof to its lowest point, 10 inches.”

On these data we find that in six years the stalagmitic crust has been increased in height about 3 inches, or about  $\frac{1}{10}$ th of the whole; and in diameter 2 inches, or about  $\frac{1}{20}$ th of the whole. These experiments will probably be continued. (See Appendix.)

But the formation of such stalagmite is only the last part of the process; the excavation of the cave is an earlier work; and earlier than the excavation of the cave is the shaping of the limestone valley into which it discharges the water, which had fallen in the state of rain and snow on the sides of Ingleborough.

Ingleborough has attractions for the geologist of no ordinary kind. To reach the summit from Ingleton Beck we pass over four groups of rocks, each full of interest; and these rocks are cut off toward the south by one of the most magnificent dislocations in England, the Craven Fault. For the effect of this fault is to throw down to the south, as much as three thousand feet, the strata of Ingleborough, so as to bury its highest rock below the thick group of coal-measures which are worked below Ingleton. The lowest of the four groups of rocks is the slate rock worked in large quarries in the valley above Ingleton; the vertical cleavage planes of this slate appear in singular contrast

with the level limestone beds which cover them on the north, and the highly inclined portions of the same calcareous rock on the south. The lowest of these limestone beds contain pebbles of that older slate rock, which is thus proved to have been consolidated before the formation of the limestone. At some very early period it had been thrown into great disorder; then worn down by watery agitation to a nearly level surface, and in this state sealed down as it were by the level beds of limestone. These limestone beds contain a good series of fossils in some places; and amount to 500 or 600 feet in thickness. Over them rises the great mound of Ingleborough, composed of the shales and limestones with some beds of sandstone, the whole capped by thick beds of millstone grit.

Saxifrages abound in this limestone district.

PENYGHENT, no unworthy rival of Whernside and Ingleborough, sits like these great mountains on a broad floor of Scar limestone, which lies level over dislocated slate rocks. Its form, as seen from the Vale of the Ribble below Settle, is more suited to the painter than the outline of either of its loftier neighbours. Perhaps it is nowhere better seen than from some elevated points which may be chosen on the limestone surfaces connected with the Scars of Giggleswick and Feizer. The outline (Pl. IV. f. 2.) will illustrate this. The upper craggy edge seen to encircle the top is formed of millstone grit; and the main limestone makes a remarkable cliff at a lower level. Low down on that side of Penyghent which slopes toward the Ribble are several caves, picturesque glens, and hollows in the Scar limestone. On the eastern side, by the track leading to Litton, are the Giant's Stones, supposed to be Danish remains.

To climb Penyghent from Horton is a very easy undertaking; the ascent, something less than 1500 feet from Horton Bridge, is laborious only in the upper part of the mountain. The view from Penyghent is extensive, but not so interesting as that from Ingleborough.

FOUNTAIN'S FELL, 2190 feet N.; Coska, 2050 feet N.; and

Birks, 1949 feet N. ; far less interesting points of similar strata, rest on the same broad limestone floor as Penyghent. The view from Fountain's Fell stretches very far to the south and south-east. The mountain was part of the wide possession of Fountain's Abbey.

**RYELOAF.**—Eastward of Settle, and on the south side of the Craven Fault, is the round-topped mountain bearing the above name. It is formed of the millstone grit, resting on thick shales—and this series is brought by the Craven Fault into direct opposition and contact with the Scar limestone of Kirkby Moor—Ryeloaf having an elevation of 1796 feet, and the limestone on the north of it, 1800 feet. Between them on the line of the Fault are the old mines of zinc ore. Ryeloaf is conspicuous towards the south, and commands a wide prospect in that direction towards Pendle Hill. It is so easy of ascent, that the slight toil of a walk from Settle or Malham may be regarded as fully repaid by the extensive views. The summit has some appearance of having been occupied as a military post in early times. From the continuation of this hill to the south, where it is crossed by the road to Kirkby Malham, is a fine and picturesque view of Settle and the rugged region around it.

**BROWN HILL**, east of Malham Dale, is like Ryeloaf, on the south side of the Craven Fault, and of similar composition, and is in like manner opposed to limestone of somewhat greater elevation on the north. Its height, by Nixon, is 1360 feet.

**BARDEN FELL WEST**, 1663 feet N., and **Simon Seat**, 1593 feet N., both near Bolton Abbey, are the highest points of the millstone grit, in the broad ranges of that rock east of Ryeloaf, and south of Greenhow Hill. They are supported by a great number of other more or less conspicuous hills, such as **Burnsal Fell**, 1505 feet N. ; **Carncliffe**, or **Barden Fell East**, 1471 feet N. ; **Gaisegill**, 1332 feet N. ; **Roggan Hall**, 1318 feet N. ; **Beamsley Rock**, 1314 feet N. ; **Embsay Crag**, 1221 feet N. ; **Rylstone Fell**, and **Flasby Fell**, 1151 feet N.

**GREENHOW HILL**, 1441 feet N., a limestone ridge traversed

by lead veins, which were worked by the Romans,—Nursa Knot, of similar structure, 1274 feet N., and High Crag, 1325 feet, a millstone grit summit, make another little group of hills, worthy of notice, from which the descent is easy to Little Almes Cliff, 837 feet N., and Great Almes Cliff, 716 feet N.; each of which, like Brimham Crag, is capped by huge rocks of millstone grit.

**BOLLAND.**—A small district of moorlands remains to be noticed, which lies on the west side of Ribblesdale, and includes the limestone tract of the Vale of Hodder. The highest points are on the drainage summits of Bolland Forest which form the County boundary. Wolf Crag, Cross of Greet, Bolland Knots and Burnmoor are conspicuous, but uninteresting. On the northward slope of Bolland Knots, looking toward Ingleborough, many fragments of trees appear rooted below, or lying prostrate in the peat, especially in situations where water might stagnate, at elevations and in aspects where now the utmost art and care fail to raise oaks or pines, or indeed any tall trees. This is one of many examples spread over the British Isles and Northern Europe, for which no satisfactory explanation can be given by climatal variation of merely local character. Similar phænomena have been noticed on the east slope of Ingleborough at more than 1300 feet above the sea.

**SOUTH-WESTERN DISTRICT.**—Passing out of the north-western district we meet no more with elevations exceeding 2000 feet: we lose for the most part the name of Fell; the high lands are seldom formed into distinct and single mountains; waterfalls are rare, caves are unknown; but the dales retain many features of grandeur, and the rivers are always beautiful. Of the higher grounds we shall only name in each district a few of the more remarkable points.

Rombald's Moor between Wharfdale and Airedale, a long range of moorlands formed on millstone grit, which in some places exhibits the fantastic forms which suited the Druids, and sometimes are ascribed to their agency. The highest point

south of Ilkley is 1322 feet (N.) above the sea. Cowper Cross according to Nixon is 1250 feet, and Bradhope near Ilkley 1248 feet; Baildon Hill near Bingley 922 feet; Otley Chevin 921 feet; the Cow and Calf Rocks above Benrhydding 860 feet (see Pl. XVI.); Shibden Top near Ilkley 831 feet, and Rawden Billing 773 feet.

**BOULSWORTH HILL.**—On the summit of drainage between two rivers which bear the same name, the Calder of Yorkshire and the Calder of Lancashire, is a mass of millstone grit (1689 feet O. S., 1697 feet N.). Several points of nearly equal elevation conduct us along the heaven-water boundary to Blackstone Edge, over whose dreary rocks and heaths the old road climbed from Halifax to Manchester, to descend abruptly on the west; and Stanedge, under which the Huddersfield Canal was carried by a tunnel exceeding three miles in length,—the route now taken by the railway. A rough seat on the coach up the slow and difficult road over Stanedge, with its romantic and interesting view, was more pleasing than the softest cushion on the rail. Continuing on this summit to the south we reach the heavy wastes of Holme Moss, perhaps the most elevated point in the south-western district (1859 feet O. S.), and afterwards the more marked though less elevated forms of Bullstones, Haystones and Derwent Edge, which overhang with wild rock edges the eastern branch of the beautiful river of Derbyshire.

**NORTH-EASTERN DISTRICT.**—The oolitic formation which constitutes the elevated part of the north-east of Yorkshire, is cut across from west to east by the dale of the Esk, and by a hollow extending from Coxwold and Byland, by Gilling, to Stonegrave, along which the Thirsk and Malton Railway finds an easy passage.

The hills and cliffs north of the Esk consist of lias (including the Ironstone series), capped by sandstones, representative of the Lower Oolites. The whole country slopes to the eastward, but with much irregularity, from the detached peak of Rosebury Topping (1022 feet O. S.), and the continuous ranges of Guis-

borough Moors. The highest cliff formed against the sea is at Boulby Alum Works (680 feet). Danby Beacon, a little north of the Esk (966 feet O. S.), is one of the more conspicuous points; and Eston Nab or Barnaby Moor, a detached hill near Guisborough, though only 784 feet high, is well worthy of climbing for its very fine prospect, ancient camp, and modern quarries and ironstone pits.

South of the Esk the land is much higher, and is formed upon an axis which passes nearly east and west from the Old Peak and Stow Brow, south of Robinhood's Bay, through Lilhoe Cross, Loose Hoe, Ralph Cross, and Burton Head to Wainstones and Cranimoor. The heights augment to the westward as far as Burton Head, Old Peak Cliff being 605 feet, Stow Brow 800 feet, Lilhoe Cross 1000 feet, Loose Hoe 1404 feet, Farndale Head 1412 feet, and Burton Head 1485 feet. From this point they decline westward to Wainstones 1300 feet, Cranimoor 1423 feet, and Cold Moor 1314 feet.

From this high axis many short glens lead down to the north and join the Esk, and others, somewhat longer, direct their course southward to the great basin of the Derwent, in the Vale of Pickering. Thus the wide moorlands are split into many romantic dales, often edged with rocky borders, and somewhat enriched with wood along the course of the 'beck.' Along the ridges between the dales the heights successively diminish, and all which pass southward are crossed by the upper oolitic rock, which presents a terrace-like range of hills escarped to the north, showing cliffs along every stream, and rising westward from Scarborough Castle, 300 feet, to Hambleton End, 1300 feet. The hill-ends of this range receive the name of 'Nabs.' From Hambleton End southward the heights diminish by Black Hambleton 1246 feet, Limekiln House 1148 feet, Boltby Scar 1100 feet, Whitstone Cliff 1078 feet, Oldstead Bank 954 feet, Wass Bank 900 feet, to Ampleforth Moor 800 feet.

The small tract of oolitic hills south of the line of the valley of Gilling has received in modern times the name of 'Howard-

ian' Hills. Its main course is to the east-south-east, literally running into the chalk wolds. The highest point which I have measured is the summit of the road between Brandsby and Gilling, 520 feet. In the vicinity of Gilling and Kirkham these low hills are pleasing features in the landscape.

THE WOLDS constitute properly but one region, sloping from a curved summit, whose extremities touch the sea at Flamborough Head, and the Humber at Ferriby; but this crescent of hills is cut through by one continuous hollow,—the great Wold Valley from Settrington to Bridlington. Along this valley burst the most remarkable of those intermitting springs to which the name of 'Gypseys' is applied. By gradual upswelling from the white cliffs of Flamborough, 159 feet, and Speeton, 450 feet, the wolds arise to 805 feet in Wilton Beacon,—a mark on the old British and Roman road from Eburacum to the sea-coast; and from this point they decline gently to Hunsley Beacon, 531 feet, and beyond that drop to the Humber.

Everywhere these hills present a smooth bold front to the north and west; and from a point like Leavening Brow, which commands views in both directions, the prospect is singular and delightful. An immense vale sweeping round, with the great tower of York Minster for its centre; in the south the gleaming water of the Humber; on the west the far-off mountains; to the north purple moorlands; while immediately surrounding us are the green wold hills, crowned with the tumuli and camps of semi-barbarous people, who chased the deer and wild boar through Galtres Forest, watered their flocks at Acklam springs, chipped the flint or carved the bone, or moulded the rude pottery in their smoky huts, and listened to warriors and priests at the mound of Aldrow and the temple of Goodmanham.



## CHAPTER III.

## RIVERS OF YORKSHIRE.

“ I know no better way of describing this County than by following the course of the Dan, Calder, Aire, Wharfe, Nid and Ouse, which rise among the mountains, are rivers of eminence, and run by considerable places.”—*Camden.*

THE area of Yorkshire is reckoned by Mr. Rickman, in the Population Returns for 1831, at 5836 square miles. Of this the larger portion, viz. about eighty parts in one hundred, delivers its springs and surface water by innumerable feeders to the Humber and German Ocean; somewhat less than thirteen parts in the hundred enter the same sea, but not through the Humber; and rather more than seven parts in the hundred flow to the Irish Channel. The particulars are contained in the sub-joined statement, which I have constructed with some care from the County Maps.

Drainage of the Humber, estimated in square miles, each including 640 acres:—Swale, 543; Ure, above York, 725; additions to Ure, below York, but above Derwent, 175; Wharfe, 359; Derwent, 871; Aire and Calder together, 683; Dun, with feeders on the south and west, 691; additions to Ouse and Humber, below Derwent, 170; Hull, 286; Streams falling into Humber below Hull, 170. Total, 4673 square miles.

Drainage to the East Sea, but not through the Humber:—Tees, 347; Streams on east coast from Tees mouth to Filey, 131; Esk, 162; Streams on Holderness Coast, 100. Total 740 square miles.

Drainage to the Irish Channel:—Lune, 169; Ribble, 221; Saddleworth, 33. Total, 423 square miles.

In this enumeration the river which drains the largest surface is the Derwent, but the quantity of water which it discharges in ordinary states of the weather is comparatively small, because

the average fall of rain in the country which it traverses does not, I believe, exceed 24 inches in a year. A far greater body of water comes down the Tees, Swale, Ure, Wharfe, Aire, Calder or Dun, though they drain smaller areas, because the annual fall of rain in the districts through which they flow is double that which feeds the Derwent. The average annual fall on the whole area of Yorkshire may be estimated at about 30 inches; on the east coast under 20, and on the extreme west under 50.

The great body of water which flows through Humber to the sea, has risen in vapour from the ocean and the land, ascended to high regions of the atmosphere, collected into clouds, and descended in snow-flakes, hail-stones, or rain-drops. There is perhaps no more instructive history than that of a drop of rain. The elements of its composition are diffused through the atmosphere, but so sparingly that they constitute less than one hundredth part of its bulk. Rain falls in Yorkshire to the average depth of about 30 inches in a year; and in some parts of Cumberland the annual fall of rain has been measured by Mr. Miller to four times this amount; yet at any one moment, upon the average, the atmosphere probably contains of vapour only so much as would yield over all the globe a depth of three inches of water. And this quantity may be always nearly the same, though almost every particle of it may be, or rather must be, many times raised in evaporation, and thrown down in snow or rain in the course of a single year. The drop, gathered by accretion of minute particles, may be snow, ice, or water, according to the circumstances of the place and time; it may be collected from elements which have floated from another quarter of the globe, or have been exhaled from the surface immediately below. On the ground, the drop is divided between two rivals—the earth and the air. The portion which enters the earth is again demanded by two claimants;—vegetation, acting by the roots of plants, carries upward much moisture to the air, and the porous subsoil and rock conduct the residue to the hidden reservoirs of springs. After seasons when rains are scanty, this residue is

very small. In some cases none whatever has been found to elude the spongioles of plants, and to pass to even a depth of three feet below the surface. Artificial wells of small depth are then dried; shallow springs fail, and we learn the value of those perpetual fountains which gush out from below the dry wolds and limestone hills, bearing life and beauty on their course,—objects on which rustic love and admiration may tastefully bestow the emblematic flowers and grateful songs\*, which constituted a pleasing form of popular worship in the earlier ages of the world.

The function of water while passing underground is essentially to waste the solid substances among which it is filtered in capillary streams—to dissolve lime, silica, and other elements—to excavate caverns—to make subterranean river-channels, and thus to bring to the surface a large amount of mineral matter. Much of this matter is deposited near the spring-head in tufa, and a new life is imparted to the current. It acquires mechanical force, transports clay, sand and pebbles, and wears away even the marble which is so abundant in our north-western dales. But again there is a change, the inclination of the surface diminishes, the river approaches the sea, and deposits in the low ground near its mouth, the spoils it had won in conflict with the mountains which gave it birth.

There are no experiments on record made in this district from which we can infer how much of the rain is carried up again invisibly by ordinary evaporation, how much transpires through the leaves of plants, how much descends into the earth to be poured out again in springs and drains. Nor am I aware of any published experiments to show how much water is discharged in a year by the rivers, or indeed by any one river. As some approximation to these results, I have gauged, with the assistance

\* The beautiful ceremony of the 'Well-flowering' of Tissington, near Ashbourn, Derbyshire, which takes place annually on Ascension Day (Holy Thursday), is here alluded to; a ceremony, in which, to some extent, the Psalms of the Church of England are employed.

of Mr. William Hill, the river which washes the walls of York, and obtained for a period of seven months, commencing 1st November 1851, the quantity of water in cubic feet per day. I conclude from these observations, that the river, when it is entirely free from freshes, and supplied only by springs and drains, delivers about 15,000 cubic feet per minute. The drainage of the York River amounts to about 1268 square miles, and therefore the annual supply of spring water to the river is equal to a depth of 2.66 inches on the whole surface, besides the amount evaporated from the streams.

At Naburn, four miles below York, the river discharges itself over a dam, where its depth can be easily measured. After long drought, when the stream may be regarded as supplied only from springs and drains, the depth on the dam is only a few inches. What additions are made to this constant supply by irregular freshes and inundations, I cannot at present state.

#### THE TEES.

TEES, a river to which Yorkshire and Durham have equal claims, rises among the loftiest and most lonely mountains on the Penine Chain; for its main stream comes down from the east side of Cross Fell (2901 feet), and several branches gather their supplies from scarcely inferior levels in the wilderness of Milburn Forest, and on the slopes of Scordale Head and Mickle Fell. Some of their remotest sources reach beyond the boundaries of Yorkshire and Durham into Westmoreland and Cumberland, and other branches come in from the north which rise in Harthope, Swinhope, and Westenhope Commons. These streams are more commonly called Burns, as in Northumberland, than Gills or Becks, as in Yorkshire and Cumberland. The termination 'hope,' affixed to some villages and many small hamlets in Weardale, is rarely used in Yorkshire.

Descending from Crossfell, and gathering small feeders on its way, the Tees expands into a long irregular surface, called the 'Weel,' a Teutonic name, and at length throws itself over a great cliff (200 feet high) of greenstone (this rock is locally called

Whin), and becomes the boundary between Yorkshire and Durham. This great waterfall is 'Caldron Snout,' a wild and dreary cataract, seldom visited, though accessible from the High Force Inn. Good pedestrians may from this point explore High Cup Nick, and the other deep cuts in the summit of drainage, from which the views toward the Lake mountains over the deep Vale of Eden are magnificent.

Maize Beck, which for a short space separates Yorkshire and Westmoreland, is the most interesting branch of the Tees for a geologist to follow. For about two miles above Caldron Snout, Maize Beck runs on the greenstone; then limestone rock (called Tyne bottom limestone) appears over the greenstone and continues without interruption to the western front of Dufton Fell (in Westmoreland), where the greenstone appears again below this limestone, but reduced in thickness to 24 feet.

Proceeding down the Tees from Caldron Snout, we find the greenstone continue in bold cliffs with limestone over it; the limestone being in some places bleached, and recrystallized where in contact with the trap, so as to resemble coarse statuary marble. Cronkley Scar gives examples of this. The Tees spreads widely in a shallow channel full of stones\*, till we approach the High Force, a waterfall of 69 feet, over greenstone resting on shale and limestone, the shale prismaticized by the heat of the trap, but the limestone not bleached as that above the trap is. The High Force shows usually one great stream of water, but in times of great flood a second channel through the rocks is filled with another current. This is a very grand scene. The dark tints of the rocks, the agitation of the water, the contraction of the channel, and the ornament of wood, make a very effective combination. A much improved Inn near the Fall will be found very convenient for exploring Upper Teesdale, and ascending Mickle Fell.

\* It is common to ride through the Tees here. Late one evening, after a long day's walk, I attempted twice, and each time in vain, to save a few miles of walking in the dark, by wading through the stream when it was in flood,—a foolish experiment.

Below High Force, the river runs with a swift current on a rocky bed, and where it is crossed by Winch or Miner's Bridge, makes a pleasing scene. High cliffs of greenstone run parallel to the river several miles on the south-west side from the High Force to Lorton, and then return for a mile parallel to the Lune. Romalldkirk is the mother parish of Teesdale, and extends over all the extreme north-west region of Yorkshire, and down the Tees to Startforth near Barnard Castle. Thus all Upper Teesdale (on the Yorkshire side) and all Lunedale, with the several smaller dales on Balder Beck, Grize Beck, and Deepdale, are in this enormous parish. Beyond the usual amount of interest which belongs to moorland waters with rocky channels and a few craggy summits (as Goldsborough, Cragg, the Clent, &c.), none of these dales have attractions for the artist. The lower end of Baldersdale is finely wooded, and indeed all the lower part of Teesdale by Cotherstone, Lartington and Egglestone, is a rich and pleasing country. The reader will remark the name of Baldersdale; Woden Beck will also be pointed out to him near it, as another indication of the Scandinavian element in our northern population. The ruins of Egglestone Abbey (founded 1189) are a good subject for the artist. On the Durham side of Tees, Middleton is worthy of a visit by the admirers of lead mines and smelting houses; and 'Barnard's Towers,' the Castle of Baliol, will not be neglected by the artist or antiquary who has any reverence for the genius of Scott. (See Pl. IX.)

We have now reached a branch of the Tees which deserves special notice, not only because the muse of Scott and the pencil of Turner have been employed on its banks, but because of its marking out the line of the Roman Iter from Cataractonium to Luguwallium. The Greta rises by a few branches on the surface of Stainmoor Forest and the northern slopes of Watercrag. Its name goes with the stream which springs near the old British Camp, or Rey Cross, and passes through the natural limestone, at God's Bridge. Below this a farther supply joins the beck and turns it to a small river, which flows by Bowes, remarkable



A mile-stone found by the side of the Roman road is inscribed :—To the Emperors our Lords Gallus and Volusianus (his son) ; probably A.D. 253 (Gough's Camden).

IMPP. DD.  
 NN. GALLO  
 ET VOLV  
 SIANO  
 AVGG.

DEO  
 MART

occurs on several altars.

On an altar preserved at Rokeby is the funereal inscription—

D M  
 SALVIA DOM  
 IA VIXSIT · A MVIII.

(Perhaps the AM should be read ANN.)

This selection will show how much additional charm is thrown over the Vale of Greta by the reliques of its early conquerors, which however were not always so carefully preserved as they have been of late years, by the good taste of the family of Rokeby.

Only the lower part of the Greta is specially picturesque ; but the Cliff of Scargill, and the woody and rocky banks of Brignall and Rokeby are deservedly famous.

The line of country drained by the Greta deserves the attention of the geologist for another reason—this being the great line of transport of the 'erratic blocks' from the Cumberland Alps toward the eastern parts of the island, one of the strangest phenomena of physical geography. Some of these blocks may in fact be traced from their parent mountains of Shap and Carrock, across Edendale to Brough, and up the slope toward the summit of Stainmoor. On the eastern side of the summit they follow radiating lines toward Romaldkirk, Cotherstone, Barnard

E



Castle, and Brignall, and are scattered over many parts of the vales of Cleveland and York, the sides of Eskdale, the cliffs of Scarborough, Flamborough, and Holderness.

Proceeding in a course continually growing more rocky, woody, and romantic, the river passes Rutherford Bridge, Scargill, Brignall, and Greta Bridge to Rokeby Park and Mortham Tower, below which it joins the Tees.

At Greta Bridge, on a tongue of land between the Greta and Tutta Beck, is a small but well-known Roman camp—not named in the Itinerary of Antoninus, though it is on the line of the great north-western military road. Maclauchlan has lately surveyed it—(see Plans of Camps).

Below the junction of the Greta the Tees changes its course, as if it had *adopted* the channel of the smaller stream, and runs N.E. by the old camp at Howbury to beyond Winston Bridge, where the water from Staindrop comes in. Had it continued in what seems to be the natural and easy course to the S.E., it would have passed by the line of the Gilling Valley, and have entered the Swale near Brompton. Near Winston it turns again to the S.E., as if under the influence of the Staindrop stream, and so passes Pierse Bridge, where the Roman road crossed it (from Cataractonium to Vinovia and Bremenium) and a square camp remains. An altar inscribed to Condatus, and other circumstances, indicate this to have been a station of importance, but its name is not certainly known. Below this point the Tees acquires the great sinuosities usual in rivers where they enter low ground and meet the tide, and with this character it passes by the sulphuretted mineral spring of Croft,—the equally sulphuretted water discovered by deep boring at Middleton, and the towns of Yarm and Stockton, and expands into the German Ocean at the rising port of Middlesborough. The Leven, a stream of some importance, enters the Tees at Yarm. It flows from the highest region of the north-eastern moorlands, and has many branches.

On Barnaby Moor, or Eston Nab, a few miles east of Stockton, is a semicircular Roman or British camp, less frequently examined

than the newly established ironstone mines which are rapidly entering the heart of the hill.

- At Stanwick, a few miles from Croft Bridge, the ancient mounds which extend from the Swale to the Tees may be seen to great advantage—(see a subsequent part of the work).

Stations for exploring Teesdale:—High Force Inn; Middleton; Barnard Castle; Greta Bridge; Piense Bridge; Croft Bridge; Middleton One Row.

#### THE SWALE\*.

SWALEDALE originates in many branching hollows (called gills), which undulate the eastward slope of the high crescent of moorland sweeping from Water Crag by Nine Standards, Fell End, High Seat, Lady's Pillar, and Shunnor Fell. The rivulets which run in these branches have very elevated summits, and no deep glens connect them with branches of the nearest rivers. Swaledale, thus shut in, and surrounded by a high and dreary expanse of moorlands, is less picturesque in all its upper part than Teesdale and Wensleydale, and is accordingly little visited and little known. I have found, nevertheless, great pleasure in crossing its wide and houseless heaths, and following its solitary waters, deeply tinged with extract of peat. The fine mountain walk from Muker to Kirkby Stephen, which follows the main stream of the Swale by Hollow Mill Cross (1700 feet above the sea), is rarely trodden by tourists.

Muker, though a very small place, and included in the large parish of Grinton, calls itself somewhat boldly a market-town. Though uninteresting in itself, and without a proper inn, I found it a convenient station for geological exploration. Keasdon, a magnificent mound of limestone with capping of gritstone, is in sight, and near it the Swale makes two cascades, the value of which depends on the weather. The valley of the Swale seems

\* The Norse word Svalga = æstuary, to flow tumultuously, would better fit this impetuous river than Swala = gentle (Teut.).

to divide into two glens, so as to embrace and insulate the Mount of Keasdon. The pass from Muker to Hawes, called 'Butter-tubs,' requires good sinews, but affords a noble prospect of the mountains associated with Whernside, Ingleborough, Dod Fell, and Great Whernside—(see Pl. IV.).

Shunnor Fell, the fourth in height of the Yorkshire mountains, is within a short walk (four miles) to the west of Muker; but the moors are wet, and the surface uninteresting. Rogan Seat and Water Crag lie to the north, but are not more inviting. Lovely Seat, of somewhat superior height, is easily reached from the mountain road to Hawes, and is far better worth a visit. The lead-mines which are on the line of the Auld Gang Vein, north of Muker, are very ancient and extensive.

From Muker to Reeth\* are bold river and valley scenes: the hills called Healaugh Crag (millstone grit) and Calver (limestone) being conspicuous objects on the north; while Fremington Edge on the east (also limestone), and Whitea Fell and Robin Cross Hill on the south, contract the prospects. The view up Arkendale from near the old bridge at Reeth, is sometimes rendered more stern and wild by the terrific floods on the Arkle Beck. Baxton Knab is conspicuous south of Reeth; and on the opposite side of the Swale is a small fort, called Maiden Castle. This must not be confounded with the small square camp between Rey Cross and Brough, which bears the same name.

At Fremington, near Reeth, many ornaments of brass inlaid with silver (the work of ingenious Gaul), apparently trappings of a horse, and belonging to Roman times, have been dug up: they are now in the Yorkshire Museum. No Roman station is positively recognized in Swaledale; but if we consider the antiquity of the 'Auld Gang' lead-mines—old in the days of the Saxons,—and give due weight to this discovery at Fremington, we can hardly doubt that Roman troops have gone by a regular (possibly British) way along or across the dale. The lead-mines of Auld Gang and Arkendale may be visited from Reeth.

\* Rhydd, in Celtic, is 'a ford.' It may also be rendered 'road.'

Grinton, on the south side of the Swale, near Reeth, is the old or mother parish of this dale. All the upper part of Swaledale, even to the mountain border against Westmoreland, is included in it. The church is ancient. Fairs were once held here; but Reeth has now acquired the superiority, being in fact the mining capital of the dale, and is even counted among busy market towns. Here is the best inn of Upper Swaledale, the White Hart; and from this point, Arkendale, Swaledale, and parts of Wensleydale, afford much of interest to the botanist, geologist, and mineralogist, and something for the archæologist.

Below Grinton, the parishes become smaller and more frequent; the population augments; the country loses its character of wildness, and the dale deserves to be called beautiful. Marrick Abbey, as it is called, was a house of Benedictine nuns, of the 12th century. The parish church is formed of the nave and the chancel of this old religious house.

Winding by Ellerton (not the birth-place of 'Old' Jenkins\*), Downholme, Marske and Hudswell, the Swale, now a large stream, flows among rocks and woods to Richmond, where the fine reliques of a Norman castle crown a noble cliff of limestone, and combine with bridge, water and wood into many charming pictures (see Whitaker's Richmondshire).

The Norman Richmond has succeeded to the Roman Cataractonium, and stands in a part of Yorkshire full of the traces of earlier British people. Richmondshire, that great district which was taken from the Saxon Earl Edwin and given to the nephew of the Conqueror, spreads on all hands round the ancient centre of population at Catterick, and includes all the mountains and dales to the north, west and south. It may have been a native principality before the days of Ostorius and Cartismandua. The numerous, devious and extensive earth-mounds between the Swale

\* See his pillar and inscription in the church at Bolton-upon-Swale. It was at Ellerton near Catterick that he was born.

and the Tees, lately described by Mr. Maclauchlan, are in the lower and fertile parts of Richmondshire.

The keep of Richmond Castle, though not the oldest part of this great fortress, is by far the most interesting. Earl Alan received his great estates immediately after the expulsion of Edwin, and built the oldest part of the castle. The keep was erected in 1146, by Earl Conan. It rises 99 feet above the rock, and that stands 100 feet above the river. Of other mediæval structures in Richmond, little of importance remains, except an elegant little tower of the Grey Friars' Monastery (13th century), and the chapel of the Holy Trinity.

At Easby, only a mile from Richmond, lower down the river, is the extensive and very interesting ruin of St. Agatha (12th century), richly varied with ivy.

Swaledale ceases below Richmond, and falls into the great Vale of York and Mowbray at Brough and Catterick. Here, at Thornborough, on the south side of Swale, is the place of the Roman station of Cataractonium. Thorn (Thurn, Thurm, Turris, a tower or fortified place) is a common adjunct to old military posts over all the Saxon parts of the island. To this place the old Roman road led straight from Isurium (Aldborough); it is now called Leeming Lane, a name supposed to be of Celtic origin, and to mean 'stony.' North of Cataractonium the road divided into two branches, one proceeding north-westward by Stainmoor to Carlisle, the other northward by Pierse Bridge to Binchester and Rocester.

The station at Cataractonium was a walled camp—like that at York, with sides of 240 and 175 yards, including an area of about nine acres. By its position in connexion with the earth mounds, and marks of old residence which are so great a feature in the neighbouring country, it was evidently a post of importance. Its name indeed declares this, and at the same time shows that, as in so many other cases, the Roman camp was posted near an earlier British stronghold; for Cathair-righ, in

Gaelic, signifies 'fortified city'—perhaps 'royal.' Sir W. Lawson has lately laid open a part of the eastern wall.

On the handle of an urn, taken with four others from a vault, was this inscription :—

I I AVR HERACLE  
PAT ET FIL F BAR.

The following much more remarkable record, which was found in 1620, narrates the restoration of an altar to the tutelary deity of roads and paths, A.D. 191 (Gough's Camden) :—

DEO QVI VIAS  
ET SEMITAS COM  
MENTVS EST . T . IR  
DAS . S C . F . V . L L M  
Q . VARIVS VITA  
LIS ET E COS ARAM  
SACRAM RESTI  
TVIT  
APRONIANO ET BRA  
DVA COS

Whitaker mentions an inscription containing the words 'Dea Syria' (ii. p. 24).

Sir W. Lawson possesses two lions sculptured in stone, and a remarkable bronze vessel, which when found was covered with flat stones and full of Roman coins. It was capable of holding twenty-four gallons, and was in a former century "fixed in a furnace to brew in" (Magna Britannia, vol. vi.). Bases of old pillars, a floor of brick, a pipe of lead, &c., are among the other interesting reliquiæ dug up at Thornborough. This district will again attract our attention in a later chapter.

The course of the Swale is now south-eastward, in a low but not flat country, to near Leeming, where it receives the Grimscar Beck, from Bedale and Bellerby between Swaledale and Yoredale; then south-eastward to Breckenbrough, where the Wisk enters. This river rises near Ingleby Arncliffe, and Mount

Grace Priory, on the edge of the Cleveland Hills, flows by a singular course north-westward nearly to the Tees, and then returns south by North Allerton to join the Swale. It retains the Gaelic name for 'water' (uisg). North Allerton has been thought to be a Roman station. The names near it—Romanby, Thornborough, and Thornton—seem to indicate a 'street' between Thirsk and North Allerton.

Still flowing south-east, the Swale reaches Topcliffe, with its fine old church (where it touches the Lias formation), and receives a branch which rises on the Osmotherley Moors, near the sources of the Wisk and the Leven, and flows by Ellerbeck, Crosby, and Thirsk, under the name of Coldbeck or Codbeck. At Thirsk, the church (15th century) is large and fine; the old castle of the Mowbrays is traceable only by earthy mounds. There is a large tumulus near Thirkleby. Parallel to the course of this valley on the east is the grand range of the Hambleton Hills, on which an ancient (British?) road runs from Oldstead to Hambleton End. The region below these hills on the west is one of the pleasantest parts of Yorkshire, being in general fertile, well-sheltered and woody, with magnificent hills and mountains for the background of rich domestic pictures. The Carthusian Priory of Mount Grace (14th century) is sheltered by the woods of Arncliffe, and Mount St. John—a Preceptory of the Knights Hospitallers—on rising ground below the Edge of Hambleton. Above Thirsk, but under the perpendicular scars of Whitstoncliffe, Gormire Lake, formed by a great landslip in some early time, is a conspicuous and beautiful object. The road up Hambleton by the side of the lake passes among grand scenes, and displays an extensive and noble prospect to the west. From Topcliffe to Myton the Swale runs more nearly south, and here it joins the Ure.

Stations in Swaledale:—Muker, in the upper part, offers only the simple accommodation fitted for enthusiastic artists, sportsmen, or naturalists. Reeth has a better inn, and is well situated for ascending Calver and Healaugh Crag, and visiting Arken-

dale, Auld Gang, Fremington Edge, Marrick Abbey, &c. ;—  
Richmond ; Catterick Bridge ; Leeming ; Topcliffe.

#### THE URE.

WENSLEYDALE, one of the finest of the Yorkshire dales, lies in a direction from west to east. It is connected at the upper or western extremity by one long branch (Cotterdale) with Mallerstang, a wild glen, the origin of the Vale of Eden, and with Garsdale ; by another (Widdale) it approximates to the sources of Dentdale and Ribblesdale. These facilities for railway lines are, however, accompanied by so extremely scanty a population, and lie amidst such unproductive moorlands, that the deep solitudes of Hellgill and Mallerstang are not likely to be broken by the steam-whistle. "On the side of the country next to Lancashire is such a dreary waste and horrid silent wilderness among the mountains, that certain little rivulets that creep here are called by the neighbourhood ' Hell becks,' *q.d.* rivers or streams of hell, and especially that at the head of Ure, which runs under a bridge of a single rock in so deep a channel as to strike beholders with horror. In this part the goats, deer and stags of extraordinary size, with branching horns, find a secure retreat."—*Camden*.

The many torrents collected from the sides of Shunnor Fell, Widdale Fell, and Dod Fell, unite into a considerable volume before reaching Hawes,—a small town conveniently situated for the tourist, at the head of Wensleydale ; from whence elevated passes over narrow tracts of land\* lead to Muker in Swaledale, Edendale, Garsdale, Dentdale and Ribblesdale. By selecting good points of view near Hawes, the inequalities of ground occasioned by the many branching glens and prominent hills which divide them may be thrown into picturesque groups, and with the advantage of a sweetly diversified and active river in front. There is little of wood in this part of the dale, though the elevation of Hawes is only about 700 feet. The evening or the

\* I suppose Hawes—t'hawes, as it is called by the natives—is equivalent to *Hals*, a neck (of land). So Hawes in Coverdale.



morning lights, or rather shadows, always desirable in landscape, are productive of fine effects on the broad mountains round the head of the Ure.

The streams which come down from Shunnor Fell and Lovely Seat on the north open beautiful scenes, at Cotter Force and Hardraw Force. The former is a very pleasing waterfall, interrupted by ledges of limestone rock, richly shaded and relieved by free and natural foliage: the latter, a bold leap of 99 feet, which, when much water flows, fills the large basin of rocks with sheets of vapour; sometimes iris-tinted, and always very effective in composition. Hardly anything can be more unlike, in a pictorial point of view, than this noble fall in a dry season, as compared with its appearance after a day's heavy rain. The stream is very short, and the water soon collects to a formidable torrent, where not long before an easy step might pass the stream. In all conditions of the water, the deep, narrow and winding glen through which the beck flows from the cascade is of great beauty, and specially interesting to the geologist, who, seeing this little dell in the process of further extension into the heart of the mountain, may be encouraged to estimate the length of the period necessary for such a stream to fashion such a ravine. Let him do so when a summer evening is spreading broad and solemn shadows over Wensleydale.

South of Hawes is another interesting waterfall, Gale Force, over limestone, which rests on dark shale remarkably full of fossils.

From Hawes downward to Bainbridge (four miles), the Ure receives only small feeders; but now a considerable rivulet enters on the south side, and brings the overflow of the only lake in this part of Yorkshire,—Simmer Water. This name appears to contain two words of one meaning—See and Meer—both signifying Lake. Having once seen this water under the influence of a heavy thunder-storm on the lofty range which bounds the horizon to the south, and traversed the same region covered by snows, I can speak of its pictorial effect more favourably than most travellers. There are small forces on the side streams.

At Brough, just below Bainbridge, in the low ground close to the Ure, is an oblong Roman camp.

Here the following Inscription has been found (Gough's Camden):

IMP. CÆS. L SEPTIMIO  
 PIO PERTINACI AVGV . . . .  
 IMP. CÆSARI . M . AVRÈLIO A . . . .  
 PIO FELICI AVGVSTO  
 (Name of Geta erased.)  
 BRACCHIO CÆMENTICIVM (*cohors*)  
 VI. NERVIORVM SVB CVRA L. A.  
 SENEÇION AMPLISSIMI  
 OPERI L. VISPIVS PRÆ . . . . .  
 . . . . LEGIO

“From this,” says Camden, “we may infer that this fortification at *Burgh* was anciently called *Bracchium*, which being at first of earth was at this time built of stone, and the 6th cohort of the *Nervii* stationed there, which seems to have had its summer quarters on an adjoining high fortified hill, now called *Ethelbury*.”

A statue of *Commodus* in the character of *Hercules*, holding a club in the right hand, was also found at *Nappa*, not far below *Askrigg*, with an imperfect inscription.

It does not seem quite certain that *Bracchium* is the name, or at least the only name, of the *place*. In the *Notitia* we have, under the government of the Honourable the Duke of Britain,

Tribunus cohortis sextæ Nerviorum *Virosido*.

This cohort is mentioned in no other inscription in Britain. *Virosidum* contains apparently the element *Ur*,—the name of the river by which the inscription was found; and there is no other evidence for the position of *Virosidum* than what the above seems to furnish.

On the remarkable limestone hill which rises to the south-east of *Bainbridge*,—by *Camden* called *Ethelbury*, by other writers *Anchellbury*, *Othelburg*, and by the country people

Addleborough, Aggleburgh, and Aid-to-Brough,—is a sort of Cromlech of gritstones. The Roman station doubtless communicated by a road down the dale with the great military way from Isurium to Cataractonium. A custom is recorded at Bainbridge of blowing a horn every night at ten o'clock in winter, as a signal to benighted travellers.

It is probable that an ancient British road crossed the Ure near that place; proceeding northward by Askrigg, Feetham Row, Arkendale, and Hope, to Barnard Castle; and southward over the side of Stake Fell, and by a romantic pass among the rough rocks over Cray to Buckden and Wharfedale. This road crosses several very narrow necks of land, and pursues a course generally north and south.

Three waterfalls very near Askrigg are extremely beautiful. Of these two are easily reached, viz. Bow Force, a low but very pleasing cascade (12 feet) over limestone rocks, overhung by the charming mountain elm; Millgill Force, also over limestone (69 feet), and of much grander proportions. Millgill Upper Force requires more labour to reach, and is well worth the toil; the water, falling in broad sheets over gritstone rock (42 feet) into a romantic woody glen, makes an excellent picture.

Above the pretty grounds of Nappa the sea pink (*Armeria maritima*) grows wild.

Below Bainbridge and Askrigg the valley contracts upon the river, and the stream has a more rapid descent: at Aysgarth\*, with its conspicuous old church and bridge (A.D. 1536), rapids begin, and soon become the powerful cataracts on which Turner has bestowed some touches of his magic pencil (see the Lithograph). The Ure, like other northern streams, especially near their source, varies greatly in respect of the quantity of water which it discharges. In floods it is a great, a mighty river, bursting with a prodigious effect through magnificent rocks;

\* The Celtic words for water and promontory, from which Aysgarth, well describe this remarkable situation. Ask-rigg has the same Celtic prefix for water.

but in droughts only a few gentle rills—the tears of the Naiads—run over the ledges of limestone. The bridge above the Falls is commendable as a station for looking on the river and church. Penhill\* now becomes a noble object, and the views up the deep and shadowy glens below it—Bishopdale and Waldendale—are grand and pleasing. In the time of Leland, Penhill was crowned by a rude fortress or Peel. We now enter a part of Wensleydale on which art has conferred some not unattractive objects. The bordering hills become lower and less wild; the lowland is more shaded with woods; the slopes have more evidence of resident wealth and greater effect of ornament. Among buildings of interest—

Aysgarth Church, already mentioned as standing in a prominent position above the Falls, may be regarded as a mother church; for all the upper part of Wensleydale, including Ask-rigg and Hawes, is in the parish of Aysgarth. Below this point the parishes are of smaller extent and more frequent occurrence, indicating more ancient and important settlements than most of those in the higher part of the valley.

The little church of Red Mere will gratify the archæologist who can approve a very plain edifice, suited to a simple pastoral country.

Bolton Castle, with its four towers, one of the most complete, in respect of walls at least, of the Yorkshire castles, dates from the latter part of the 14th century, having been built by Richard Lord Scrope (temp. Ric. II.), whose family mostly resided at it, till the title was extinct in the days of Charles I. It stood for the king, and was taken in 1645. This was one of the many prisons of Mary Queen of Scots (1568). On approaching this noble pile from the east, we remark on each side of the road the ancient cottages which crouched under the shelter of the castle. Leland speaks with wonder of “chimneys conveyed by tunnels made in the sides of the walls between the lights in the hall, by which means and by no covers is the smoke of the harthe in the

\* *Pen* in Cymraic signifies point or head.

hall strangely conveyed." He saw at Bolton "a very fair clock *cum motu solis et lunæ*, and other conclusions."

Wensley.—This beautiful village is, like Aysgarth, a large parish, including the whole of the northern side of the dale from Bolton to Leyburn. It may be regarded as a place of importance in early times, since it gives its name to the dale.

Leyburn, situated on an elevated plateau of limestone, commands very fine prospects of Wensleydale and Coverdale. Penhill is a conspicuous feature to the S.W., and Great and Little Whernside appear high on the south. The walk on the cliff called Leyburn 'Shawl' is much admired.

Middleham Castle,—one of the strongholds of the 'King-maker,'—the place where he failed to secure Edward IV., is now a huge mass of mostly ruinous walls, in which little of architectural beauty remains, but not unsuited to artistic effect. Middleham,—the middle dwelling between Masham and Aysgarth?—may be regarded as of Saxon origin. A little below Middleham the Ure receives a tributary from the south, called the Cover, on whose banks are some remains of Coverham Abbey, or rather Priory, a house of White Canons, or Præmonstratenses. The dale is called Coverdale—the birth-place of the learned Bishop Miles Coverdale, to whom we owe a translation of the Bible.

The road up Coverdale is of no great interest till we reach the narrow summit of limestone under Great Whernside, from which the descent to Kettlewell begins. The view of Wharfedale from this road is admirable.

Passing East Witton, with its modern church (the whole village was reconstructed by the Marquis of Aylesbury), we reach Jervaux Abbey, a Cistercian foundation (1156), beautiful in ruin, whose name (Ger-, Jer-, Yor-, or Ur-vaulx) is derived from the river flowing beneath its walls.

Here Wensleydale ends; the hills subside into easy slopes; the valley opens into a wider area, and on one side loses itself in the Vale of York. Much of the beauty of Wensleydale is continued along the river and its banks to Masham and Swinton.

Here a considerable affluent enters from Colsterdale, which spreads out in many branches toward the west among the moorlands, as far as the edge of Coverdale: no limestone appears at the surface in this dale, but coal is dug sparingly.

The church at Masham is a fine structure, in the centre of a beautiful district full of antiquarian reliques. On the south is Nutwith Camp, crowning a natural hill, with its nearly rectangular entrenchment. It almost overhangs admired Hackfall and antique Grewelthorpe; Kirkby Malzeard, where the Mowbrays had a castle, being a little more south. At Aldborough, nearly opposite Nutwith Camp, an old road crossed the Ure, and there are marks, fitting to its name, of ancient foundations.

Tanfield, on the same side of the Ure, still preserves its ancient castle or hall, and in the church under alabaster tombs, repose the ashes of the Marmions. At Well, near Tanfield, a Roman pavement has been found (*Gough's Camden*). At a distance of a mile east of Tanfield are three circular entrenchments of similar plans and proportions, about half a mile asunder, and placed almost exactly on a right line directed to the N.N.W., which is the course of the Roman road from Wensleydale by Well to join the Leeming Lane. Each circle is interrupted by a clear passage or road through it, and the openings thus made point one to another, so that the three entrenchments constitute one great work. Thornborough, a name doubly suggestive of an ancient fortification, is very near on the east of these 'rings,' and Nosterfield is to the north of them. A line drawn from Well, where Roman remains have been found, to the S.S.E., would pass nearly through the centres of the 'rings.' Between the northern and middle ring is an interval of three-eighths of a mile; between the middle and southern entrenchment about five-eighths of a mile; and in this larger space near the middle and on the line joining the two is a tumulus of rather large diameter (111 feet), but of comparatively small elevation.

Of the three circles, that to the north has been preserved by the plantation in a nearly perfect state; the middle one is in

comparatively good condition; the southern one is much degraded by the plough, though centuries must elapse before its main features are destroyed.

These remarkable earthworks are formed on the plan of that well known at Arbor Low in Derbyshire. The great feature is a circular mound, about 1800 feet in circumference, and rising in places to 15 feet in height; within this is a ditch 10 feet deep in the parts best preserved, and above 1200 feet in circuit; on the outside a concentric depression which is most traceable round the northern ring.

The passage across the ring is level, the bank appearing as if cut through, and the inner ditch is filled up for the breadth of about 16 yards—not very different from what is observed on the camp at Ingleborough, and in the circle at Arbor Low. These works are sometimes described as Saxon camps; they have also been regarded as hippodromes; and may further be considered as suited to National Councils; though they have not, as at Arbor Low, stone seats in the inner circle for the leaders of the tribe, while the people gathered on the surrounding bank—

*Consedere duces, et vulgi stante coronâ  
Surgit ad hos dominus clypei.—Ovid.*

(See the Plan of these Camps, Pl. XXXV.)

Passing Norton Conyers, the family seat of

. . . . Norton and his eight good sons,

the Ure reflects the ancient towers of Ripon; three miles south-west of which are the extensive and beautiful remains of Fountains' Abbey (Cistercian, 1152).

Ripon was not a Roman, perhaps for the reason that it had not been a British station. The artificial mound called Ilshaw Hill is of doubtful antiquity. Gough says it is composed of "human skeletons laid in regular order, greatly decayed, discernible from the top to the bottom of the hill." A considerable number of brass stycas of the later kings of Deira have been

found here. There was a custom in this place, earlier than the Conquest, to blow a horn every night at nine o'clock.

From Ripon to Boroughbridge and Aldborough the general line of the Ure is to the E.S.E., and a little below the 'old borough' the river joins the Swale. The twin towns of Boroughbridge and Aldborough formerly sent two members each to Parliament,—a sufficient proof of their importance in early English history. Both probably were important long before the Anglians crossed the sea; Aldborough undoubtedly was the Roman Isurium, and it was probably placed near a British town of earlier days, to which the yet standing monoliths called the Devil's Arrows bear durable testimony.

If, as is probable, Isurium was an earlier station of the Romans than Eburacum, and this Roman camp was fixed near the British capital of the time, Cartismandua reigned here, and her name, or the name of her city (Caer or Cathair-ys-maen-ddu), seems to typify the great stones, near which, on the removal of the bridge from Aldborough after the Conquest, Newborough, afterwards Boroughbridge, was gradually peopled or re-peopled.

The great monoliths at Boroughbridge have caught the attention of all our topographers, and speculation has not been idle as to their history and uses. The stones, which have doubtless been extracted from the great rocks of Brimham, or Plumpton, have been conjectured to be of artificial composition; the furrows on the sides, which are merely the effects of 2000 years of rain, have been supposed to be the flutings of columns, fitted to imaginary capitals or busts. They have been called marks for four roads—metæ of a chariot race, trophies of victory, and we might add other such fancies if it were proper to delay without necessity our pleasant journey on the banks of the Ure.

Leland, describing his visit to Boroughbridge, says:—

“There I passed over a great Bridge of stone on *We* (Ure). The Toune is but a bare thing; it stonidith on *Wateling-Streate*: almost at the very end of this Towne cummith a litle broke a



4 or 5 miles of by west caullid *Tudlad\**, and rennith into *We* (Ure) a very litle beneth *Borough* bridge.

“A little without this Towne on the west part of *Watiling-Streate* standith 4 great maine stones wrought above *in conum* by Mannes hand.

“They be set in 3 several Feldes at this Tyme (now in two fields).

“The first is a 20 foote by estimation in higeth and an 18 foote in cumpace. The stone towards the ground is sumwhat square, and so up to the midle, and then wrought with certen rude boltells *in conum*. But the very toppe thereof is broken of a 3 or 4 footes. Other 2 of like shap stand in another feld a good But shot of: and the one of them is bigger then the other; and they stand within a 6 or 8 fote one of the other.

“The fourth standith in a several feld a good stone cast from the other 1, and is bigger and higher than any of the other 3. I esteme it to the waite of a 5 Waine Lodes or more.

“Inscription could I none find yn these stones; and if ther were it might be woren out; for they be sore woren and scaldid with wether.

“I take to be *trophæa a Romanis posita* in the side of *Watheling Streat*, as yn a place most occupied in Yorneyng and so most yn sighte.

“They stand [all] as [loo]king *ab occiden[te ad orientem]*.”—LELAND, fol. 101.

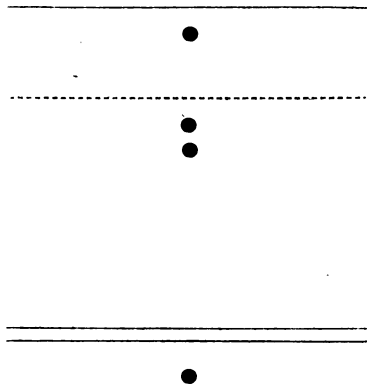
Camden, following Leland after an interval of half a century, saw four stones, one of the two middle lately thrown down by “the accursed love of gain.”

In the diagram (p. 67) the stones are placed in their relative position, and as they appeared to Leland. One of the two near the middle has been removed. That which is now standing is about 200 feet from the northern, and from the southern stone

\* *Lad* means a small brook in Gaelic. Near Greta Bridge is a beck called Tutta.

300 feet. The northern stone is, according to Gough,  $16\frac{1}{2}$  feet by 84 inches, above the ground; the middle one  $21\frac{1}{2}$  feet by  $55\frac{1}{4}$  inches; and the southern one  $22\frac{1}{2} \times 4 \times 4\frac{1}{2}$  feet. The late Mr. Lawson, to whom these precious monuments older than Isurium belonged, excavated round the basis of the northern stone and found it to be roughly fashioned, and firmly imbedded about 4 feet below the surface in a dry sandy soil.

North.



The Roman camp at Isu Brigantum was walled like that at Eburacum, but without the angle towers. It formed an oblong parallelogram, with the north-east and south-west angles bevelled. In our plan (Pl. XXXIV.), which is taken from one prepared by Mr. Gill, from a recent survey, the length appears about 1940 feet, and the breadth 1320. The included area would be nearly 60 acres, which may be regarded as indicating one of the greatest stations, ranking with that of York. There are roads through three sides of the camp, two of which bear the names of Westgate and Eastgate: they are not opposite. The southern entrance is in the centre of that part of the wall. No opening is traced in the north wall. The church of Aldborough stands in the very centre of the camp. Outside of

the enclosure, near the south-east angle, is an artificial hill called Studforth.

Leland gives us the following notice:—

“Aldeburge is about a quarter of a mile from Boroughbridge. This was in the Romanes tyme a great city on Watheling Streate called *Isuria Brigantum*, and was walled, whereof I saw *vestigia sed quædam tenuia*. It stode by south west on We (Ure) river. The compace of it hath been by estimation a mile.”—“There be now large felds fruitful of corn in the very place wher of the town was; and in these felds yerely be found in ploughing many coynes of sylver and brasse, of the Roman stampe. There hath been found also sepulchres, *aquæ ductus, tessellata, pavimenta, &c.* There is an hill on the side of the feld wher the old town was caullid Stothart, as if it had been the kepe of a castle.” (i. 102.)

Mr. Gough describes the walls as 4 yards thick, founded on large pebbles laid in a bed of blue clay. “To the foundations on this clay is in many places four or five yards deep. Almost in the centre is a hill called *Borough Hill*, which seems to have been a sort of citadel, where mosaic pavements have been found, and foundations of a large building with bases, &c., engraved in Drake’s Eboracum.”

To the numerous examples of tessellated pavements which have from time to time been discovered at Aldborough, the late lamented owner, Mr. Lawson, made remarkable additions, and with much taste and liberality preserved them from injury, and gratified the public by allowing easy inspection. So many coins, gems, busts, and other bronzes, vases, glass vessels, pavements, sculptures, and frescoed walls of houses, have been laid open by excavations within the Roman walls, as to give rather the idea of an easy and luxurious city, than of the stern war-camp which we know Eboracum to have been. And this is perhaps not a false notion; for, planted at first close to Isu Brigantum, the water town of the tribe, it may have gradually relaxed its warlike aspect, and assumed, as we know from Tacitus happened in other cases, the milder aspect of colonial life.

Among the inscriptions and sculptures found at and near Aldborough, we may signalize the cylindrical milliary stone found in 1776 at Duel or Devil's Cross (on the Roman road to York), though its true import is not well ascertained. The stone is 7 feet in height. (See Appendix.)

IMP . C  
 ÆS C ✠  
 S2 IVS  
 SOCEC  
 TR A PO  
 FELICr  
 AVG  
 v C  
 S

A plain altar and a mural statue of Mercury are figured by Gough.

THE OUSE.

The SWALE and URE meet on equal terms, and unite to form the Ouse,—the greatest stream of Yorkshire; for it seems absurd to trace the name of this river to the insignificant rill which springs at Ouseburn. Hither formerly flowed the tide, now effectually stopped at Linton Lock, even if it should pass over the dam at Naburn. The Ouse flows south-eastward to Nun-Monkton, where, close to the singular and beautiful church, it receives the Nidd from Knaresborough and Pateley Bridge.

THE NIDD.

NIDDERDALE\* (Nithersdale on some Maps) gathers itself by short steep slopes from the moorlands of Great and Little

\* If not the 'lower dale' (from the German *Nieder-thal*), perhaps the 'dale of the Nith-water' (from British *dour*, water, and *Nedd*, turning or whirling). So Nithsdale in Scotland and Neath (the Roman *Nidum*) in S. Wales. But Nidd is also the name of a Norwegian river.

Whernside and Carlton. The Nidd, excavated into a narrow channel of limestone, plunges into a sinuous underground course at Govden\* Pothole, fully two miles in length, from which it emerges a fresh and full stream at Lofthouse. Here it receives a large branch from the west, and, thus reinforced, runs in a nearly straight course to Pateley Bridge and Darley; then bending eastward passes by Ripley, and south-eastward to Knaresborough, the Castle of Serlo de Burg, and finally north-eastward to join the united Swale and Ure.

The few tourists who penetrate to the upper end of Nidderdale above Angram, find the expansion of the remote fingers of this dale upon the broad slopes of Whernside extremely grand; the still fewer who have the resolution to cross over these slopes to the 'limestone pass' between Great Whernside and Buckden Pike, will experience great enjoyment. Once I guided a friend over this wild 'no road,' and by great, if not good, luck, there came on a glorious thunderstorm, with the lightning in almost a constant blaze of discharges over the summit of Great Whernside, while all around us was in dark shade. After this severe storm had passed, the sun shone brilliantly, and we reached the 'limestone pass' dry, and rejoicing in the splendid effects of light on the vast expanse of mountains and glens spread out between us and the distant cone of Ingleborough.

Between Angram and Govden Pothole, the river runs in a contracted, partly limestone channel, having on the left bank very bold edges of gritstone, with coal strata interposed; between Govden Pothole and Lofthouse, the nearly dry channel is enclosed in rocks of limestone and woods, overhung by lofty gritstone hills. A similar description applies to the How Steane Beck, which here enters the Nidd. Below Lofthouse, the emerging river flows in a picturesque woody dale, shaded by gritstone summits 1000 and 800 feet high, by Ramsgill, Gouthwaite Hall,—the house of Eugene Aram,—to Pateley Bridge, and

\* From *Gof, Ogof*, a cavern, in Celtic. It is also called Gowden, Goyden, Cowden.

Bewerley; and it preserves this character, with lower margins of gritstone, to Ripley. Borders of magnesian limestone accompany it to Knaresborough, and New Red Sandstone plains conduct it to the Ouse. (See Appendix.)

The little rill which enters the Nidd below Ripley draws part of its scanty supply from the many health-giving wells of Low Harrogate. These precious waters have their local origin determined mainly by the anticlinal axis of strata which may be traced in the higher ground west of Harrogate between the millstone grit ranges of Rigton and Birks Crag, which dip in opposite directions. The existence of chalybeate waters is too common a circumstance to be of special interest; but the sulphuretted water of Harrogate, loaded with common salt, is an indication of a deep-seated spring, rising under peculiar circumstances. The 'old well' is, in fact, a salt-spring, with traces of iodine and bromine as in modern sea-water; and possibly there may be only one deep source for this water and the springs both east and west of it, as far as Harley Hill, Starbeck and Bilton. The differences between these springs—in proportion of sulphates particularly,—seem to be explicable as effects due to the different channels through which they reach the surface.

The situation of Harrogate is such as to give a cool bracing air in the summer and autumn, and the country around invites to lengthened excursions. These have been much facilitated of late years by railway communications to the north, east, south-east, and south. Nidderdale, Brimham Crags, Fountains' Abbey, Ripon, Boroughbridge, York, and a great part of Wharfedale, all full of interest, are accessible with little effort. For easy walks, Harley Hill, the Haveray Beck, Almes Cliff, Plumpton, and Knaresborough, may be suggested.

The lands of Nidderdale from the sources of the river to the neighbourhood of Ripley belong to parishes at some distance to the east, viz. to Kirkby Malzeard and Ripon,—old centres of population on the course of the Ure. The lead-mines of Greenhow Hill, which were worked by the Romans, and probably by

British tribes before the Romans\*, are in the township of Dacre and in the parish of Ripon.

At Hayshaw Bank near Dacre Pasture were found in 1735 two pigs of lead of the same shape and dimensions. The inscription—

IMP . CAES . DOMITIANO . AVG . COS . VII

taken from one of them, preserved in the British Museum, gives us the early date of A.D. 81 for this mark of the Roman possession of Greenhow Mines†. In Gough's 'Camden,' the inscription, perhaps taken from the other preserved at Ripley Castle, is augmented by the terminal BRIG,—which marks the district. On Roman pigs of Derbyshire lead, LUT or LUTUD occurs for the same purpose.

One of the most interesting caves I ever saw was opened in the course of lead-mining at Greenhow Hill. In 1825, when I reached it by a miner's climbing shaft, it had much the appearance of a Franconian bear cave,—dust on the floor, stalactites of great size and brilliant beauty everywhere depending from the roof. It was, however, soon robbed of its sparry ornaments by tasteless visitors and greedy miners, and must now be mentioned as one of the lost wonders of Yorkshire.

Still south-eastward by Beningbrough,—the Saxon name of a residence of the Abbot of St. Mary's of York,—and the 'Red House,'—an erection of the time of Charles I.,—the Ouse flows on to the York of today,—the Eoforwic of our Saxon sires,—the Eburacum of the Emperors of Rome,—probably the Aberach of earlier British princes.

\* Proceedings of the Yorkshire Philosophical Society.

† Memoirs of Archæological Institute, 1846.

## YORK.

We have now arrived at a city still one of the most interesting in England, and whose memorials go back into remote antiquity:—

..... fuit Ilium et ingens  
Gloria . . . .

For York was once the imperial city, the ‘altera Roma’ of Britain, the stronghold of war for twice the period which has elapsed since the Norman Conquest. Innumerable battle-plains surround her Roman camp, and from her walls we may see the three decisive fields where Hardrada fell at Stamford Brig, and Clifford died in Towton Dale, and Rupert fled from Marston Moor. Sixteen centuries of historical renown dignify the winding streets and narrow pavements by which we reach the feudal walls, the Benedictine abbey, the Northumbrian church, the camp of the “victorious legion.”

York, though no longer enriched by commerce and dignified by meetings of parliament, retains the Gothic halls in which princes, and merchants not less powerful than princes, once did congregate; of its fifty churches half remain, and it possesses the Minster, the centre of the broad lands and rivers of Yorkshire. This vast and wonderful structure—the great cathedral of Northumbrian Britain—rises from the centre of the Roman camp, perhaps over the demolished shrine of Bellona, or Isis, or Serapis, amidst three millions of Saxons, Jutes, and Northmen, speaking various dialects and following dissimilar occupations,—a bond of union amidst jarring creeds and warring opinions,—memorial of the past, index to the more glorious future.

The changes which York has experienced in the course of the present century have not effaced, but have much impaired its antique and singular character. The ramparts reared over Saxon walls and Roman villas open to admit Stephenson and his chariots,



alike impressed with the stamp of the latest iron age; railway stations replace the abbeys and hospitals which sheltered within the walls; the castle is transformed to a jail; the Gothic bridge is gone; the very river has lost the tide; and we can hardly trace the ford or ferry by which the soldiers passed from the camp of Eburacum to enjoy the baths on the road to Calcaria.

But nature still endures; and many of the monuments of other days remain. From the summit of Clifford's, which replaced Earl Waltheof's, Tower, we trace the woody vale across which, in earlier times, the Cohorts marched to Derwentio. The road remains which conducted Hardrada to a bloody grave, and Edward IV. to a troubled crown; and, over all, more durable and unchangeable than Norman tower or Roman road, the smooth and shadowy wold, crowned by the burial-mounds of Brigantian chiefs, rises calm and cold as in primæval times.

Much wider is the prospect from the great tower of the Minster, elevated 200 feet above its floor, and 254 feet above the sea. This altitude, moderate for so great a building, is sufficient, in this level region, to procure for the spectator a magnificent panorama. Standing on this basis, far above any fixed object of nature or art, in the whole course of the great vale which extends from Durham into Nottinghamshire and Lincolnshire, we trace the main features of Yorkshire topography, and scarcely need the additional elevation reached by the tiny manufacturer of the gossamer\* which is floating over our heads, to have a bird's-eye, or rather a spider's eight-eye view of the hills and woods and waters most celebrated in our provincial history.

York has had full justice from local historians of ability,—Drake, Wellbeloved, and Davies, not to mention a crowd of more humble writers. Mr. Wellbeloved has lately augmented his claim to the enduring gratitude of the Yorkshire Philosophical Society, by a clear and well-arranged description of their numerous antiquarian treasures, which include baths, tombs, altars, inscriptions, urns, tiles, coins, bronzes, glass, enamels, beads, and

\* Dr. Lister's observation of the æronautic spiders is here alluded to.

innumerable other objects, memorials of British, Roman, Saxon, and later times.

At some epoch before the age of Cartismandua, we may believe that a mound was fortified by the Britons, near the place where the little river Foss flows into the Ouse. This the name and peculiarity of the place seem to indicate, whether we derive Eburacum from Aberach, "the mound by the confluence," or Evrach, "the mound by the Eure."

Clifford's Tower stands on what may be regarded as the most conspicuous part of this early fortification. It was moated round or possibly insulated by a tidal channel communicating from the Ouse to the Foss, in a period when canoes scooped out of oak-trees navigated the Yorkshire rivers (see one in the Museum). A mound, now called Bail Hill (Ballium?), stands on the bank of the Ouse opposite to Clifford's Tower.

Wellbeloved, reasoning on all the data collected by himself and previous writers, concludes that "the second campaign of Agricola, which occupied the greater part of the year 79, was most probably the era of the foundation of Roman York." It became the head-quarters of the Sixth Legion at a very early period after the arrival of those soldiers from Germany, by the command of Hadrian in 117; for Claudius Ptolemy, the first author who names the city (his work is usually supposed to be of the date A.D. 138, but *may* have been earlier), writes "Legio sexta victrix" in connexion with it. There is no inscription to prove the date of the Roman walls; perhaps they were erected when Eburacum became the head-quarters of the legion, in the time of Hadrian (about A.D. 120).

The walls include a quadrangular space about 1610 feet from east to west, and 1412 feet from north to south. The western wall is nearly parallel to the river Ouse; the northern and eastern walls ran not far from the city wall now standing. The camp was apparently of the Polybian form, traversed by roads from Isurium and Calcaria, the former entering nearly where Bootham Bar now stands, the latter crossing the river by the Mansion

House to Stonegate. It was furnished internally with guard-rooms and turrets, and strengthened by angle towers of many sides, and founded on piles. It enclosed about 52½ acres.

Remains of Roman villas, pavements, baths, sarcophagi, urns, tiled graves, have been disclosed in the course of many excavations round the Old Camp, but the marks of luxurious life and inevitable death, which occur within its area, belong mostly to later times. Excavations at several points, on the road to Calcaria, have yielded mosaic pavements, sculptures, an inscription, many urns, and some glass vessels.

Traces of Roman buildings have lately been discovered in digging the foundations of Dr. Laycock's house, not far from the place in the Old Mint Yard, where the stone was rediscovered, which was inscribed to Serapis, and recorded the erection of a temple to that deity. (See Appendix.)

In the year A.D. 208 Severus marched from Eburacum to repress the Caledonians, and in 210 he died here, and perhaps was burned with funeral honours within sight of the Roman camp; but whether the ashes of this great emperor were laid to rest in 'Severs Hoe,' or in the tomb of the Antonines by the Appian Way, seems uncertain (Wellbeloved's Eburacum, p. 15). Constantius Chlorus also died here in 306; his son and successor, Constantine the Great, being with him at the time.

On the retirement of the legions during the last convulsions of the Western Empire, the Roman walls were probably broken through. The materials have been recognized in a Saxon wall, deeply buried in the mound, where it was cut through by the railway. They may also be seen in one of the churches on Bishophill, which is of the Anglo-Saxon style, though in the opinion of several antiquaries it has undergone reconstruction. The Saxon name of the place is Eoforwic: in the Sagas of the Northmen it is called Iorvic, no doubt the immediate precursor of York.

The Norman masons opened new quarries, and employed larger masses than suited the builders of the Roman wall, but

the stone preferred in each case was the magnesian limestone, from the vicinity of Calcaria and Legeolium. For heavier work, sculptures on a large scale, altars, and tombs, the Romans mostly employed the solid gritstone of Brimham, Plumpton, and Ilkley; probably following in this the example set them by the ambitious rearers of the Devil's Arrows.

The stranger in York who has seen the Minster will do well to walk round the city walls, as far as practicable *upon* them; he should observe the singular defensive features imparted by the walled banks of the river, and the towers at and near Lendal Ferry; inspect Clifford's Tower; the four Bars; the Norman porches of St. Margaret and St. Denis; the Guildhall; and spend as much time as can be afforded in the Yorkshire Museum and the grounds adjacent. Here, the Roman wall, St. Mary's Abbey, St. Leonard's Hospital, rich collections of local natural history, and a large and fine series of British, Roman, Saxon, and Mediæval antiquities, will reward careful inspection.

Of Roman monuments mentioned by Camden and other writers as belonging to Eburacum, but now lost, we may mention the curious sarcophagus which 'Marcus Verecundus Diogenes, Sevir of the colony of Eboracum, and a citizen of the Bituriges Cubi, made while living for himself.' This is the only one which mentions Eburacum as a colony\*.

M . VERECVNDVS DIOGENES IIIIIIVIR COL  
EBOR IBEIDEMQ MORT CIVES BITVRIX  
CVBVS HAEC SIBI VIVVS FECIT

On a votive altar found at Bishophill in 1638, and made known by Lister, Publius Ælius Marcianus, præfect of a cohort, expresses his gratitude to Jove and the domestic gods and goddesses for the preservation of his health and that of his family, perhaps during the prevalence of some epidemic.

\* Kenrick, in Proceedings of the Yorkshire Philosophical Society.

I O M  
 DIS DEABVSQVE  
 HOSPITALIBVS PE  
 NATIBVSQ OB CON  
 SERVATAM SALVTEM  
 SVAM SVORVMQ  
 P . AEL MARCIAN  
 VS . PRÆF COH  
 ARAM SAC F.NCD.

The Fosse—filling at York the Roman fossa—springs on the edge of the Howardian Hills at Brandsby and Craike, and runs a short course by Stillington and Marton, where remains of a Norman monastery appear, and not far from Sheriff Hutton Castle (12th century), whose high walls are conspicuous over the Vale of York.

Below York the course of the Ouse is southerly by Fulford, where the Earls Edwin and Morcar were defeated by Hardrada, and Bishopthorpe—an old, but not the ancient seat of the Archbishop, for Cawood preceded it, and indications of an earlier residence in York are perceptible—to Naburn, where a dam and lock again hold up the fresh water for purposes of navigation, and repel the tide. Thence by Acaster Malbis and Acaster Selby, places with which, notwithstanding their name, no Roman camp or road is known to have been connected, to the junction of the Wharfe.

#### THE WHARFE.

**WHARFEDAILE.**—In its upper part this noble valley is divided into Langstrothdale and Littondale, and the part about their union is called Kettle-dale; but the river preserves its name from the source under the southern brow of Cam Fell, 1273 feet above the sea, to the junction with the Ouse below Tadcaster. The early course of the Wharfe is in moorlands between two

bands of limestone, the upper one forming the summit of Cam Fell, and high edges on the front of Deepdale and Yoken-thwaite Moors. Near Deepdale the river plunges into the thick lower limestone, from which it never escapes till it encounters the gritstone hills of Barden Fell and Symon's Seat. Below this point its course to Wetherby is in gritstone and shale; and thenceforward in magnesian limestone and the New Red formation. Thus we have in Wharfedale four parts distinguished by geological characters—which are accompanied by very characteristic differences of scenery.

The gritstone portion of Langstrothdale has the usual wild scenery of the moorlands, relieved by the grand forms of Cam Fell, Whernside, Ingleborough, and Penyghent. The calcareous part of the dale has a very different aspect. Lofty mural precipices, broken and undulated by many lateral sinuosities, and sometimes prominent in huge mountainous masses, overhang the narrow green meadows and the clear free sparkling river. Neat little villages, churches and churchyards, nestling by the stream and below the rocks, have reared a few trees, and some undergrowth of wood clings in places to the detritus of the cliffs. This character belongs also to the rocky dale of Arncliffe and Litton, which opens out at the foot of Penyghent and Fountains' Fell, and the broad limestone floors of Hardflask.

In the region about Kettlewell, the scenery is crowned by the heights of Great Whernside and Buckden Pike, and the bold rough rocks of Birks, Litton Hill, and Raisegill Hag; while, looking down the dale, we have the lower but fully as picturesque summits of Rilstone, Burnsall, and Barden, Symon's Seat, and High Crag,—forming an irregular distant horizon. Kettlewell is the old parish of Langstrothdale, as Arncliffe is the mother parish of Arncliffe or Littondale. Kettlewell's old church has been *replaced*,—the church of Arncliffe has been *restored*. Lower down the valley we have the large parishes of Linton and Burnsall. On the moorland above Starbottom and Kettlewell,

a waterspout burst in 1686, causing enormous devastation in these villages. (See Appendix.)

We now enter the third portion of Wharfedale, through a most romantic woody glen, with fells towering above, and rocks contracting below to form narrow channels, of which the "Strid," immortalized by Wordsworth, is most remarkable, for the rapid and powerful river. Past these obstructions the Wharfe emerges into that sweet and picturesque combination of cliff, meadow, forest, and monastic ruins, which has rendered Bolton Abbey dear to the painter of nature, and which owes no small share of its witchery to the graceful sweeps and ever-changing face of this beautiful mountain-stream. Gladly might the princely shepherd, the good Lord Clifford, pass happy years in this retreat, suggestive of better thoughts than

. . . low ambition and the pride of kings.

Five miles below Bolton is Ilkley (the *Olicana* of Rome), under the slope of Rumbalds, Romells or Rumbles Moor, or finally Rumeley's Moor, as belonging to De Rumeley, the founder of Skipton Castle; which gives forth the cold pure springs for which Ilkley was long famous, before Ben Rhydding claimed attention. The Roman roads through *Olicana* have not been completely traced, but there is good ground to admit a connection by this means from *Rigodunum* (Ribchester) to *Calcaria* (Tadcaster) and *Eburacum* (York).

Ilkley still preserves on the south side of the river, near the church, some remains of the Roman camp. This was probably founded near to an earlier British town, mentioned by Ptolemy under the name of *Olicana*, in which we may detect the British *Llecan*,—rock; and certainly no place in Yorkshire better deserves the title of rocky. For above the station is one of the finest 'edges' of millstone grit which can anywhere be seen, and the 'Hanging Rocks'—the 'Cow and Calf'—which project over Ben Rhydding, are scarcely to be surpassed in picturesque effect.

In the churchyard are preserved three remarkable crosses, of unequal height and unlike ornaments, but all very interesting. Our sketch (see the Lithograph) will give the general effect of these objects; the complication of the designs, in which animals are introduced, is unusual. These crosses are no doubt Saxon, though, singular to say, Camden speaks of them as Roman. In the village we may yet find a grey-haired seer who thinks them Druidical, and appeals to a fourth example on the road to Keighley, still called the Druid's Cross. More care should be taken of these curious relics.

Ilkley has yielded a Roman votive altar, dedicated to the nymph or goddess of the Wharfe, under the name of Verbeia. This name scarcely conceals the British *Guru*, rough, rapid, which exactly fits this free and impetuous mountain-stream. The Saxon name *Gurf* is scarcely different. The altar is preserved at Middleton Lodge, but its simple inscription must be sought in the pages of Camden and his commentators:—

VERBELÆ  
SACRVM  
CLODIVS  
FRONTO  
PRÆF . COH .  
II . LINGON .

Fairfax says this altar was erected *in water*.

From the following inscription, also preserved in Camden,—

IM . SEVERVS .  
AVG . ET ANTONINVS  
CAES DESTINATVS  
RESTITVERVNT CVRAN -  
TE VIRIO LVPO LEG E -  
ORVM . PR . PR .

we learn that it was rebuilt in the days of Severus by Virius Lupus, the legate and proprætor. The same diligent antiquary



has recorded an inscription which he saw in the church-wall ; the parts within brackets being supplied, it reads thus :—

[Pro Salute Imperato]  
 RVM . CAES  
 AVG . . . .  
 ANTONINI  
 ET VERI  
 IOVI DILECTI  
 CAECILIUS  
 PRÆF . COH .

In the steeple is a bas-relief, supposed by Stukely to be a figure of Hercules strangling the serpents (Gough's Camden, iii. 289).

In the church is a very good effigy of Sir Adam de Middleton, in chain mail (A.D. 1312).

Few places of general resort so well deserve their reputation as Ilkley. The springs are pure and abundant ; the air is free and bracing ; the river utters cheerful sounds as it wanders through green meadows, or rushes between lofty banks, shaded with woods and crowned by mighty rocks. High open moorlands easily accessible to even feeble pedestrians—pleasant home walks—an admirably regulated household—make Ben Rhydding a delicious abode. And for excursions, Wharfedale, Airedale and Nidderdale, with Bolton Abbey, Skipton Castle, Malham Cove, Brimham Crag, and Fountains Abbey, offer irresistible attractions. Artist, antiquary, sportsman, naturalist, and invalids who are none of these, may join heartily in the old spirit of gratitude which dedicated an altar to the life-giving waters of Ilkley.

Below Otley the Wharfe receives a considerable tributary—the Washburn, which rises in the high moorlands near Greenhow Hill, and flows by Blubber Houses. In all its course from Bolton Bridge to near Wetherby, the Wharfe flows in a broad rich vale, bordered by woody slopes and ornamented grounds ;

among which Farnley, still, after many centuries, the home of the Fawkes, and Denton, the former seat of the Fairfaxes, the birthplace of the translator of Tasso, are conspicuous.

Near Wetherby the scenery contracts, and cliffs begin to shade the stream, which winds between limestone cliffs through alluvial meadows to St. Helen's Ford, where the old military way crosses the river. Below the dam at Tadcaster, the *Calcaria* of the 'Itinerary,' we meet the tide. From the vicinity of this place the Roman masons took stone for the walls of Eburacum; by it passed the road from that great station to Mancunium (Manchester), soon joining another ancient way which led from Lincoln (Lindum) by Doncaster (Danum) to Aldborough (Isurium). This was the road which crossed the Wharfe at St. Helen's Ford. It was probably at first a British road, as the name, Rudgate, contains the Celtic prefix *Rhydd*, a ford, with the Saxon term *gate*, a road. The town of Tadcaster is perhaps situated on the very site of *Calcaria*, but we look for the bank and ditch in vain. The Wharfe, after passing by the Saxon village of Ulleskelfe and the pleasant park of Nun Appleton, pays its tribute to the Ouse. (Appendix.)

Half a mile below Tadcaster, the little river Cock enters the Wharfe from the south. A few yards from the confluence the small stream is crossed by what is now a mere footpath, but in the last century it was a line of road from Tadcaster towards Grimston. It is carried over the Cock by a semicircular arch, constructed without a key-stone, and springing from square pier-walls. The blocks of stone are neatly squared, about twice as large as in the wall of Eburacum; on several are the mason-marks. The parapets are modern. The arch has yielded a little upwards, so as to be rather elliptical; its breadth 13 feet, height 7 feet. The width of the bridge was estimated at about 8 feet. Mr. Roach Smith believes it to be Roman work. The track leading from it to the south is called 'the Old Street.'

At Cawood, all that remains of the archiepiscopal palace (15th century) is a large chapel constructed of brick, and the

elegant gate-house, through which Wolsey passed in his hour of humiliation. A venerable chestnut, fish-ponds, extensive marks of old foundations, assist in carrying back the mind to one of the most remarkable periods of English history. At Riccall, a few miles below, the Norwegian fleet of Hardrada was moored, while the troops marched to victory at Fulford, followed by revelling, and death at Stamford Brig. On Skipwith Common are many tumuli, old banks, and the *slightly-marked foundations* of ancient (turf or log?) houses or wigwams. These, by some error of tradition, are called 'Danes' Hills,' but, on opening the tumuli, no confirmation of so modern a date appeared. *The tumuli are set in square fossæ*; the sides of the fossæ range north and south and east and west (true). Similar facts appear in connexion with the tumuli on Thorganby Common adjacent. Burnt ashes and bones occur in the mounds; facts which suffice to overthrow the supposition of these hills being funeral heaps of the Danes of the 11th century, for then they *buried* their dead. No instruments of metal, bone, or stone, or pottery were found. Skipwith Church is well worth an examination, as containing very late Saxon or very early Norman work in the tower.

A few miles further to south-east the Ouse arrives at Selby, and sweeps with a broad current near to the eastern termination of the grand old church of the Benedictine monastery, founded by the Conqueror (1069). Though its great tower has fallen, and some unfortunate restorations have been perpetrated, the Norman features of this noble fabric may be contemplated with high gratification.

Between Hemingbrough, with its fine church and lofty spire, and Drax Abbey (a priory of Augustine friars), the Ouse receives its largest tributary from the east, the Derwent.

#### THE DERWENT.

The DERWENT,—a common British name of northern rivers, in Cumberland, Durham, and Derbyshire, and not quite un-

known in the south (as Darent in Kent),—the 'fair water' of the east of Yorkshire, has a very singular course. Rising by many branches on the north-eastern moorlands, it drains the whole of that region lying south of Eskdale, by the Rye of Bilsdale, the Hodge Beck and Dove of Bransdale and Farndale, the Severn of Rosedale and Hartoftdale, the Costa of Newtondale, the Staindale Beck, and the many streams which water the region of Hackness and Harwooddale. We are thus brought near to the sea-side at Scarborough; but if we turn to the south, a more singular thing is observed. The Hartford Brook or river rises almost on the very cliff near Filey, at a height of about 100 feet from the sea, and flows westward, southward, and eastward, 100 miles before reaching it.

Many other rivulets than those here named join the Derwent, between its origin near Scarborough and New Malton, where it quits the Vale of Pickering to cross the Howardian Hills and enter the Vale of York, but it will not be necessary to notice them all.

Derwent Head may be fixed not far from the Flask Inn, between Scarborough and Whitby, but nearer to the latter place. The elevation of its moorland source may be about 600 feet. It is nearly met by a stream which flows northward to the Esk. Harwooddale is on the course of the Derwent before it enters the chain of oolitic hills which runs from Scarborough to Hambleton. Into this chain the valley enters deeply, and then winds remarkably. Several branch streams come into it, before reaching Hackness, below which it is shaded by the beautiful woods of the 'Forge Valley.' At Hackness was a cell to the monastery of Whitby. Monks sometimes established forges, of which the cinders remain witnesses at Hackness and Rievaulx. The hills on each side of the valley bear tumuli and extensive earthworks of British tribes. Some of the former have yielded rude and curious urns, burnt bones, beads, flint arrow-heads, and other Celtic reliquæ. They may be seen at Scarborough, in the possession of Mr. J. Tesseyman.

By the Old Tower at Ayton the Derwent leaves the beautiful valleys of Hackness, and enters the expanse of the Vale of Pickering. (See Appendix.)

In this vale the river runs westward, between the northern oolitic hills and the southern chalk wolds; each of these ranges having at its foot a long series of ancient villages, on a line of ancient (not Roman) road. In each case the facility of obtaining spring water, and the proximity of high ground fit for sheep pasture may be regarded as determining the sites of population in very early periods—probably pre-Roman—as on the range of the Cliff Row in Lincolnshire, and below the Chalk Downs of Surrey and Sussex, Wiltshire and Berkshire. Beyond these villages, on higher lands to the north, and again similarly to the south, camps and earthworks abound, some British, some Roman, others Saxon—the same physical conditions having continued through successive periods, the same local centres of population, and similar military arrangements.

Among these may be mentioned the Cawthorn Camps, on the ancient road from the 'Street' near Malton to 'Dunum Sinus' at or near Whitby, which were probably constructed by the 9th Legion (see Plans of Camps); the Scamridge Dikes, north of Ebberston, the work of a ruder people; Obtrush Roque, north of Kirkby Moorside, with a multitude of other tumuli on the hills; and the old British village of Cloughton, near Scarborough.

At Wykeham remains part of a priory of Cistercian nuns.

#### THE RYE.

On approaching Malton, one considerable stream enters the Derwent from the west, under the name of Rye (*Brit. Rhe*, swift). The origin of this river is on the edge of the moorland hills of Cleveland, west of Burton Head, whence it flows down Bilsdale, and, receiving a branch from Snilesworth Dale, enlivens the grounds of Rievaulx Abbey, and then, turning round to Helmsley, enters the Vale of Pickering. Bilsdale has some features of grandeur, and the pass out of it at the head gives a

magnificent view over part of Cleveland to Rosebury Topping. (See Lithograph, Pl. XVIII.) The scenery about Rievaulx is bold and well-wooded; the hills forming terraces on the east side, which continue round toward Helmsley.

The Cistercian Abbey, early English (founded 1131), of wonderful beauty, under a finely wooded hill, must be ranked among the noblest ruins in Yorkshire. Helmsley Castle—a fragment of the early English fortress, erected by De Roos, and the mansion of Lord Feversham, built by Wakefield in the style of Vanburgh, with its pictures and sculptures, add to the attractions of Ryedale.

In its eastward course from Helmsley the Rye receives the Dove, which has previously added the Hodgebeck from Bransdale to its current. The scenery on these rivers is much like that on the Rye, but not so extensive. On the line of the Bran, and 30 feet above its level, is the celebrated Cave of Kirkdale, from which so large a collection of the bones and teeth of hyæna, elephant, rhinoceros, ox, stag, &c., were gathered by Mr. Gibson and Mr. Salmond, and described by Dr. Buckland (see the Museum at York). In the same valley is the curious old church of Kirkdale, with its inscribed sun-dial, constructed in the days of Edward the Confessor (about 1060). The first accurate copy of this remarkable inscription which I have seen was given in the 'History of Whitby,' by the late Dr. Young (vol. ii. p. 743).

The design is arranged in three compartments: the central one contains the dial, on a semicircular plan, divided into eight hour spaces. The writing on the upper line of this compartment is—

DIS IS DÆGES SOL MERCA (This is day's sun-mark).

Below it on the semicircle—

ÆT ILCUM TIDE (at every time).

And at the bottom quite clearly—

✠AND HAWARD ME WROHTE AND BRAND P̄RS (And Haward me wrought, and Brand Priest).

On the two sides we have—

ORM . GAMAL .	CAN . AND TO FALAN . AND HE
SUNA BOHTE . <u>SCS</u>	HIT LET MACAN NEWAN FROM
GREGORIUS MIN	GRUNDE, CHRE . AND <u>SCS</u> GREGORI
STER . <u>ÐONNE</u> . HI	US . IN . EADWARD . DAGUM . <u>CNG</u> .
T . WES <u>ÆL</u> TO BRO	IN TOSTI . DAGUM . EORL ✠

(*i. e.* Orm, Gamal's son, bought St. Gregory's Minster, when it was all to broken and to fallen. He caused it to be renewed from ground, to Christ and St. Gregory in Edward's days the king, in Tosti's days the earl.)

Dr. Young mentions also another sun-dial, with an imperfect inscription, in the same style of lettering, with eight hour spaces, and probably of the same date, at Edstone, not far from Kirkdale. The inscriptions state, 'Lothan me wrohte'—and 'Orlogiratory' (Hour-circle).

The Hodgebeck is partly swallowed up by the limestone about Kirkdale, and issues again farther down the valley.

Kirkby Moorside is on the Dove, which like the river just named has a partly subterranean course. Here in a good private house—not 'the worst inn's worst room'—died George Villiers, the eccentric Duke of Buckingham.

Rosedale, with its conventual fragments (Benedictine, Rich. I.), sends down the Severn; near its course is the old church of Lastingham, with the still older crypt: on a neighbouring hill the Roman camps of Cawthorn, and extensive earthworks. The stream which comes by Stonegrave to join the Rye, has its farthest source in hills which overhang Byland Abbey, which, like Rievaulx, was of the Cistercian order, nearly coeval in its foundation (1177), equally admirable, and situated in a region of equal beauty.

This stream flows by Gilling Castle, a residence of the Fairfaxes, and near Hovingham, where in 1745 a hypocaust and bath, with leaden pipe, and a small tessellated pavement were discovered. At Eastness, near Hovingham (1616), a sarcophagus, placed north and south, was dug from a depth of 3 yards, bearing the following inscription,—by Valerius Vindicianus, in memory

of his wife and two sons. The reader will remark the omission of the usual dedication to the *Dii Manes* :—

TITIA PINTA VIXIT ANN . XXXVIII  
 ET VAL ADIVTORI VIXIT ANN . XX  
 ET VARIOLO VIXIT ANN XV . VAL  
 VINDICIANVS CONIVGI ET FILIIS  
 F . C .

Of the dales which descend from the north to join the Rye, none are more beautiful than the narrow winding glen through which, under the walls of Pickering Castle, the railway runs towards Whitby. It is difficult to suppose a more pleasing and romantic route than through the woody gill, shaded by lofty cliffs, crowned with rugged rocks, which, under the names of Pickering Dale, Newton Dale, and Goadland Dale, conducts us to the picturesque Vale of Esk and Port of Whitby.

Malton was certainly an important Roman station. The coins, urns, inscriptions, graves, baths, &c., sufficiently attest this fact. Founded, as most of the Roman stations were, in proximity to older British towns, we see here, as so often in Yorkshire, a double town—Old and New Malton on one side of the river, and Norton on the other. Roads of Roman use at least, lead westward by several villages with the suffix of ‘street’ to Yearsley Camp and Isurium; southward to Eburacum, eastward by Wharram le Street to the great road to Bridlington (*Prætorium*?). Another route (*Wade’s Causeway*) conducted northward to *Dunum Sinus*, near Whitby; and we may be confident a fifth led to the well-havened bay—the *κόλπος εὐλίμενος* of Ptolemy. Round Malton in several directions are important earthworks, probably not all of British construction. What was the name of this great station? Alas! lost with the Commentaries, if such ever existed, of Agricola—Hadrian—Severus! Malton was not *Camulodunum*—that was a southern *colonia*: it could not be *Derwentio*, as the late Dr. Young supposes, unless that was XVII. instead of VII. *millia passuum* from York.

A Roman inscription, dug up in 1753, is supposed to in-



dicate the usual burial-place of the Equites singulares, part of the body-guard of the emperor :—

D . M .  
AVR MA  
CRINVS E  
EQ SING AVG .

Mr. Copperthwaite has made known an inscription found at Old Malton, which is believed to have been placed as an invocation of good fortune at the shop-front of a goldsmith. Mr. Wright has given a figure and explanation of this unique monument\*. The inscription is thus read :—

FELICITER SIT  
GENIO LOQ:G:I  
SERVVLE VTERE  
FELIX TABERN  
AM AVREFI  
OINAM .

The fourth word is supposed to stand for *loci*.

Before following the course of the Derwent below Malton, we may pause to restore, in imagination, the ancient aspect of this part of Yorkshire. The general features of its valleys and hills were, no doubt, due to the action of sea-waves on its subsidence below and re-elevation above the level of the sea. To this general effect has been since added the surface influence of descending rains, and all the agency of atmospheric vicissitudes. The Vale of Pickering, originally a sea-valley in the strata, has been in great measure filled up by deposits of two kinds and successive ages. These may be seen on the cliffs which the *modern sea-action* has made by cutting into the basis of this vale near Filey. First upon the unequal floor of the strata is deposited detritus full of fragments of far-transported stones—the glacial drift of modern geologists. In hollows of this, which is a marine deposit, lie sediments derived from fresh water, often containing shells of

\* 'The Celt, the Roman, and the Saxon,' p. 247.

such water, peat, marls and clays. Such deposits lie very widely in the vale of Pickering, and teach us that at least much of its surface was inundated—if indeed the whole were not, for its general aspect suggests a great inland lake.

It is very conceivable that such a lake might exist, whether it discharged itself into the sea in an easterly direction, or drained away through the rocks at Malton, and that at some later time a practicable channel was opened at Malton, and the lake was gradually and partially drained, the vale being still subject to frequent inundation from the river.

The making of such a channel in the limestone at Malton by the river action is not inconceivable, if we remember the frequent subterranean courses of the rivers on the north side of the vale. Time might convert such concealed caverns into open passages, and lower greatly the level of the water in the vale. Before such change of level, Kirkdale Cave may have been at the edge of a lake, and in this respect may have agreed with a great number of other ossiferous caverns which are on record.

All things fairly weighed, no river in Yorkshire surpasses the Derwent in archæological interest. A few miles below Malton, it sweeps by the fragments of beautiful Kirkham (12th century), whose gateway, the latest piece of the priory, is nearly complete. The other parts of the fabric are romantically pleasing. Much laud to Walter L'Espece, the founder! At Westow in this vicinity, an earthen pot full of many bronze tools, as chisels, gouges, and celts, was found, and presented to the Yorkshire Museum. Aldby, placed on a bank above the river, and on the line of the old road from York to Malton (a Roman road or a British track), was the site of a Saxon palace.

Stamford Brig, two miles below Aldby, is the place to which the royal Northman is said to have retired to council after his victory at Fulford, and from which he set forth to a more disastrous battle; and on the wooden brig, which then crossed the Derwent a little above the place of the present arch, his champion fought right well. An annual boat-like cake is the village

monument to his fortunate enemy. The general current of opinion places the Derwentio of Antoninus at Stamford Brig. That a Roman mansio or small station was fixed in this vicinity can hardly be disputed, after seeing the urns and coins which have been dug up at Scoreby by Mr. Wood, and the votive altar recorded near Dunnington by Mr. Proctor. But surely, here, only seven miles from York, cannot be that Derwentio which gave a permanent name to the detachment of troops mentioned in the Notitia.

The river now flows by Kexby, Elvington, and Wheldrake, and receives a small branch from Pocklington at Cottingham. Ellerton Priory (of the 13th century), a little further south, and now a parish church, stands on the east bank. Wresill Castle, one of the most interesting of the many strongholds of the Percys, is still farther down the river on the same side, and close to the floodway of the Derwent, the navigation of which it must have commanded. Most readers would have shared the delight which Leland expresses in the following passage on Wresill:—  
 “One thing I liked exceedingly in one of the towers, that was a study called *Paradise*, where was a closet in the middle of eight squares, latified about, and at the top of every square was a desk ledged to set books or covers within them, and these seemed as joined hard to the top of the closet, and yet by pulling one or all would come down breast-high in rabettes, and serve for desks to lay books on.”

#### THE AIRE\*.

Airedale has an origin quite unlike that of any other great Yorkshire dale, for its river springs at once, a full stream, from under a huge cliff of limestone called Malham Cove, 285 feet in height. The water is supplied by subterraneous channels in the limestone; some, no doubt, comes by this means from Malham Water,—a beautiful lake, strangely placed on the high ground

\* ‘Air’ is a British word for ‘bright.’

to the north, from which a rill proceeds, but is soon absorbed by the jointed rocks.

Malham Cove is but part of a long line of this elevated limestone cliff, which, commencing near Kirkby Lonsdale, never loses its importance till we reach the border of Wharfedale, at Threshfield. The dislocation or fault which caused this inequality of the ground, is called the Craven Fault. Looking up at the front of the Cove, we perceive that *if* the water came flowing in abundance over the top, it would make a cascade of almost unrivalled grandeur—and it is *said* that such an event has occurred in consequence of some choking of the channels from Malham Water, in time of great floods. One mile east of the Cove, a chasm in the limestone cliff admits a small rill, to dash through its sinuosities, and give animation to one of the grandest rock-scenes in the north of England. This is Gordale, which is said to have first received its water in 1730, after a violent thunderstorm.

That part of the valley of the Aire which lies a few miles below the Cove is called Malham Dale. The inns are near Malham Cove, not at Kirkby Malham, where the parish church is.

Near Gargrave, which is a considerable trading village, a Roman villa was discovered. The name seems to be compounded from *Gaer* (camp) and *grave* (excavation); the former element indicating perhaps the proximity of a Roman station: the name of the adjoining place, *Broughton*, seems to give a similar hint, perhaps confirmed by the neighbouring hamlet of *Thornton*.

A considerable feeder from the same limestone range which gave birth to the Aire, joins that river below Gargrave. Other feeders come in by Broughton and Skipton; and now the Aire quits the green pastures and smooth rounded hills of Craven, and plunges into a deeper vale, roughened by ridges of millstone grit, at Kildwick, spreading widely toward the north at Silsden, and again contracted by rocks at Hawkliff, and opening to the south at Keighley. Rumeley's Moor, on the north, rising to the height of 1308 feet, offers many remarkable rocks, and some

traces of ancient population and worship: the hills on the south are not much inferior in height. The same general characters belong to this river as it sweeps by Bingley and Shipley, under the remarkable elevation called Baildon Hill\*, and the valley becomes narrower and more woody as we approach to Bramley Fall, whence so much gritstone has been taken for building purposes.

Kirkstall Abbey, placed below the rocky gorge of Bramley, stood amid pleasant meadows by the Aire, backed by rising grounds and ancient woods. It is still a splendid monument, mostly of the 12th century; the upper part of the tower is of later style.

Since the day when Henry de Lacy brought the Cistercians to this sweet retreat (1152), how changed are the scenes which the river looks upon! Then, from the high rocks of Malham, and the pastures of Craven to Loidis in Elmete, the deer, wild boar, and white bull were wandering in unfrequented woods, or wading in untainted waters, or roaming over boundless heaths. Now, hundreds of thousands of men of many races have extirpated the wood, dyed the waters with tints derived from other lands, turned the heaths into fertile fields, and filled the valley with mills and looms, water-wheels and engine-chimneys. Yet is not all the beauty of Airedale lost; nor should the thoughtful mind which now regards the busy stream of the Aire, lament the change. The quiet spinner is happier than the rude and violent hunter; the spirit of true religion fills these populous villages as well as once it filled those cloistered walls; the woods are gone, and in their place the iron road: but that road conducts the intelligent lover of beauty to other hills and dales where art has had no contest with nature, and by enabling him to compare one region with another, corrects his judgement, heightens his enjoyment, and deepens his sympathy with man.

Leeds was anciently 'Loidis in Elmete,' a small British territory, of which Barwick may have been the principal military

\* Here tumuli and entrenchments are seen.

post. From this tract the regulus Cereticus was expelled by Eadwin son of Ella, king of Northumberland, in 620. Barwick is said to have been a royal vill of Northumberland, and to have been surrounded by walls. The great mound ('Auld howe'), with its encircling ditch and other works, is well worthy of a visit. It may be studied in connexion with mounds at Killingbeck. Perhaps it retains the Gaelic name 'Barrach,' a high mound.

Roman remains have been found at several places near Leeds, on the north side of the Aire, especially at Adel Mill, where a camp has been traced on the line of Roman road from Ilkley to Bramham Moor. A sepulchral inscription at Adel reads thus :—

D . M . S  
CADIEDI  
NIAE FO(r)  
TVNA .  
PIA . V.A.X.

Another, imperfect, retains only

IVGI . PIENISS .  
H . S .

Three similar figures sculptured on one stone were supposed to represent the Deæ Matres (Horsley).

From Leeds to Castleford the Aire sweeps through fertile meadows below gently elevated, mostly well-wooded regions; in which Temple Newsham, Methley, and Ledstone are conspicuous houses. Coal is dug in all this tract,—a miracle achieved since Castleford was a frequented Roman station, the *Legeolium* of Antoninus. Here Rudgate, the great road from Isurium, crossed the Aire, no doubt by a ford at or near the head of the tide. There is no trace of the Roman camp, but coins and other antiquities of the empire have been dug up. Over the door of Methley Church was placed a mutilated statue of the Northumbrian king Oswald, who died in battle against

Penda (A.D. 642), and is the saint of the church. Pontefract Castle, of gloomy memories, is well worth a morning's visit. At Castleford, Calder joins the Aire.

#### THE CALDER.

Calder, a common name of northern rivers, seems to have Celtic roots, and to signify 'woodland water.' The Yorkshire river is composed of many branching streams, which originate in the rough gritstone hills on the south-western side of the county. These branches frequently descend through rude and craggy fissures, to which the name of 'Clough,' replacing 'Dale,' is applied. Flat marshy parts traversed by rivulets are called 'slacks.' The prominent hills are called 'edges' ('pikes' were surmounted by obelisks or heaps of stones), 'stones,' 'craggs,' and 'mosses,' according to their individual characters.

The main stream of Calder rises in a narrow dell between Rochdale and Todmorden, in close proximity to one of the sources of the Roch. This summit of drainage afforded the easiest passage from Yorkshire to Lancashire for the Rochdale Canal. At a later time it has been traversed by the Leeds and Manchester Railway.

From this point the stream descends amid scenery characterized by rocks of millstone grit, to Todmorden, receiving there a branch rivulet from Maiden Cross and Stiperden, in the direction of Burnley; then running almost under Studley Pike to Hebden Bridge, it is augmented by the water from the rough and wild slopes of Heptenstall. At Mytholm a small stream, and at Sowerby Bridge a larger feeder, enter Calder from Blackstone Edge. Halifax sends an auxiliary from the north, and at Cooper Bridge the Colne arrives from Huddersfield, bringing water from Marsden, Pule Hill, and Stanedge, and from Holmfirth and the elevated ground about Holme Moss, 1859 feet high. Under Pule Hill the long tunnels of the Huddersfield Canal and Railway pass ( $3\frac{1}{4}$  miles).

Almondbury, near Huddersfield, has been often indicated as the site of Cambodunum—on the Antonine Iter from York to Mancunium. The works at the Castle Hill, near Almondbury (or Albanbury), are, however, believed by Horsley to be of later date. It is a very large parish. Huddersfield is likewise a large parish, and both probably were of importance in Saxon days. The name of the river ‘Colne’ is given to other streams which adjoined Roman stations and Colonix, as at Colne in Lancashire, and Colchester. Cambodunum is by Hunter, our latest writer, referred to Gretland (near Elland) on the Calder, chiefly on the evidence of the altar mentioned below. Cambodunum, containing the Gaelic element of *dun*, hill or hill-fortress, should perhaps be looked for in an elevated site.

“At Gretland, on the top of a mountain inaccessible except on one side, was dug up this votive altar, dedicated, as it should seem, to the tutelar deity of the Brigantes (A.D. 209).”—Gough’s Camden, iii. 236.

On one side—

DVI . CI . BRIG .  
 ET . NVM AVGG .  
 T . AVR . AVRELIAN  
 VS . DD PRO SE .  
 ET SVIS . S . M . A . G . S .

That is to say:—DVI Civitatis Brigantum et numinibus Augustorum Titus Aurelius Aurelianus dedicavit pro se et suis. (S . M . A . G . S . have been explained as—Susceptum merito animo grato solvit.)

On the other side—

ANTONINO  
 III . ET GET . COSS .

Or (Antonino tertium et Geta Consulibus).

Near Stainland have been found several Roman coins. At Slack, in this township, many antiquaries have placed Cambodunum, and there are indications that it was a station of im-



portance. On the site of a Roman temple here a votive altar was found, bearing the inscription :—

FORTVNAE  
SACRVM  
C . ANTO . MODES  
) . LEG . VI . VIC . or P . F.  
V . S . L . M .

Or, (*Fortunæ sacrum, Caius Antonius Modestus Centurio, Legionis Sextæ victricis, piæ, fidelis, votum solvit lubens merito*).

Many other remains of less importance indicate the occupation of this country by the Roman soldiers, especially a small square camp at Kirklees. When Bede says *Campodonum* was destroyed by *Ceadwalla* and *Penda*, does he mean *Cambodunum*?

Hence by *Mirfield* and *Dewsbury* (where *Paulinus* is said to have preached Christianity to the Saxons, about A.D. 626), and *Horbury* to *Wakefield*, the *Calder* traverses a pleasing vale, which, like the greater part of the course of this stream, is well wooded. Filled with manufacturing establishments from almost its very source, it is refreshing to be reminded of other days by the ruins of *Sandal Castle*,—fatal to the *White Rose*,—the *Chapel on Wakefield Bridge*, lately restored, and what was the *Nunnery at Heath*. From the foot of this last-mentioned hill the stream takes a winding course by *Stanley* and *Altofts* to its junction with the *Aire* at *Castleford*.

At *Lingwell Gate*, north of *Wakefield*, clay-moulds for the fabrication of Roman imperial coins by fusion, and castings were found; in one of the moulds a coin. They were accompanied by a crucible. The coins thus forged extend from *Hadrian* to *Alexander Severus*\*.

\* *Memoirs of the York Meeting of the Arch. Inst.*

## AIRE AND CALDER.

At Castleford, the Aire, reinforced by the Calder, enters the magnesian limestone range, and continues in it through the smoke of innumerable kilns to Knottingley,—giving easy access to the valuable building-stone and limestone of Weldon, Brotherton and Knottingley, and the gypsum of Fairburn. It is a melancholy description of Ferrybridge, to say that it *was* formerly on the great road from York to London. The course of the river is now through low lands to Snaith, Rawcliff and Airmin, where it joins the Ouse.

Before quitting the valleys of the Aire and Calder, it seems worth recalling to memory, that the flat meadows which margin these streams, through a great part of their course, are formed by gradual deposits from freshwater inundations and the tide, laid upon a more rugged and uneven basis, which was an old arm of the sea. In the vale of Calder, for some distance above Altofts, glacial drift is found below the alluvial sediment. In the same valley, at Stanley, this alluvial sediment at 16 feet in depth contained a British canoe scooped out of an oak-tree. This deposit by the side of the Aire at Ferrybridge contained coins of Edward I., below these, oars of an ancient boat, and still lower, a buried forest of hazels, with nuts; the kernels of the nuts and central parts of the wood *petrified* in certain spaces of the woody layer. Bones of deer accompanied this curious deposit (see Phil. Mag. 1827).

The Ouse, now widening and making a large sweep within sight of Howden and its noble church, passes by Hooke to receive the Dun at Goole.

## THE DUN.

The DUN, called by Camden Dan and Dane, also, but not properly, named *on maps* the 'Don,' has a double source; the same hills giving origin to the Dun and the Little Dun; they

also give birth to the Etherow, a picturesque stream of Cheshire, and the Wrongsley, a branch of the Derbyshire Derwent; and under them the railway is carried from the Dun at Dunford Bridge to the Etherow at Woodhead. A little to the north is the most elevated point of this district, Holme Moss (1859 feet O.S.). The most picturesque aspect of these hills is to the west; the upper parts of the valley of the Dun are dreary enough; nor till we pass Penistone is the barrenness of the surface much relieved. There, however, the features of the ground are more favourable, the left bank becomes bold, near Thurgoland rocky, and under Wharnccliffe, a rich and ancient wood, formerly haunted by the Dragon of Wantley, whatever that may have been. Whoever loves an oak forest, skirting broad and mighty hills, over a deep glen and rapid river, should linger an hour at Wharnccliffe Lodge, built by the good knight of Wortley to hear 'the hartys bell,' and be soothed by the murmurs of the Dun.

This woodland character of the Dun is still remarkable in many parts of its course, and on some of its branches above Sheffield it is a source of great beauty, as on the Sheaf, toward Beauchief and Dore Abbey. Formerly the hill-sides on the south of Sheffield, round the castle and manor where the Queen of Scots was confined, were thickly clothed with forest trees; and much of the neighbouring country, especially on the north side of the valley, remains in a state to illustrate and justify the opening scenes of 'Ivanhoe.'

As examples, the wide regions of Wentworth and Tankersley; of Silkstone, Bretton, Wolley, and Barnsley, may be quoted; oak being the prevalent and self-sown tree on this argillaceous and gritstone soil, as the ash is indigenous on the limestone.

"Before the Dun reaches Rotherham it passes by *Templeborough*, a fair Roman camp, the north-east worn away by the river, the area about 200 paces by 120, the ditch 37 paces deep from the middle of the vallum to the bottom. The outer bank is covered by large trees, and on the side of the road was a bark-

less chestnut tree, scarce fathomable by three men. On the north side of the river, opposite to this work, is *Wincobank*, a high hill from which a large bank is carried almost four miles without interruption, called in one place *Danesbank*.”—(Gough’s *Camden*, iii. p. 266.)

The Roman road is supposed to have crossed the river here, in its course northward from Chesterfield, to which place it has been traced from Derby under the name of Rykniel Street.

The Rother, a stream of some importance, entering from the south, brings much water from Derbyshire, to join the Dun near Rotherham.

From Sheffield by Rotherham, Thryburgh and Mexborough, the Dun holds its course through a varied country, usually in a broad vale; but on approaching Conisbrough, it faces the terrace-like range of magnesian limestone, and becomes shut in by the cliffs of that rock. Conisbrough Castle now appears on its rocky mound—itself a rock, begirt with ancient trees—perhaps a monument of the Norman Earl Warrenne, certainly not of Harold or Hengist, or any Saxon prince, whatever may be the date of the neighbouring tumulus, which is popularly regarded as the tomb of vanquished or worn-out Hengist. A sculptured stone of Saxon date, lying in Conisbrough churchyard, is figured in Gough’s *Camden*, vol. ii. pl. 14. [The Castle at Tickhill was on a very similar plan, and raised on a mound, modified by art.] Conisbrough was called *Caer Conan* by the later Britons. Near it is Edlington (*Edel*, noble); on the opposite side of the river, Sprotbrough, Barnbrough, and many other names indicating proximity to some ancient camp or military strength. From Sprotbrough a bank runs northward several miles toward York. Probably these names have no reference to the Roman *Danum* (Doncaster), but rather to a station on the old road (British or Roman?) which leads by Street Lane near Barnbrough, and Old Street, near Hooton Pagnell, and may be the continuation of Rykniel Street.

On regarding the course of the Dun, we perceive that along

the whole line from Doncaster to Rotherham and Sheffield, it is marked by banks, castles, camps, and the names of fortified places. These are most extensive on the northern side, and are of such a character as belongs not at all to Roman, but rather to British work. The name of Wincobank belongs to one of the most characteristic parts. In connection with this line of defence, west of Sheffield, is an ancient road leading across the moors, in the direction of Hope and Mam Tor; at the former of which is a Roman camp, and at the latter a British fortress. The Roman station, being on the south side of the line thus traced, corresponds perhaps with the camp at Templebrough, near Rotherham, on the south side of the Wincobank works, and with Conisbrough Camp and Doncaster Camp on the south of the Dun.

The earthworks about Catterick, connected as they seem to be with old British stations at Bowes, Brough, and Kirkby Thore, seem to mark another line of defence on the north of this county; but as no such continuous works appear on the west, we may perhaps conclude that in that direction the territory was united across the Cumbrian Lakes and the plains of Lancashire. Similar lines of earthworks to those of the Dun Valley have been long known along the edge of the Cotswolds, and have given rise to much speculation. They appear to have the same general character as the earthworks on the north and south sides of the Vale of Pickering.

Doncaster, one of the prettiest towns in the north of England, and most desirable as a place of residence, is known in the Antonine Itinerary as Danum. It was on the line of the great Roman road from Eburacum to Lindum, and was, no doubt, a British settlement at the head of tide, as Castleford on the Aire, Tadcaster on the Wharfe, Aldborough on the Ure.

In digging the cellars of Mr. Jarratt's house in Doncaster, March 1781, was found, six feet underground, the elegant altar engraved in Gough's 'Camden,' pl. 13. f. 1, 2, 3, 4, in height about 2 feet 6 inches, inscribed to the *Deæ matres* by M. Nantoniæ Orbitalis.

We might have expected many other monuments of Roman date, for Danum was the quarters of the Prefect of Crispinian Horse under the Dux Britanniarum, in the last years of Imperial sway in Britain. The old church of Doncaster, a rich and elegant example of perpendicular English architecture, was destroyed by fire (Feb. 1853).

From Doncaster toward Thorne the river runs in a flat district, in which its course appears to have varied much. At present, after passing the little town of Thorne (where Roman remains occur), the river turns north, for a few miles, and receives the picturesque river Went from the west (Appendix).

The Dun then flows eastward by an artificial cut to the new and thriving port of Goole, on the Ouse. This cut was made by Vermuyden the engineer, and from him it is named the Dutch River. Before the making of this cut, the Dun flowed northward into the Aire near Snaith, and the old channel is yet traceable, though much filled up: when a boy I have crossed it by bridges.

But this deviation of the river by art seems to have been preceded by others effected by nature. We find on the maps indeed between Thorne and the Trent, an old winding river channel called 'The Old Dun,' and this channel appears fairly traced from the north side of Hatfield Chace down to the out-fall of the Trent at Adlingfleet, being the county boundary.

Southward of this point, the same winding course continues, and is called 'The Old Idle,' this being also the county boundary. If the Dun could be supposed to have ever flowed from Thorne by the line now taken by the Keadby Canal, this now somewhat puzzling part of the map would become intelligible. Such variations are by no means uncommon on rivers which flow through low marshy districts, and receive high tides, and great inundations from the upland.

Hatfield Chace is a great peat marsh; Thorne Waste, a similar expanse. Both are now drained by artificial means, and in the excavations appeared the roots and stems of innumerable oak-trees, some apparently cut down with axes and wedges, others

burnt down. Roman coins also have been found with them (see De la Pryme, Phil. Trans. 1701). Skeletons of deer occur in the peat.

A singular specimen was sent from Thorne to the Yorkshire Museum in 1831, the cranium, jaws and teeth of a deer converted into leather; a circumstance easily explained by the dissolution of the earthy part of the bone by sulphuric acid (common in peat), and the action of the tannin of the peat on the residual gelatine.

At Hatfield (Heathfield), Edwin, the first Christian king of Northumbria, was slain with his son Offrid in 633, by Penda and Ceadwalla.

Reinforced by the great river Trent, Ouse acquires the higher dignity of an arm of the sea, and assumes the name of Humber. As an arm of the sea we shall treat of it hereafter, and now proceed to the only remaining affluent of importance on its northern banks, viz. the river Hull.

#### THE HULL.

The HULL is the river of Holderness, a great natural district of extensive marshes and silt lands, ramified among low hills of gravel, sand and clay,—materials drifted from the northern and north-western parts of England, and enclosing some rocks derived from Scotland and Norway, or more distant regions. In hollows of these masses occur small lacustrine deposits, with bones of elk, stag, boar, &c., while in them and in the drift, and in the flinty covering of the chalk, elephants' bones sometimes occur. This country has much planted, but no natural wood; yet in the lacustrine deposits and in the ramified peaty valleys, oak, yew and fir occur abundantly, as in Hatfield Chace and Thorne Waste; and they are found sometimes far below the level of tide, the land being drained by machinery.

The Hull, springing with the clear trout-streams of Driffeld (Deira-feld), the seat of Saxon power in Holderness (Höll-deiranness), and Kilham, flows in marshy ground among gravelly hills

which resemble the 'äsars' of Scania—the 'escars' of Mayo—and in a less degree the 'moraine' of glacial countries—such as the hills of Kelk and Brandsburton. Small affluents enter it from the wolds which rise to the west, and drains come into it from the lower grounds on the east, but it is still a small stream where it passes Beverley to join the Humber. The Hull has no pictorial interest, but its course is marked by monuments of man which awaken sympathy and curiosity.

It flows from the district where Ida—'flame-bearing'—landed to conquer Northumbria. At Driffeld the mound is raised over Anglo-Saxon dead; at Danesdale are the numerous graves of their piratical foes; and at Beverley was the shrine of St. John, preceded by an earlier settlement marked by 'four stones,' from which we infer that it was the British *Pedwarllech* and Greek *Petouaria*, chief city of the *Parisoi*, as it still is of the East Riding. From Pedwarllech we have Bevorlac, Beverley.

To St. John of Beverley Athelstane offered the sword which had waved in triumph at Brunanburgh, perhaps the greatest of Anglo-Saxon victories. Here, in later times, we have Meaux Abbey,—in the isles of Holderness,—the renewed and glorified Minster of the 13th century, St. Mary's Church, which even in Beverley is admirable, an ancient gateway, and a town full of mediæval memories.

A few miles further in its course is the King's town upon Hull, which Edward I. fostered; and which, while trade was deserting Hedon, and the sea was destroying Ravenspurn, rose to be the emporium of the eastern coast.

#### THE GYPSEYS.

Of these variable and intermittent streams which appear on the surface of the chalk valleys in Yorkshire, the principal, rising at Wold Newton, runs by a short course to Burton Fleming, Maiden Grain, Rudston, Boynton, and Bridlington Quay. Another bursts forth with violence, after wet seasons, at Kilham. The wolds of Yorkshire absorb so freely the rain



which falls, and allow it so easily to pass for great distances underground, that many of the valleys are dry for miles, and springs burst out naturally, or may be obtained by art, at points beyond the chalky surface. The artificial process is exemplified in artesian wells; the natural efflux by the intermittent spring in the harbour of Bridlington.

At Rudston, on the high ground south of the principal Gypsey, is a famous monolith, possibly sacred in Saxon times, and so named 'Roodstone,' *i. e.* Stone of the Cross; but also possibly a Druid stone of earlier date, dear to an earlier creed. It is taller than any one of the stones of Boroughbridge, being 29 feet above the surface, and is reported to be rooted even deeper in the ground. It is *not* a mass of the same kind of stone, but consists of a finer-grained grit, such as might easily be obtained on the northern moorlands, about Cloughton, beyond Scarborough, to which ancient British settlement a road led from Rudston by Burton Fleming and Staxton. Near Wold Newton, in 1795, a great meteorite or mass of iron 56 lbs. in weight fell from the sky, and penetrated the earth to the depth of a foot. It is now conspicuous in the British Museum. In this neighbourhood are several camps and many earth-mounds.

#### THE ESK.

The Esk, flowing eastward to Whitby, and the Leven, running westward to Yarm, are tenants of the same valley in the upper part of their course, near Rosebury Topping. The easternmost fork of the Leven runs toward the Esk, and is only diverted from it by a low swell, not 10 feet above its own level, probably formed of detrital matter laid in the previously excavated valley. All the considerable feeders of the Esk run in 'Dales'; and the waterfalls on them are 'Forces,' as in the north-western parts of Yorkshire. The hills, however, are not called 'Fells,' which would have completed the Norwegian affinity, but 'Moors,' and their edges are frequently called 'Banks.' Tumuli scattered on the

summits are called 'Hows'; and the small streams receive the name of 'Beck.' The name of the river is Celtic, but the greater part of the local names are Teutonic. The Esk flows in a synclinal depression of the strata, and from its head, 500 feet above the sea, to its mouth is a succession of pleasing and romantic scenery, which only the want of roads prevents from being much resorted to. Entering the Esk, and varying its scenery, are many short lateral rivulets, the most considerable being on the south side. In the highest of these, Baysdale, darkened by pines in the lower part, was a retired abbey; Westerdale, a forked valley, succeeds; then the fine extended hollow of Danby Dale; next, the two pretty and picturesque dales of Fryop; then, neglecting some small streams, we come to the narrow and at the lower end rugged Glaizedale. The expansive and pleasing hollow of Goadland succeeds, and then the woody Iburndale, and the equally umbrageous glen of Cock Mill Beck.

But Eskdale itself deserves further notice. Leaving its summit, and the bold hills between which it looks through Kildale into Cleveland, we descend with a cheerful rivulet through a remarkably pretty rural tract called Commondale, where abundance of trees, neat farms and cottages, curiously varied ground, and a stream winding in a thousand curvatures among narrow meadows and corn-fields, make pleasing home scenes, often completed by the brown and purple hills which range above all. Below this scene we come upon the old elevated mound of Castleton,—a feudal stronghold,—if indeed it be not a relic of earlier oppression. A mile lower down, on the same south side of the valley, is what remains of Danby Castle,—also elevated above the valley. The dullest part of Eskdale succeeds, but changes on approaching Glaizedale to scenes of picturesque and uncommon beauty. The river is in fact barred from a direct course by cross ridges of sandstone and shale, through which its deep and winding channel is cut. Through the woods which cover the greater part of the surface the shale peeps out in high dark cliffs, and here and there white crags of gritstone appear on the

edges. Often, too, they lie in huge confusion on the slopes, or make islands in the water, and serve with fallen trees for cheap and primitive bridges. Not a house in this wild sylvan scene, nor a sound save that of the swift Esk breaking into a thousand falls, and running by its own sweet will in many little streams. In autumn the rich hues of the decaying foliage are charmingly lighted up by the fresh green leaves and bright red berries of the holly. This pleasant bit of Eskdale can be well seen in a short walk from Egton Bridge, where the modest 'public' ('Oak-tree') may satisfy a lover of nature. Those who like feasting in the open air may recline by the romantic Beggar's Bridge\*, or climb to the summit of 'Arncliffe Wood,' or 'Mount Snowdon.'

The Esk here flows by some reliques of British, Roman, and Mediæval remains of interest. We are indebted to the late Dr. Young of Whitby for a notice of the singular traces of British dwellings at Egton Grange. Eskdale continues full of a pleasing rural and woodland scenery by Grosmont Bridge and Sleights, above which are bold moorlands.

At Grosmont was an abbey (now a farmhouse), whose name is derived from the parent abbey of Gramont in France (12th century). There is a ruined chapel at Sleights. On the north side of the valley, the residences of Grove and Woodlands show by their names the nature of their situation.

Below Ruswarp the valley is a large natural amphitheatre; from which the river wanders a little among the woods of Larpool, and then turns to enter the sea, under the bold cliff which is crowned by the famous abbey of Streonshalh, the most interesting monastic ruin in this part of Yorkshire.

A little to the north is Mulgrave Castle, and near it the site of the older structure of the real or mythical Saxon leader Wada, from whom the older Roman road leading from Malton to Dunsley (Dunum Sinus), is called 'Wade's Causeway.'

In its own beautiful course and in those of its tributaries, the

\* The subject of some graceful verses by Mrs. George Dawson.

Esk exhibits many small rushes and falls of water; the most famous in the district is that remote and solitary cascade near the head of Little Beck, called 'Falling Force.' The crown of this cascade is ferruginous gritstone, such as usually covers the upper Lias shale; over and in front of that shale the water streams; and then rushes northward in a long, narrow, nearly straight channel margined by woods.

In Goadland Dale we have Thomason's Force, a very pretty wood-adorned rush of water.

The district from which the Esk draws its supplies is quite as much occupied by memorials of the dead as by the houses of the living. For not only are tumuli seen on most of the conspicuous hills—Lilhoe, Silhoe, Loosehoe, Danby Beacon, Swarthhoe, &c., but on lower parts of the surface circular pits, the bases of British huts, are seen in great number. In the excellent 'History of Whitby' by Dr. Young, we have a full account of the observations made by Mr. Bird and himself on these curious dwellings of our forefathers.

In general, as in the double series which encircles the summit of Rosebury Topping, only circular hollows appear—not unlike swallow-holes. But at Egton Grange in Eskdale, the cavities, which vary in diameter from 8 to 18 feet and in depth from 3 to 6 feet, have a raised border of earth and stones, with usually an opening on one side. Some have been built round within in the form of a well.

Killing Pits, one mile south of Goadland Chapel; Hole Pits, a little south of Westerdale Chapel; a few near Ugthorpe; and a large group between Danby Beacon and Wapley, have the same general characters. In the last situation they are ranged in two straight lines, as if on two sides of a street. The pits are about 10 feet in diameter. Near them are several tumuli and some high monoliths. Within the drainage of the Derwent such remains are perhaps even more numerous, and trenches on the terminal points and edges of hills are countless. (See Mr. Newton's Map of British and Roman Yorkshire.)

## THE RIBBLE.

The RIBBLE rises near the edge of Wensleydale, on the west of Cam Fell, by small branches, whose variable sources are about 1300 feet above the sea. These gather toward the centre of the space between Whernside, Cam Fell, and Ingleborough, where in the broad limestone area is the feeble but constant rill which is honoured with the title of Ribble Head (about 1000 feet). Near this is Gearstones—anciently ‘Deer Stones,’—a comfortable inn, the best station for exploring the mountains round the sources of Ribble.

From Ribblehead the stream descends through limestone a few miles, and then enters the singular band of slaty Silurian rocks which lie under that limestone in Craven. Small streams come in from the east, their courses partly interrupted by the numerous ‘swallow-holes’ which are so common in the limestone ranges of Yorkshire. Still smaller rills enter from the west, and in one of these under Moughton Scar, an uncommon junction may be seen of the limestone and Silurians with interposed beds not known elsewhere. The Silurian strata dip in various directions very steeply, but their top is nearly level, as if cut off or planed away by some great and widely acting force; and the limestone lies level above them. The slate or rather flagstone quarries near Horton yield *Orthoceratites*, *Favosites*, and *Lituites* but rarely. Penyghent on one side and Ingleborough on the other, each rising above broad and lofty scars of limestone, make this part of Ribblesdale very interesting.

Swallow-holes, fantastic little glens and caverns, diversify the aspect of the limestone. Among these may be noticed a long subterranean passage, once ornamented by stalactites, called Catknot Cave, near Gearstones; Allen or Hellen Pot, near Sel-side—a deep and gloomy Avernus, connected with other remarkable and complicated caverns called Long Churn and Diccán Pot, difficult of access, but rendered interesting by underground falls of water; Browgill, on the east side of the dale, gives sub-

terranean passage to a small rill, and expands into great cavities. To enumerate all the caves and remarkable chasms and hollows in this part of the country would be tedious and unnecessary. The mountains are thoroughly cavernous.

Geologists will be rewarded for inquiring into the remarkable distribution, over limited breadths, and to elevations somewhat exceeding 1200 feet, of blocks of the slaty and calliard masses which fill a large space about Horton in Ribblesdale, and between this place and the village of Austwick. Here they are *in situ*, occupying what, with reference to the limestone hills around, may be regarded on the whole as a hollow space between two elevated ranges of limestone, of which the northern is the higher, that on the south being depressed by the Craven Fault.

From this hollow, regarded in a general sense, masses of the slaty rocks have been drifted by some force of water to the south-west, south, and south-east, not merely or even mainly by the valleys, but over the high ground,—so as to rest on the limestone hills above Ingleborough House and Austwick, on the elevated ridges of Feizer, on the summit of Giggleswick Scar, and at still greater heights on the rugged mountain over Stainforth, Langcliffe and Settle, and eastward of this place toward the summit of the road to Malham Cove. The greatest elevation reached by the slaty rock, *in situ*, in the district, is about 1160 feet in Moughton Fell, the limestone there rising over it to the height of 1404 feet. It is at about the same height under the bare limestone of Long Scar. The hills on to which it has been drifted southward do not in general rise so high as this; but Feizer is about 30 feet higher, and the point on the hills over Settle which is reached by the blocks, in considerable number and of great magnitude, is not less than 1350 feet—nearly 200 feet above the highest part of the native rock. Still more singular is the fact, that the limestone of Long Scar, the hill which rises over the slate to a height nearly the same as that of Moughton Fell, is covered by very many of these blocks brought from below, and scattered on the surface to a height of not less than 1260 feet.

The blocks are very often perched; show no marks of abrasion; no other drift matter is with them; they are collected sometimes into small groups; and they may be regarded as having been uplifted and floated by ice, and dropped on surfaces which had been swept by currents clear of other loose matter.

In lower ground, to the southward, westward, and eastward, the slaty blocks have been carried very much further; in this case they are no longer solitary, but mixed with other sorts of detrital matter, and occasionally show marks of attrition in water—which they never do on the high limestone hills (see the Lithograph, Pl. V.).

The river quits the elevated region which is north of the Craven Fault at Settle, the limestone country here dropping suddenly down 1000 feet. Long picturesque cliffs mark the line of this singular and enormous displacement. Of these great scars, Giggleswick, on the west, is perhaps the most remarkable; Castleber, above Settle, is also a fine mass of rock, worth ascending. At the foot of Giggleswick Scar is a small spring, subject to uncertain fits of rising and falling,—a phenomenon which the stone basin into which it flows renders apparent. Variable pressure on the water, derived from a curved or siphonal passage underground, is the principle on which explanations have been offered for this and other such springs by Gough and other writers, and the effect may be copied by artificial experiments. In dry seasons it is useless to wait for the performance.

The course of the river is southward by Hellifield Peel (an ancient rural tower of defence) and Gisburn, where still the old breed of almost white cattle, which formerly roamed in the forests of the north of England, may be seen. At Bolton by Bolland, an ancient mansion which once sheltered Henry VI., caverns appear in the limestone. A little further down the river is the admired ruin of Sawley Abbey (Cistercian, 1147).

The Ribble now becomes for a few miles the boundary between Yorkshire and Lancashire, leaving on the Lancashire side

the town and picturesque castle rock of Clitheroe. The Hodder, which now enters the Ribble from Chipping, nearly at the same point as the Calder from Colne, is emphatically the river of Bolland Forest, in the midst of which it discloses and traverses considerable breadths of limestone, surrounded by the usual gritstone hills. Caverns occur in the limestone, and veins and nests of calamine and lead ore, which seem to have been very anciently worked. Through this district a Roman road runs from Ribchester (Coccium?) to Over-Burrow (Bremetonacæ?) near Kirkby Lonsdale.

Here, in sight of Pendle Hill, Ribble bids farewell to Yorkshire, but does not quit the Brigantian territory till it reaches the sea below Preston. In this part of its course, Whalley Abbey and Ribchester Station might detain us long and pleasantly; and Samlesbury, which perhaps retains a part of the name Belisama, the river noticed by Ptolemy; and Cuerdale, with its treasure of coins; and Preston, surnamed the 'proud'—but these are in the territory of the Red Rose, and in the pages of Whitaker.

#### THE LUNE.

The LUNE belongs to Yorkshire only as a beautiful border stream, at the western foot of Hougill Fells; but it draws so much water from this county, and is so connected with three of its western dales, that its course must be traced, and a pleasant task it is. There is perhaps no more delightful stream than this. High mountains stand around its springs, rich woods and pastures accompany its seaward course, and a magnificent castle looks over the tide which enters its winding channel. Is it possible that this noble stream was neglected by Rome? No road up its alluring banks? There is such a road, though few of our antiquaries have followed its course.

On the north front of Hougill Fells, the country is roughly swollen into irregular eminences, which upon the whole stretch out and decline northward, and allow many 'becks' of unequal



size to flow between them to a general receiving drain, running to the west: thus the Lune is collected. At Tebay it receives a considerable addition from Shap Fells on the N.W., and then turns south through the chain of Silurian rocks which connect Hougill Fells with the hills above Ambleside. Its course through these rocks, by Borrobridge and Crooks of Lune, is rather tortuous and difficult, and productive of many beautiful variations.

In the vicinity of Sedbergh it receives the Rother, after that stream has gathered to itself the waters of Garsdale and Dentdale. The Rother collects its first water from the slopes of Swarth Fell and Wild Boar Bell; from Hougill Fell it receives the produce of the Cautley Spout, a lofty waterfall on a lofty hillside; and passes by Blue Caster,—a tempting name for the follower of Roman roads. Garsdale is a deep but not very interesting glen, yielding excellent grey marble. Dentdale is more romantic, and has a wild aspect in the upper part, which is under the steep of Whernside: black marble is obtained in this dale.

The Lune now runs southward in a rich and pleasing vale, frequently contracted by *terraces*, which mark ancient and higher levels of water, when Lunedale was an arm of the sea (a circumstance common on our rivers from the Tees to the Dun). Rigmaiden Hall, the waterfalls on Barbon Beck, and the Roman camp at Casterton, conduct us to Kirkby Lonsdale, the very modest capital of Lunedale. Here the river winds amidst beautiful woodland scenes, with fine mountains on the east and north, and above the old bridge is a series of picturesque rapids over the limestone, here thrown down 1000 feet below its usual level. The views from Kirkby Lonsdale churchyard and the grounds above the town are much admired.

The Roman road from Manchester, by Ribchester and Overburrow, was continued by Casterton, Barbon, and the small camp at High Borrobridge, toward the greater road by Brough, but its exact course beyond Borrobridge has not been certainly demonstrated.

In dry seasons the channel of the stream which descends from Great Colne and Gragreth to Leck and Over-burrow to join the Lune, is a wild hollow of stones; in wet seasons these are rolled along by a powerful torrent. In ascending the stream we find not only its actual banks, but considerable hills on its sides to be composed of similar materials, drifted together by some earlier forces of water. Farther upward these pebble-banks give place to the native slaty rock, which has been their prolific parent, and the little stream winds, falls, and rushes through these rocks with a great variety of beautiful and intricate scenery. On a small scale it is indeed admirable, especially when the beck is reduced by long-continued drought to the few pure and perpetual feeders which are its proper source. The water is then of a clear and beautiful green, and is collected in little fairy pools, or pouring in tiny cascades over the blue slaty rocks which it has sculptured and perforated in a thousand ways. Hazel, holly, ivy, mountain ash, and a hundred other humbler plants, combine with the heathy ground and the lichen-grey rocks into minutely beautiful pictures.

Still farther up the valley the limestone dips into the stream and gives occasion to entirely different and equally curious scenes.

The channel divides into several small branches; one which bears the most water being otherwise the least marked. Another, through which in dry weather hardly a rill is seen—yet even in that state is almost impassable on account of its deep pools, shut in by steep precipices—becomes in a rainy season a wild chaos of tempestuous water. This is Easgill, one of the most singular little glens to be anywhere found. For several hundred yards along its course through the Scar limestone, this rock is wasted and perforated by the elements into a great variety of fantastic shapes.

The interior is wasted as much as the surface, and a great number of caves are formed by the action of water on the great interior fissures, which mostly range N.W. and S.E., as in In-

gleborough Cave. These are partly laid open by the falling away of the limestone, and give occasion to the name of Easgill Kirk, which is applied to the narrow and irregular passage. As usual there is a good deal of wood about the caverns.

One of the least accessible of these openings is at the level of the water, and has a fine holly growing over it. Only sure-footed pedestrians should attempt to follow all the windings of Leck Beck; and Easgill Kirk, though it can be approached by a carriage, requires cautious footsteps for inspection. The return to Kirkby Lonsdale may be made over Casterton Low Fell.

Near Tunstall the Lune is augmented by the Greta, which brings the drainage of Whernside, Ingleborough, and Gragreth, through the two remarkable dales called Kingsdale and Chapeldale. The scenery on these streams is of a simple description, for it consists of little but the dale expanded between two gigantic insulated mountains, and the effect is very much dependent on the hour of day; early morning and late evening give grand and admirable effects. In Chapeldale are the fine limestone caverns of Weathercote, Gatekirk, &c., already noticed (pp. 29, 30). Below all these caves the Greta appears in a regular channel on the green slaty rocks of Ingleton, which are largely quarried, and though they yield no fossils, their vertical cleavage, under horizontal limestone scars, bands of calliard, traces of felspathic dykes, and remarkable crystals of pyrites, are worthy of attention.

Kingsdale has its origin in the south-western slopes of Whernside, but soon, transformed into a lonely glen of the Scar limestone, continues in a very straight course, between the high ridge of Gragreth and Ingleton Fells by Yorda's Cave and Thornton Force, to join Chapeldale at Ingleton. At Thornton Force the water falls 30 feet, from a ledge of limestone over a breast of slate; the horizontal beds of the upper part contrasting curiously with the angularly meeting joints below. The botanist will remark the different appearance of the herbage on the limestone and the slate.

At Grassingham is an ancient camp, with an elevated castellum; perhaps Roman. Below Hornby Castle, Wenning, a stream from the south-eastern slopes of Ingleborough and the north side of Bolland Forest, enters the Lune. The Wenning has a less picturesque course than the Greta; but its northern branches penetrate into very rocky glens above Clapham and Austwick, in the former of which is Ingleborough Cave (p. 29). The north ridge of Bolland is marked by many conspicuous stones, among which the 'Great Stone of Four Stones' is chief.

The course of the Lune by Caton to Lancaster is very pleasing, and, with Ingleborough for the background, makes several good scenes for the painter. Lancaster Castle is also a fine object. The mouth of the Lune is commonly thought to be the *Setan-torium Portus* of Ptolemy. The name of this tribe may perhaps be retained in Sedbergh and Settle; Morecambe Bay is clearly the Morecambe *Æstuarium*—the 'Mor Cam,' the Crooked Sea, of the British tribes.

#### THE EDEN.

EDEN (*Ituna*) gathers no tribute from Yorkshire, but its origin is conterminous with a branch of the Swale near Lady's Pillar; and Mallerstang, in which its collected waters run their deeply-shaded course, is a glen continuous with Cotterdale and Helbeck Lund, which is the terminal valley of the Ure. Quitting the wild scene described by Camden around the source of the Ure, Eden touches the mound of old Pendragon Castle, passes the rocky floors of Stenkrith Bridge and Kirkby Stephen, and, from near Brough (*Verteræ*), turns to Appleby (perhaps *Aballaba*), Kirkby Thore (*Bronnacæ*), and Carlisle (*Lugualium*), where we must bid adieu to this the principal river of Cumberland.

## CHAPTER IV.

## THE SEA-COAST.

Ouse and Trent meet on nearly equal terms, and HUMBER is constituted by their united waters. Trent draws from the heart of England the drainage of 4500 square miles; Ouse collects from Yorkshire alone supplies from 4100 square miles. Ouse brings more water, because it is fed by higher mountains and more rainy countries.

Brough Ferry, the point where the Romans crossed the Humber, is by many writers vainly thought to be the *Petouaria* of Ptolemy. An imperfect inscription found here—

## BREXARC

has been read *Brexarum*, as the name of the place, and *Bretonum Exarchus*, for the commander of a district in Britain.

Hessle, further down the estuary, which derives its German name from the abundance of flint-gravel (*Kiesel*), deserves the attention of geologists from the fact that a deposit of these flints lying on the chalk, and containing bones of elephant, horse, stag, &c., is covered by the *glacial drift* of boulder-clay.

KINGSTON-UPON-HULL, the great port for the Baltic and Greenland trade, derives its importance from the little river which here finds a channel through warp land to the tide, and gives some space for the crowded shipping. First appearing under the Scandinavian name of 'Wyke' (suitable to its position on the river Hull); first called 'Hull' in the days of Richard I. (1198); distinguished by this name among commercial ports in the early part of the next century (1203-5); it finally received under the smiles of Edward I., the flattering title of *Kingston-upon-Hull\**.

\* Notices of the early history of Hull, by Charles Frost, F.S.A.

No river was so convenient to the sea-kings of the North as the Humber, from which, by the Trent, they navigated into the heart of Mercia, and by the Ouse penetrated to the richest parts of Northumbria. Hither Anglians, Danes, and Northmen directed their chiules, the moment the Roman legions were withdrawn: landing where they chose, the whole country was their prey. One of the most ancient ports on the Humber was, just at its mouth, sheltered from the sea by a point of land corresponding to that which we now call the 'Spurn.'

This port is named Ravenser in the middle of the 13th century; near it was an 'island,' thrown up by the sea, called 'Odd.' The names of Ravenser and Ravenser-od appear contemporaneously, sometimes distinctive, sometimes convertible, till the middle of the 14th century, when their short period of prosperity was ended by overwhelming inundations of the sea.

While Ravensrode flourished and decayed, the King's Town upon Hull was steadily growing in importance, perhaps to the detriment of the ancient port and town of Hedon. "The treuth is, when Hull began to flourish Heddon decaied." (Leland.)

Both Hedon and Ravenser were of sufficient importance to be summoned to send members to the Parliament of 33rd Edward I. (1305), which summons the 'citizens' obeyed. These demands were continued in the case of Ravenser, in the 20th of Edward II. (1326), and 2nd of Edward III. (1328), when they ceased, though the 'burgh' was still of consequence enough to be consulted in 1344, on naval affairs, by the King. After this, as Leland tells us "In Richard the Second's days the town of Hull waxed very rich", but Ravenspurne was dying away. In 1298, Hull and Ravenser presented petitions to Edward I. for privileges, the former offering the gift of 100 marks, the latter of 300.

Ravensrode might perhaps have withstood the rivalry of Hull, but by gradual steps it yielded to the sea. In 1346, the injury done to the manors of Saltehagh, Tharlesthorp, Frismerk, Wythefleet, Dymelton, and Ravensrode in Holderness, is ac-

knowledged in a grant from the Chapter of St. Peter at York to Meaux Abbey. The merchants removed to Hull; the dead were transferred from Ravensrode to Easington; and after the *unusually high tides* in 1357 and following years, little of the ancient and renowned port remained; yet in 1399 Bolingbroke landed here, and found Matthew Danthorp, a hermit priest, engaged in building an oratory without royal permission. As Henry IV. he confirmed the worthy man in his possession, and added for its maintenance the rights of wreck and waif, and other profits of the shore, *except the Chief Lord's Royal fishes*, for two leagues round the place *for ever!* We next hear of Richard Reedbarowe, the hermit, building a tower at Ravensersporne—the first lighthouse or 'Beken' "at the entrance of Humbre," in 1428. In 1471 Edward IV. landed "*within Humber* on Holderness side, at a place called Ravenspurgh\*." After this, Ravensburg is mentioned by Leland (about 1538) as ten miles from Patrington, at "the very point on York side of the mouth of Humber," and from this time it disappears from history and tradition. Compensation was made, a century later, in the time of Charles I., when the formation of Sunk Island began farther up the Humber.

There appears little room to doubt that the site of Ald Ravensers—which, by the Chartulary of Meaux, quoted by Thompson, was accessible from Easington by a road on the pebbly beach,—was within and near to the Spurn Point of that day (which may have been since driven inward as the clay cliffs of Kilnsea on the north decayed), and that the villages which were mentioned as belonging to Meaux, and those noticed by Camden, were chiefly on the Humber bank, where now broad sands appear overspreading a basis of peat and clay which the tide sometimes lays bare. Judging from the injury to Ravensrode which 4 feet of extra height in the tide occasioned in 1357, and from the character of the region, it must have been founded on a low silty and marshy tract, the gift of the Humber floods in some earlier time, which

\* Most of these notices of Ravenspurgh are taken from Thompson's 'Ocellum Promontorium,' 1824. Shakspeare writes 'Ravenspurgh.'

could not be preserved when the waste of the coast had brought the violence of the sea upon it, perhaps over the bank of pebbles by which it was connected to the main land. (Appendix.)

Spurn Head, the northern limit of Humber, the south-eastern point of Yorkshire, is a mass of pebbles and sand, moveable by wind and tide; yet so balanced are the forces by which it is assailed from the river and the sea, that this has long supported Smeaton's lighthouses, and is one of the least unstable parts of this variable line of coast. It is not, properly speaking, a part of the *old land*; but a long curved bank, thrown up by the sea, on the place of a tract of land which has been destroyed. It is subject to continual waste by the action of the currents setting along the shore southward; but this waste is continually repaired by new materials which these currents bring from the cliffs which undergo destruction farther north. It is out of the ruins of Holderness that the Spurn is constituted and maintained.

Proceeding northward by a narrow natural causeway of sand and pebbles, slightly connected by the growth of *Elymus arenarius*, and sometimes overflowed by the sea, we arrive at the place where Kilnsea was. Here stood a cross, which had been first erected (it was said) at Ravenspurn to commemorate the landing of Henry IV. in 1399, but in 1818 the wandering relic was removed to Burton Constable, and in 1832 was re-erected at Hedon. Kilnsea has shared the fate of Ravenspurn. The broad lands which intervened between the church and the sea, and perhaps constituted a rival to Dimlington Height, have long vanished; half the church fell in 1826, ten years later the village was removed, and at no distant date the whole of this little hill of hard land will disappear. Destruction of land, once fertile and populous, is the melancholy characteristic of the whole coast from Spurn northward to Bridlington. Through all the reach of history, and probably for longer periods before, the sea has here been gaining on the land. The rate at which the cliffs recede from the insatiable waves has been measured of late



years, and found to equal  $2\frac{1}{4}$  yards in a year, on an average ; which upon 36 miles of coast amounts to about 30 acres. At this rate, which may be less than formerly, when the coast was less protected by Flamborough Head, one mile in breadth has been lost since the Norman conquest, and more than two miles since the Roman occupation of Eburacum. The composition of the cliffs favours this rapid waste. In all the length from the Spurn to Bridlington there is no rock.

Kilnsea Cliff is a low detached part of the old solid land, and its composition is very peculiar. The silt or warp, which alone is found in it, is disposed in thin parallel laminae remarkably undulated ; as if sediments derived from inundations had been subject to very uniform *rippling*. Beyond to the north, as far as Easington, sand and pebbles form the shore, and guard the interior low ground which extends to the Humber. Then the cliffs of boulder-clay and pebbles appear, and gradually rise to Dimlington Height, 146 feet above high water. Lower gravelly cliffs succeed, with freshwater deposits in hollows about Out Newton and Holympton, and near Withernsea. A more remarkable deposit of this kind appears in a depressed part of the cliff before reaching Outhorne, or rather what was Outhorne. There is a blue lacustrine clay with *Anodonta* ; above, a layer of peat, with many roots and branches of trees, hazel-nuts, leaves, and, less commonly, horns and bones of the red deer. *A canoe, made of the trunk of a tree*, was also found here, like others of early British date which have been found in the sediments of the Aire and the Calder, in the Fens of Lincolnshire, and many other places.

Those are impressive words which we read on old Yorkshire maps :—“ Here stood Auburn which was washed away by the sea ; ”—“ Hartburn, washed away by the sea ; ”—“ Hyde, lost in the sea. ” In other documents mention is made of Frismerk, Tharlesthorpe, Redmayr, Pennysmerk, Upsal, and Pottersfleet. Where are they now ?

Within my own knowledge Outhorne has been added to this

catalogue of ruined villages, deserted churches, and lost graveyards.

When I first saw Outhorne, in 1828, its churchyard remained, but only one tombstone had been left, which bore a not uncommon inscription, implying the expectation of the deceased that he must lie there till Christ should appear. A few years later, and the burial-ground was lost in the sea.

At Sandley Meer is another old lake, not quite destroyed by the sea, on a level as low as that at Outhorne, and yielding similar remains of quadrupeds. Washed out from the cliff of boulder-clay immediately beyond, teeth of elephants have been found. One result of the long-continued waste of the Holderness coast is seen in the position of many villages on the edge of the sea, on cliffs which are still undergoing decay. This is observable at many points as we proceed northward from Sandley Meer, by cliffs varying in height, but nowhere exceeding 80 feet, and often undulated by little hollows of old lakes as far as Hornsea. Hilston is on the highest point, 80 feet; Ringbrough, 40; East Newton, 67; Bunker's Hill, 79; Great Cowton and Mappleton, 60. All these places are on the edge of the cliff.

Ulf het araeran cyrice for Hanum and Gunthards saula

is the inscription on a stone 15 inches in diameter, which commemorates the building of the church (now rebuilt) at Aldborough, on the coast of Holderness. It may be of the date of Canute. (Gough's Camden.)

At Hornsea Gap the little drainage of an inland meer enters the sea. Hornsea Meer is now undergoing some of the changes which are traced in the old lakes cut into by the sea at Outhorne, Sandley Meer, and other places. It is slowly filling up, by depositions of vegetable matter and earthy sediment round the shores and islands. The sea, once (they say) ten miles distant from Hornsea, which now stands on the cliff, is advancing steadily to destroy the barrier of the meer; when that happens, a section will be presented like what is seen at many of the old

drained lakes in the cliffs of Holderness;—a hollow in pebbly clays or sands, covered by fine argillaceous, perhaps shelly sediments, over which peat is spread, and above all the sandy, loamy, and argillaceous accumulations which are in daily progress.

The great Peat period—the period of subterranean and submarine forests—is of high antiquity, though one of the latest in the classification of geologists.

Hornsea has begun to attract its share of the annual migration of Yorkshiremen to the sea-coast; and to many quiet-loving people its comparative retirement is a source of enjoyment. The Holderness coast is by no means deficient of interest for those who love any of the wonders of nature, and the interior offers some memorials for the antiquary and ethnologist.

North of Hornsea, low cliffs, occasionally diversified by peaty deposits and shelly marls—the beds of old lakes—continue to Atwick, where the height of 40 feet is reached, and other lacustrine deposits appear. A fine elephant's tusk was found in the cliff here. Beyond Skirlington Hill, 60 feet high, freshwater deposits occur, one of which, containing peat upon shelly clays, yielded to Mr. A. Strickland the head and horns of the Great Irish Elk (*Cervus megaceros*). Cliffs, nowhere exceeding 30 feet in height, continue by Skipsea, broken here and there by freshwater deposits; but for the most part, from hence to Bridlington, these perishing cliffs show at the bottom the amorphous boulder-clay, in the middle finer and more laminated sediments, and above all, layers of chalk and flint gravel, variously inclined, and accompanied by many marks of local agitation and drifting.

Among the peculiarities of Holderness may be reckoned the irregular mounds of gravel and sand (containing crag-shells near Heddon and Paghill), which denote the ancient effect of sea-currents,—for all Holderness was a sea-bed in the 'glacial' period. Of these, the long curved mound of Brandsburton,—which in Norway would be called an 'asar,' and in Ireland an 'escar,'—is one of the most singular. It has yielded remains

of the mammoth. Skipsea Brough is probably an 'escarp' which has been scarped and moulded by Norman or earlier than Norman art; just as a gravel-heap at Bainbridge in Wensleydale has been squared to form a small Roman camp. Hamilton Brough may belong to the same class.

Among the few events which enliven the coast of Holderness may be counted the stranding of whales. The possessor of Burton Constable, the Lord Paramount (representing the Comes Littoris of late Roman date) of Holderness, claims such spoils of the sea, and in one instance a fine spermaceti whale (*Physeter macrocephalus*) was carried off to the Hall, where its huge skeleton remains. A small whale of a different species (*Balena boops*) came on shore during one of my visits to Holderness, and the hospitable owner of Rooss assisted in the dissection, and afterwards presented the skeleton to the Yorkshire Museum.

At BRIDLINGTON QUAY, the outpouring of the little stream fed by the irregular springs in the valley of the 'Gypseys,' gives occasion to the formation of a tide harbour. Within its small area is an artesian spring, opened by Mr. Milne in 1811 by boring through the boulder-clay 28 feet, and chalk and flint-gravel 15 feet, to the chalk which gave forth the water. The tide acts upon this spring, so that during the flow it rises, and during the ebb it sinks. It is now collected in a reservoir. A little north of the harbour a chalybeate spring issues from the cliff.

Two freshwater deposits lie on the cliffs near Bridlington Quay: one immediately south of the harbour yields freshwater shells; the other, north of the harbour, displays a good thickness of white chalky sediment mixed with vegetable matters. A few siliceous parts of confervaceous plants reward the microscopist.

The waste of the cliffs, and the southward drift of their ruins, are not less striking at Bridlington than elsewhere on this vanishing line of coast. In winter, and still more in early spring, masses of the clay, gravel and sand, south of Bridlington, fall

frequently; in 1837, after stormy weather, the whole was a scene of ruin; houses being destroyed, and the north pier severed from the land. By the continual waste of the cliffs north of the harbour, other houses are much endangered. It can hardly be counted as a compensation that the same action has disclosed on this side of the harbour undoubted tertiary deposits, in the spot where, following Professor Sedgwick's hint in 1821, I had often sought for them in vain. Mr. Bean obtained from them in 1835 many marine remains which have considerable analogy to the fossils of the Norfolk Crag.

Bridlington or Flamborough seems to have the justest claim to be regarded as the site of the Roman Prætorium; the ancient road leading directly to York (Eburacum) may still be followed across the high wolds. The great bay, in the deep part of which, under the shelter of Flamborough Head, Bridlington Quay is placed, is generally thought to be the well-havened bay of Ptolemy, but this honour is also claimed for Filey Bay.

The Priory of Bridlington, founded by Walter de Gant in the early part of the reign of Henry I., though now in a very incomplete state, is a noble fragment, and the remains of the gateway and fortifications by which it was protected from the attacks of predatory vessels are interesting.

As a bathing-place Bridlington is much frequented; and the easy and pleasant walk on its pier, with the view of Flamborough Cliff, and the amusement offered by innumerable coasting vessels, are suitable for invalids. The waste of the coast renders access to the sands somewhat inconvenient. Mr. Strickland's museum is worthy of a visit.

#### FLAMBOROUGH.

Before reaching Sowerby, the detrital deposits which have for so great a distance opposed their feeble barrier to the rush of the waves, ascend the cliff, and rest on a firm basis of chalk. It is the firmness of this rock which has caused the promontory of Flamborough; just as a little farther north the hard oolite

projects into Filey Brig. These rocks decay less than the softer or looser materials on either hand; but they have yielded, and are yielding continually.

The islands of chalk which stand up in the sea off Flamborough Head, show plainly the waste which has separated them from the land; and by studying the caverns in the neighbouring cliffs we see how that separation was effected, and what other changes are in progress (see the Lithographs).

At Dane's Dike the tourist should ascend the cliff, to mark the course of the artificial mound along the east side of the rough, deep, natural valley. He may also observe that a little valley was here excavated in the solid chalk before the detrital flint and chalk gravel was deposited on these cliffs, an operation followed by the overspreading of the boulder-clay.

At Dane's Dike many of the interesting organic remains of the chalk may be collected; particularly beautiful Spongiadæ, and the elegant Crinoids called Marsupites\* and Apiocrinus.

After passing the Beacon Hill, beyond Sowerby, 190 feet above high water, we descend to the south landing-place, a mere hollow in the chalk reefs, now useful to the fishermen, and formerly, we must suppose, employed by the Anglian and Danish pirates. Ida's sons with forty ships are said to have landed at Flamborough; it would seem more easy to disembark at Bridlington Bay.

Continuing our course we find the chalk excavated in many arches and caverns, and the 'Matron of Flamborough,' a fine pyramid standing up amid the waves (see Lithograph). The broken cliffs of Selwicks, under the lighthouse, succeed, and

\* Many of the fossils found in these and other cliffs are figured in my work entitled 'Illustrations of the Yorkshire Coast.' See also the work of Young and Bird. Public collections of them may be seen at York, Leeds, and Hull, Bridlington (Mr. Strickland's collection), Scarborough, and Whitby. Among private cabinets on the coast, we may signalize Mr. Bean's, rich in all branches of marine zoology and palæontology. Dr. Murray and Mr. Leckenby at Scarborough, and Mr. Ripley at Whitby, are the liberal possessors of many choice things.

then two great pillars of chalk called the 'King and Queen' arrest the attention (see the Lithograph).

The north landing-place is a small bay of a rugged aspect, but useful to the hardy seamen of Flamborough, who here draw up their boats on the pebbles. A remarkable cavern, called 'Robin Lyth's Hole,' can be easily explored on the eastern side.

West of this landing-place is a larger and more interesting bay, where the chalk is much wasted away into caverns and large fissures under a covering of drift clays, which by the action of the atmosphere are worn into fantastic peaks and ridges. In all these bays the chalk is lower than in other parts, and the drift clays above it are very thick; in the prominent parts the white rock rises higher in the cliff, and the drift is comparatively thin. We now meet the northern extremity of the dike, by which the Danes, it is supposed, defended their ill-gotten lordship of Flamborough. But the dike may really be of earlier date—perhaps earlier than the Anglian invasion—perhaps it is a British work, like many other of the entrenchments on these anciently peopled hills. The Dane's Dike is here about 292 feet above high water; in the course of a mile further west, the highest point in all the range of the chalk cliffs is reached—436 feet above high water; and if the explorer of this coast should chance to stand on the mound which marks the height at sunset, he may enjoy, as I did, a most striking prospect over sea and land. Not far from this point the chalk quits the coast and passes inland by Speeton, and a long range of the wolds. The cliff breaks off abruptly, and from below the flinty lower bands of chalk, the peculiar blue clays of Speeton come out for the gratification of the palæontologist.

But we must not yet quit Flamborough. Famous in our old history, and full of attractions for the artist, it is even more interesting to the naturalist by the crowds of birds which startle the wayfarer as they rush out from all the crevices of the cliffs filled with their eggs, and cover both land and sea with their circling flight.

The somewhat giddy feat of descending the face of the cliff with the aid of ropes, for the sake of the eggs, is one by which many of the Flamborough men obtain their living in the summer season. A more familiar hazard is run by the bold fishers of this coast, who in their little 'cobles' set forth from the north or the south landing to visit perhaps the Dogger Bank, possibly to return no more. "The sea gat him" is too often the reply to your inquiry for some honest fisherman who may have been your boatman round the promontory, or your guide through the windings of the caves.

An easier life is theirs who now gather, in the summer, at Flamborough to shoot the birds, or go through the luxurious idleness of a watering-place. They may be invited to look at the course of the 'Dane's Dike'; to examine the old square tower, and other marks of the ancient occupation of the lordship of Flamborough. Perhaps this bold cape was Ocelum Promontorium; perhaps here or near it was the Prætorium of Antoninus; from this point Ida (or Flammzwyn as the Welsh poet calls him) marched to the conquest of Northumbria. In the vicinity are British entrenchments and Roman camps, on the shore abundance of Algæ, in the cliffs organic remains. Where can a few summer days be more agreeably spent?

## SPEETON.

The dark clay cliffs below the village of Speeton are interesting to the geologist, who may still gather a fair series of Ammonites, with a few Crioceratites, and beautiful crustacea, from the clay, and the small nodules which lie in it. Belemnites of great beauty are the most plentiful fossils. But when first I saw Speeton Cliff (1824), the lovely little shells for which it is famous lay on the surface abundantly, and Mr. Bean, Mr. Williamson, and others of my friends obtained multitudes of objects which are now very rarely met with.



## FILEY.

The coast between Speeton and Filey Brig is not picturesque. Its height diminishes as we proceed northward to about 70 feet at Filey; a height so moderate as to countenance the notion that the Derwent may once have discharged its waters to the open sea on the east, instead of seeking the Vale of York through the gorge at New Malton. Leland (fol. 49) says,—“The commune opinion ys yet that part of Darwent Water ran to Scarburge, but by excaving of two sides of hilles, stones and yerth felle in great quantitie doun and stoppid that course.” Whether this alludes to a supposed discharge of Derwent through the cross valley below Hackness to Scalby, or by some other less probable channel to Seamer Meer and Scarborough, I cannot affirm. Many such *conjectures* may be made, but it is certain that if we remove from the cliffs near Filey the alluvial and diluvial covering, the Kimmeridge clays beneath will be found excavated in several parts below the sea-level. *Before the date* of these superficial accumulations, the Vale of Pickering may have been a sea-loch opening to the east; and even after they were deposited, and the vale had become an inland lake (as Dr. Buckland has explained in the ‘*Reliquiæ Diluvianæ*’), it must have discharged to the east by Filey, if the gorge at New Malton had not then been excavated.

If Flamborough Head be (as Mr. Walker suggested) the ‘*Ocelum Promontorium*’ of Ptolemy, Filey must be in the *εὐλίμενος κόλπος*, the ‘well-havened bay’ of the same author; owing to the protection of Filey Brig its rather flattering title. That Filey has been a place of importance in early ages appears by its large and handsome church; that the tide of population is now returning to it is proved by the many new and elegant houses which have lately been added. The great attractions of Filey are the firm and extensive sands, terminated on the north by the far-projecting reef called (from the Norwegian) the ‘Brig’ (see the Lithograph). This remarkable rock gives rise to mag-

nificent effects of breaking waves, and delights the naturalist with its many fucoids, corallines, radiata and mollusca. After storms the shore is frequently one vast collection of the beautiful productions of the sea. On the north side of the Brig the waves have excavated romantic cavities in which the clear sea-water rests. Leland calls this place 'Philaw Bridge.'

## GRISTHORP.

The highest point of the cliff above Filey Brig is composed of a thick mass of boulder clay, and is 106 feet above the sea; but as the strata rise continually to the north, the rocks which form the Brig ascend to 280 feet in Gristhorp Cliff, and allow of other strata appearing below. The whole series stands thus in feet:—

Diluvial clay and pebbles . . . . .	8
Lower part of the calcareous grit . . . . .	30
Gradations between calc. grit and Oxford clay .	40
Oxford clay . . . . .	120
Kelloway rock . . . . .	25
Clay and Cornbrash rock . . . . .	5
Carbonaceous shale and sandstone . . . . .	50

A little further north, between Gristhorp Cliff and Red Cliff, still lower strata come out, consisting of various sandstones and shales, in particular layers of which vast multitudes of beautiful Ferns, *Zamiæ*, *Lycopodiaceæ*, and much wood, have been collected by Mr. Bean, Mr. Williamson, Dr. Murray, and other palæontologists. Some layers of ironstone occur, and thin laminæ of bad coal, and below all is a coarse irony oolite full of shells, and covered in some places by *Millepora straminea*.

A tumulus on the cliff at Gristhorp was the burial-place of a British chief. A receptacle in the middle of this mound contained a coffin made of a large split log of oak, full of water, in which lay the skeleton of the warrior, with a small portion of adipocere derived from his flesh, and several objects which were dear to him in life. The coffin was 7 feet 6 inches long by 3 feet

3 inches extreme breadth ; it was ornamented by a rudely carved human face, and lay in a direction from north to south. The greatest internal measures were 5 feet 4 inches long, 2 feet  $7\frac{1}{2}$  inches broad, and 1 foot 3 inches deep. The weapons, utensils and ornaments were,—a head of a bronze spear, which had been riveted to its shaft ; one flint spear-head and two flint arrow-heads, of rude manufacture and irregular forms ; circular ornament of bone or horn ; ring of horn ; pin of wood ; pin of horn ; basket of wicker-work made of bark, probably a frumentarium ; portion of an ornamented girdle ? ; leaves and berries, probably of mistletoe. (Williamson's Description of a Tumulus, &c. 1834.)

Gristhorp Bay, with its island rock, plant beds, and bold cliffs, deserves frequent visits from Scarborough.

#### CAYTON.—WHITE NAB.

Red Cliff, 285 feet above high water, exhibits the same general section as Gristhorp ; but, owing to a fault, which throws its beds down to the north 40 feet, the carbonaceous shales with ironstone and plants scarcely appear. From Cayton Bay, which comes next under notice, the retrospective view to Red Cliff is fine, especially in the morning and evening,—a rule of general application to Yorkshire scenery. Part of the fine stream which feeds Cayton Mill has been diverted within a few years to a reservoir on the cliff, for the better supply of good water to Scarborough. A great land-slip, north of the mill, has brought down the calcareous grit and Oxford clay to the level of the beach ; but immediately beyond, carbonaceous rocks, occupying the place of those which were seen at the base of Gristhorp Cliff, appear in the cliff above the oolitic prominence of Ewe Nab. They do not yield plants or ironstone in the same abundance. In the pretty little bay called Carnelian Bay, the oolite is depressed ; but it rises again (with a different aspect) at the point called White Nab, and bears above it a good deal of carbonaceous sandstone with wood and plants. From this point to near the 'Spaw,' the low scars are formed of the oolite ; the cliffs con-

tain the carbonaceous sandstones and shales, with many layers of fossil plants, seldom in good condition; and at Wheatcroft Farm the Kelloway rock and Cornbrash overtop the series. 'Diluvial' clays, full of fragments of far-travelled rocks, become very abundant in the cliffs above the Spaw, which are now occupied by a conspicuous row of elegant houses. The chalybeate water of the Spaw probably derives its quality from the immediately adjacent cliff of clays and pebbles. From the appearances here presented, and from the cuttings on the railway, it may be concluded that the little valley which gives passage to the stream under the bridge is formed in a hollow of the strata which was excavated in early geological times, and afterwards filled up with the boulder-clay deposit. This indeed is the general history of the valleys on the Yorkshire coast.

## SCARBOROUGH.

SCARBOROUGH is readily admitted to be supreme among northern watering-places. No situation on the Yorkshire coast offers the same combination of picturesque cliffs, convenient access, comfortable dwellings, amusements for invalids, and motives for exercise to the more robust, along pleasant sands, among ancient fortifications, over prominent hills, or through woody valleys. Since the Bridge and Cliff walks have been constructed, the somewhat toilsome ascent from the chalybeate springs and the sands to the town is changed to an easy and healthful promenade; and the tediousness of slow drives to Filey, or Flamborough, or Ayton or Whitby, is replaced by something like the flight of an arrow, on the railway. Want of woods in the immediate vicinity of the sea is a misfortune felt on all parts of the Yorkshire coast, except in the secluded valleys of Haiburn, Eskdale, and the glens about Mulgrave, nor can this be wholly remedied at Scarborough. But the desire of improvement will in many ways augment the agreeable features of the place, and amongst other evidence of this, a better appreciation of the picturesque north sands may be mentioned.

Scarborough is first mentioned in history in connexion with the stern Norwegian king, Harold Hardrada, who paid with his life at Stamford Bridge the penalty due to the invasion of Yorkshire. Cleveland first felt the fury of the Norsemen, perhaps supplied them with steeds; Whitby suffered by their visit; Scarborough withstood them in vain. Thus saith the Saga:—

“Sidan lagdi hann til Skardaborgar, oc bardiz þar vid borgarmenn; hann geck uppa bergit þat, sem þar verdr, oc let þar göra bal mikit, oc leggja i elld. Enn er balit logadi, toko þeir forka stora, oc skuto balino ofan i bæinn, oc tok þa at brenna hvert hus af ödro, gafz þa upp allr stadriinn; drapo Nordmenn þar mart manna, enn toko fe allt þat er þeir fengo.”

This might be more nearly expressed in the Yorkshire dialect, than in the ordinary English which follows:—

“Sithence he lay to at Scarborough, and fought there with the burgher-men; he ascended the hill which is there, and caused a great pyre to be made there, and set on fire. When the fire spread, they took great forks, and threw the brands on the town; and when one house took fire from another, they gave up all the town. The Northmen slew many people, and seized all that they found.”

It is not our purpose to trace the history of the formidable castle, built by William le Gros in the days of King Stephen, or of the Cistercian monastery, to which Scarborough owes its fine old church, lately in part restored. Hinderwell's History of Scarborough and the Local Guides may be consulted for many details regarding the Spaw, harbour, and natural history of the coast.

A valuable addition has been made to the attractions of Scarborough, in the Museum of local Natural History, erected near the Cliff Bridge, very much in conformity with the suggestions of Dr. William Smith, long resident here. The collection of organic remains placed in this building by Mr. John Williamson, and much augmented by other contributions, is an instructive display of the riches of the Yorkshire coast. Here

also are the coffin and skeleton of the Brigantian chief discovered at Gristhorp, with other objects of antiquarian interest.

From Scarborough to the northward the coast is for several miles irregular and rugged, but rather low, never rising to so much as 135 feet above the sea until we reach Cloughton Wyke. The cliffs are formed of gritstone and shales, yielding fossils at Scalby; and just before arriving at Cloughton Wyke, the calcareous rock of White Nab comes up from beneath the sandstones, and ascends to the edge of the little bay (or wyke). Over this series is detrital sand and gravel. In the shale above the limestone are ironstone balls. In the limestone many fossils.

In the higher cliffs which succeed (240 feet), and separate Cloughton Wyke from Haiburn Wyke, the limestone is near the top, and about half way down is a bed of poor coal. Haiburn Wyke is a romantic woody cleft in the rocks,—a pleasant bowery retreat in the heat of summer, rather too far from Scarborough to be commonly visited.

Beyond rises the most continuous mass of very high bold cliff which occurs on the Yorkshire coast, called Staintondale Cliff. It grows continually higher as we proceed northward from Haiburn Wyke, till, at the 'High Peak,' which is at the truncation of an interior range of hills, it is 585 feet above the water. The effect of this elevation, slight as compared with the interior hills, great as compared with any cliffs to the southward, on the prospect over the sea is something wonderful.

Below a great part of the Staintondale Cliff is a remarkable 'Undercliff,' caused by an ancient seaward slip of the old cliffs. In this strange scene of confusedly aggregated rocks and underwood, very curious views are presented, but few besides zealous geologists care to traverse its labyrinthine paths.

This line of cliffs affords the best and most connected section of the strata, between the calcareous rocks of White Nab, and Cloughton Wyke, and the Lias. The almost countless members

of the series may be grouped in the following manner, beginning near the top of the cliff:—

Grey limestone series (of White Nab and Cloughton); consisting of shale, shelly limestone, with large *Belemnites*, shale and nodular shelly limestone; 30 feet in all.

Shales and sandstones, in very numerous alternations, some of which yield fossil plants and traces of coal; 130 feet.

Thick sandstone beds; 60 feet.

Series of thin sandstones and thick shales in frequent alternations, some of which yield fossil plants, as *Ferns*, *Zamiæ*, *Equisetæ*; 200 feet.

Irregular group of sandstones and shales, becoming ferruginous toward the bottom, and there yielding *Zamiæ* in abundance; 60 feet.

Then follows a remarkable group of fine-grained micaceous sandstone, generally soft, but partially aggregated into harder parts where iron nests occur. As seen at Blue Wick, at the foot of the cliff, it is divisible into three principal parts. The upper, 30 feet thick, is yellow, irony, and more solid than the rest, and contains layers of pebbles and many beautiful shells; the next division is softer, with a considerable number of shells lying in groups, 20 feet; the lowest division is more grey and argillaceous, approximating in character to the *Lias* shale which is below. This is also a shelly series, and is 20 feet thick.

The geologist who will follow Mr. Bean in the exploration of the strata of these richly conchiferous beds at Blue Wick, will often turn from the minute inspection of *Serpulæ* and *Trigonæ*, *Belemnites*, *Aviculæ*, and *Pinnæ*, to gaze on the mighty cliffs above, and the magnificent sea and shore beyond. As there is certainly no point on the Yorkshire coast more attractive to the naturalist than this, so none is more delightful to the artist. But Robin Hood's Bay is now even more difficult of access, except to pedestrians, than formerly, for the railway has stopped the primitive coach which used to drag its slow length between

Scarborough and Whitby, and thus at least *approach* the Peak and Bay Town. For bold pedestrians, however, there can hardly be a pleasanter walk than along the cliffs from Whitby or Scarborough to Robin Hood's Bay.

ROBIN HOOD'S BAY.—WHITBY.

The cliffs which guard the coast to the northward of Blue Wick, are of a different composition and aspect from those which have already been described. They exhibit almost universally, in their lower part, a mass of laminated Lias shale, and very generally on the top a crown of gritstone. The shale wasted by the rough sea perishes, though not very rapidly, and the crown of sandstone falls, though not often. The permanent effect of these circumstances is a formidable steepness in the whole range of these dark cliffs, which even at low water are margined by only a narrow belt of sands, or a scar of rugged rock—safe only to those who take heedful note of the tide.

A little north of Blue Wick, the highest part of the cliff,—the 'Old Peak,' overlooks the water.

At Ravenshill, on the Peak, an inscribed stone was dug up in 1774, from which Dr. Young concluded that a Roman fort had been constructed at Peak, "probably one of a chain of forts erected along the coast, to repel the incursions of the Saxons and other pirates\*."

IVSTINIANVS P P	Justinianus P P
VINDICIANVS	Vindicianus
MASBIERIVPR	. . . . .
M CASTRVM FECIT	M . the fort constructed.
A O	. . . . .

If Justinianus was the officer who accompanied Constantine from Britain into Gaul, A.D. 407 or 408, and was slain in battle by Sarus, the monument may be dated a little earlier. The name of Vindicianus occurs on the sarcophagus found at Eastness,

\* Young's Whitby, vol. ii. p. 709.



near Hovingham; and Valerius Vindicianus on a monument at Old Penrith. His designation is here given in the third line, but that has only been interpreted by a series of conjectural values for each letter.

There is here a fault 'throwing up' the strata to the north, about 400 feet. The effect is to place on the same level fossil plants of beds above the Lias, and fossil shells often 300 or more feet deep in it. The fallen cliffs at this point have the picturesque aspect of ruins. As nearly the whole series of Lias is here visible, and in our progress northwards we must sometimes speak of its parts by name, this appears the proper place for inserting a classification of the thick Lias formation.

Under the general cover of gritstones, which have been sufficiently noticed already, we have:—

*Upper Lias Shale*, generally about 200 feet thick; alum is made from the upper half: near the bottom are some parts firmer and harder than the rest, and through the whole run bands of scattered nodules of a ferruginous and argillo-calcareous nature. In the interior country south of Stokesley, this set of beds grows thinner, and less fitted for the preparation of alum.

*Ironstone and Marlstone series*, about 150 feet. Ironstone bands more or less mixed with shale constitute the upper part of the series, and at many parts of the coast, in Cleveland and Eskdale, and towards the base of Burton Head, Carleton Bank, and the Hambleton Hills, they have a positive commercial value. The shells which accompany these bands abundantly, add carbonate of lime to improve the fusibility of the other earthy admixtures. The produce in *iron* is about 30 per cent. Below are shales, and still lower laminated sandstones, of a soft and argillaceous character, generally very shelly, and partially ferruginous. These are the true marlstones, and make prominent edges under Rosebury Topping and the Cleveland Hills, as they also do in Lincolnshire, Northamptonshire, and Gloucestershire.

*Lower Lias series*, probably 500 feet. This is a nearly uniform mass of rather firm shale, with nodules of ironstone, in

many layers. In the interior country there are calcareous beds (true *Lias limestone*) below this shale, but they scarcely appear in the strata of the coast.

Owing to the great dislocation in the Peak, which brings up the Lower Lias, on the south side of Robin Hood's Bay, the low cliffs and extensive low-water scars of this Bay are formed of this thick shale, covered pretty deeply, especially at Bay Town—the romantically placed little capital of the bay—with northern drift. A little north of Bay Town the cliff is higher, the strata dip northwards, and the Lower Lias sinks below the sea-level, and is succeeded by the Marlstone and Ironstone series, and finally the Upper Lias guards the base of the cliff as far as the east side of Whitby Harbour, and yields fossil saurians. Between Robin Hood's Bay and Whitby, the highest point of cliff, called High Whitby, is 285 feet above the sea, and here fossil *Equiseta* may be seen erect in the gritstone rocks. Other plants of great beauty occur in the sandstones and shales nearer Whitby, with thin beds of bad coal.

## WHITBY.

The bay between the abbey at Whitby and the cliff at Sandsend is, by consent of antiquarians, the *Δούνον κόλπος* of Ptolemy, latinized into *Dunum Sinus*, a name perhaps preserved to our times by Dunsley, in which the British element *Dun*—*fortress*—may be recognized. Dunsley is near 'Old Mulgrave,' and to it the Roman road, which certainly led from near Malton by Cawthorn Camps to the sea-coast, is usually drawn, though it be not perfectly traced.

*STREONESHALH* is the old name by which Whitby first takes its place in Anglo-Saxon history; it is interpreted into Latin by Bede as "*sinus fari*," the *bay of the lighthouse*. Camden translates it *healthy bay*; Gough explains *halh*, *health*, or *alh*, as a Teutonic word—*any eminent building*; but Dr. Young restores to it the meaning of *bay*. Possibly the true version is to be found in the Norse—which was nearly the language of Northumbria

—Strandshall, the *tower on the strand*, viz. Whitby Strand, a large district, whose name survives to our time.

The year 658, according to Young, saw the foundations laid for the first Anglo-Saxon monastery at Streoneshalh, with ten hydes of land for its use, and the saintly Hilda for its abbess. Destroyed by the Danes in 867, it lay desolate for 207 years, and then reappeared on the page of Norman history as the Benedictine Abbey of Whitby, which was surrendered to the crown in 1539. The existing building is for the most part a structure of the early English style (middle of the 13th century). The sandstone of which it is built is not of very good quality, and in this exposed situation it is no wonder if

. . . . . the wasting sea-breeze keen  
Has worn the pillar's carving quaint,  
And moulder'd in his niche the saint;—

but it is matter of deep regret that the great tower and other conspicuous parts of this magnificent church should have fallen within our own memory.

The vicinity of Whitby is beautiful in all the dales and glens connected with the Esk. In the early part of the present century it was a common enjoyment of the townfolk to go up the secluded vale of Esk in waggon-parties, and pass many happy hours in the charming scenery about Goadland, Egton Bridge, and the lower end of Glaizedale. The railway to York has rendered these favourite spots more accessible, and opened new views, which have been tastefully described in the elegant volume of the late Mr. Belcher\*.

Whitby, no longer shut out from the rest of Yorkshire, receives annually its share of visitors, for whom a new town (for it is nothing less) has been constructed on the cliffs opposite to the abbey. In the way to the handsome pier, a favourite and healthful walk, is the Whitby Museum, which contains, besides many other choice and rare fossils, very fine saurian remains from the alum shale of the neighbouring cliff at Saltwick.

\* See also Reed's Guide to Whitby.

In the line of the Harbour at Whitby occurs a considerable dislocation of strata, such that they are depressed on the western side, as compared with the eastern, about 150 feet. There is no alum shale seen on the western side for a great distance, but the shore is sandy, and offers some convenience for bathing.

For about two miles west of Whitby this character of the shore continues, and the cliffs, which are low, are mostly composed of sandstone covered by drift. This part of the coast is much depressed by faults. Beyond their range, at Sandsend, the cliffs of lias rise again, and have tempted the establishment of alum-works. From this part of the shore fine Plesiosaurians have been obtained for the Earl of Mulgrave. From this point some part of the lias is seen in every cliff to the west as far as Redcar. Gritstone covers it from Sandsend to Kettlewell, where again alum-works are established, and at the highest point stands 375 feet above the sea. At the base of the cliff the remarkable ironstone bands, which were noticed at Robin Hood's Bay, re-appear and form projecting scars.

In the romantic little bay of Runswick, a part of the lias shale which lies over these ironstones, and is more compact than the rest, stands prominent, and is excavated by the sea into 'arched rocks.'

The cliffs between Runswick and Staithes have the general character of a lias base with a sandstone covering, rising at the utmost to 321 feet. This point is marked by tumuli, which perhaps might reward the labours of the antiquary. Near Staithes the cliffs descend; the sandstone cap is removed, and the ironstone series again becomes prominent. It is crossed by faults; one of them coincides with the mouth of the little stream which gives life and picturesque beauty to Staithes.

No better station than this can be selected for exploring the sections or gathering the fossils of the Lias. On the east the upper lias and ironstone series; on the west the upthrown marlstone and lower lias are easily examined; and by proceeding only a mile to the west, the great Cliff of Boulby is reached—

the loftiest of all the precipices which guard the English coast (660 feet), and in this formidable cliff the whole series of strata, from the sandstone which caps the upper lias to a certain depth in the lower lias, may be recognized (see p. 138). The alum-works at either end of the highest part of the cliff offer great facilities for this examination.

From their extreme height in Boulby Cliff the strata descend toward the narrow Valley of Skinninggrave, which, at a small distance from the sea, becomes richly wooded, and branches into beautiful glens. These may be well seen from Lofthouse, a large and pleasant village which thrives on the success of the neighbouring alum-works in Rockcliff. At Lofthouse, an ancient circular mound and entrenchment, on the western side of the village, merit inspection. At Skinninggrave the ironstone, already referred to in other places, is now dug for exportation to Newcastle. It contains many fossils. A fine Plesiosaurus, having Pliosaurian analogies, found at Lofthouse, has lately been presented by the Earl of Zetland to the Yorkshire Museum.

Huntcliff, west of Skinninggrave, though it does not rival the magnificence of Rockcliff, rears a long dark precipice, 360 feet above the sea, and the view of this promontory from the low shore at Saltburn is very striking.

Saltburn is the point of efflux for small streams which gather in the basin of Guisborough, and flow by Upleatham Hill and the woody valley of Skelton. A conical mound bearing a signal-staff shoots up in the little bay which is formed at the mouth of the stream, and gives a picturesque character to this little fishing station. From this point to the Tees mouth are low cliffs of drifted clay or pebbles, resting on lias; hard, firm, continuous sands spread widely from their foot, replacing the dark scars which abound from Whitby to Saltburn, and yield to the visitors of Redcar matchless rides and beautiful views of the contrasted coasts of Durham and Yorkshire.

Redcar is pointed out by nature for a harbour of refuge on this dangerous coast, which is very ill-provided with *accessible*

havens. Bridlington Bay is still the only retreat for coasting vessels endangered or delayed by northerly winds; and a sudden shift of these winds to the east renders even that retreat perilous. At Redcar, nature has run out immoveable piers of hard lias shale with a long deep channel between them ;

. . . . . *gemina demittit brachia ponto,*

and these piers project so far into the sea as to reach deep water and admit of passage between them at all times of tide. The Tees mouth being encumbered with sand-banks, which retain no fixed position, the construction of a good harbour at Redcar seems to be for the honour of humanity as well as the interests of commerce.

## CHAPTER V.

### CLIMATE.

THE climate of the largest county in England, one side of which is washed by the German Ocean, while the opposite edge rests for the most part on lofty mountains, must be supposed to differ much in different parts. Partaking of the general characters which belong to the north of England, Yorkshire has some peculiarities of climate due to the remarkable mould in which its masses of land are cast. On occasions of cholera and other epidemics, these peculiarities appear to have a distinguishable influence on the distribution of disease, and in ordinary years the inequality of heat and moisture in different parts of the county is enough to render migration from one district to another highly beneficial.

For the sake of a general term of comparison for the county,

we may commence our investigation at York, the central station. By the observations of my late ingenious friend Mr. Jonathan Gray, continued for a quarter of a century from the year 1800, we obtain the following thermometric results:—

	Fabr.
Mean or average annual temperature . . .	48°·2
Greatest annual temperature observed . . .	50·8
(It occurred in 1800.)	
Least annual temperature observed . . .	44·7
(It occurred in 1816.)	
Range of annual temperature thus obtained in 25 years . . . . .	6·1

The mean temperature of springs at York appears to be the same as that of the air, viz. 48°, or a little more. This in fact is nearly the mean annual temperature at places not much above the level of the sea along all the eastern side of the kingdom between the basin of the Thames and the valley of the Forth.

The distribution of temperature in the different months of the year may be next stated.

	General mean of monthly temp.	Greatest mean monthly temp.	Least mean monthly temp.	Range of mean monthly temp.
January . . . .	34°·8	41°·1	25°·7†	15°·4
February ..	37·3	41·6	31·3	10·3
March . . . .	40·7	44·6	34·7	9·9
April . . . . .	47·6	53·7	43·3	10·4
May . . . . .	54·5	60·6	48·3	12·3
June . . . . .	59·2	62·8	54·7	8·1
July . . . . .	62·0	69·5*	58·0	11·5
August . . . .	61·1	66·9	56·5	10·4
September..	55·7	60·4	51·8	8·6
October . . . .	48·2	53·0	42·8	10·2
November . . .	40·9	46·2	35·8	10·4
December ..	36·0	43·0	31·7	11·3
Means..	48·2	53·6	42·9	10·7

January is the coldest and most variable month, being some-

\* In 1814.

† In 1807.

times as mild as  $41^{\circ}1$ , and sometimes as cold as  $25^{\circ}7$ ; July, the hottest month, is also more variable than the average, being sometimes as hot as  $69^{\circ}5$ , and again as cold as  $58^{\circ}0$ . The average difference between January and July is  $27^{\circ}2$ , which does not differ much from the results of this kind obtained in the vicinity of London, and generally on the eastern side of the island; at points removed from the immediate influence of the sea air.

On the western side of the island, January and July are still the months most contrasted in temperature, but the difference between them is reduced, the former being warmer by about  $2^{\circ}$  until we reach the latitude of Kendal. Here the temperature of January sinks nearly to that of York, and the heat of July is about  $4^{\circ}$  less. The mean temperature of the year is attained at York, on the average, a little after the middle of April and a little before the middle of October; the day of greatest cold is on the average the 18th of January, and the hottest day on the average the 18th of July.

The trying month of April appears to be warmer at York than at most places on the eastern or western sides of England north of London and Gloucester; March and May are also a little warmer than in most other places—circumstances by no means to be forgotten among the favourable points of its local climate. In fact, at this period, the easterly and north-easterly winds which prevail over the island, and are very distressing on the eastern coasts, appear to be somewhat mitigated or diverted from a direct course over York by the wolds and moorlands which rise between the Vale of the Ouse and the sea.

The average temperature of any one month at York corresponds almost exactly to a calculated number depending on the meridian altitude attained by the sun, not on the middle day of the month, but on a day about twenty-five days earlier. This agreement is so remarkable as to justify for York the claim of *regular* climate, or climate due to the latitude, the temperature moving with, or rather after, and in consequence of, the heating power exerted by the sun. (See Appendix.)



The air climate is in fact *postponed* by so many days ; just as in an apartment some time elapses after the fire is at the hottest before the cold of the walls is reduced enough to allow of the full warming of the air. If instead of taking the register of the daily temperature in the open air, we try it in a large building without fire, we find the climate of the building *further postponed*. In York Minster, for example, it is found by a series of daily observations continued for three years, that the hottest day is nearly six weeks after the summer solstice, or a fortnight after the hottest day in the open air ; and the coldest day nearly six weeks after the winter solstice, or a fortnight after the coldest day in the open air. (See Appendix.)

This postponement of the effect of summer and winter influences is still more sensible and regular below the surface of the ground. By many experiments in Scotland, France, Belgium, and Germany, which have been completely studied by Quetelet and Forbes, it is found that the middle of summer and winter, so to speak, occur—

At the surface in July and January ;

3 feet deep in August and February ;

12 feet deep in October and April ;

24 feet deep in December and June ;

And at less than 100 feet the variations of summer and winter become wholly insensible.

Masses of elevated land, and broad tracts of deep water, affect climate in the same way, by giving out in late autumn and winter some warmth which they had acquired in summer, and on the other hand, by absorbing in spring and early summer a more than fair proportion of the solar heat. Hence one of the advantages to the invalid of a prolonged residence at Scarborough, or in some sheltered Yorkshire dale, till December, January, and even February, have spent their cooling power on the inland surfaces ; but for the same reasons the disadvantage of these stations in March, April, and even May.

But it is not only by prolonging the summer and postponing

the winter that the sea and mountain masses act on the temperature. The sea in particular moderates the summer heat, and softens the winter cold; and in a less degree tends to equalize the temperature of day and night. Hence arises the most remarkable character of the climate on the sea-coast—viz. the comparative equability of its temperature, a circumstance everywhere observable round the British coasts, and more favourable in winter to our islands and the coast of Norway than along any other band of longitude in the northern parts of the globe, because they are continually bathed in tides and currents flowing northward from the warm latitudes of the Atlantic.

The same considerations apply exactly to the hour of greatest daily warmth, which in all countries follows after some interval the hour of greatest solar elevation. At Plymouth the warmest epoch of the day (in the shade) is at 1 P.M., or rather a little after that hour\*; at Brussels 1.25. At York it is about 2 P.M.; at Leith 2.40 P.M.†

The highest observed temperature in the shade at York, previous to 1825, is :—

Degrees observed.	Year.	Month and Day.	Observer.	Wind.
84°.....	1800	Aug. 2.....	J. Gray ...	W.
	1807	July 10 ...	J. Gray ...	S.W.

On the 5th of July, 1852, the thermometer in the shade, at York, reached 87°·5, 88° and 88°·5.

In 1825, a temperature of 90° in the shade was registered at Brandsby, a point north of York, and more elevated above the sea.

The extreme difference between the highest and lowest temperature observed in the shade in twenty-five years is 83°·5.

\* Sir W. Harris, in Rep. of Brit. Assoc. 1839.

† Sir D. Brewster, in Edinb. Phil. Trans.

The lowest observed temperatures by thermometers more or less exposed to radiation at York, are as under.

Degrees observed.	Year.	Month and Day.	Observer.	Wind.
+4°0	1814	Jan. 14*...	J. Gray.	East.
+0°5	1816	Feb. 9.....	J. Gray.	South.
-3°5	1854	Jan. 3 †...	J. Phillips.	Calm.

The next table shows the monthly maxima and minima on the average of seven years, 1812 to 1818 inclusive.

	Aver. Max.	Aver. Min.	Diff.
January .....	38·16	29·29	8·87
February ...	43·26	32·60	10·66
March .....	45·77	34·69	11·08
April .....	51·54	37·49	14·05
May .....	58·31	44·29	14·02
June .....	64·79	49·07	15·72
July .....	67·70	52·69	15·01
August .....	64·81	51·04	13·77
September...	61·99	48·73	13·26
October .....	53·34	43·04	10·30
November ...	46·03	36·24	9·79
December ...	39·53	31·11	8·42

To this we may add a table showing the highest monthly maxima, and lowest monthly minima, in the same seven years.

	Highest Monthly Maxima.	Lowest Monthly Minima.	Difference.
January .....	42·6	21·0	21·6
February ...	47·1	27·1	20·0
March .....	51·0	31·3	19·7
April .....	56·1	35·2	20·9
May .....	59·9	39·9	20·0
June .....	71·8	46·4	25·4
July .....	72·9	51·2	21·7
August .....	66·2	49·4	16·8
September...	63·5	46·0	17·5
October .....	58·2	37·9	20·3
November ...	51·8	31·1	20·7
December ...	42·3	29·7	12·6

\* Temperature at 2 P.M. 19°.

† At 10 A.M. 6°.

Mr. Ford has communicated to me the number of days when the thermometer at York, in the shade, sunk to or below 32° in each of the seven following years.

	1841.	1842.	1843.	1844.	1845.	1846.	1847.	Sum.	Monthly Mean.
January ...	22	29	15	14	12	9	19	120	17+
February ..	16	20	18	24	25	7	20	130	18+
March ...	10	12	12	12	22	7	10	85	12+
April .....	10	17	6	3	7	4	10	57	8+
May .....	.....	.....	1	.....	.....	.....	.....	1	
June .....	.....	.....	.....	.....	.....	.....	.....	0	
July .....	.....	.....	.....	.....	.....	.....	.....	0	
August ...	.....	.....	.....	.....	.....	.....	.....	0	
September .....	.....	.....	.....	.....	1	.....	2	3	
October ...	2	10	10	2	3	5	.....	32	4+
November ..	17	10	12	2	9	5	5	60	8+
December ..	16	9	8	23	21	26	10	113	16+
Sum .....	93	107	82	80	100	63	76		
Mean .....	8-	9-	7-	7-	8+	5+	6+		

The temperature of York compared with that in other parts of the county presents a variety of results interesting to all lovers of knowledge and valuable to invalids.

The mean annual temperature of York is not materially different from that of other places in the comparatively low region of the centre of the county :—

York 48°·2, Brandsby 47°·47, Malton 47°·65.

Nor is the case very different on the sea-coast, where Keyingham gives 48·8 on an average of two years; Hull 49·00 on an average of ten years; Scarborough 49·3 on an average of five years.

Or in hollows of an elevated region. At Halifax the mean temperature appears to be 48°·3 (1827–28).

It is in the unequal distribution of the temperature in the different months that we must look for the principal peculiarities of local climate. For this purpose we may compare the mean temperature of the four critical months, at York, with that on

the sea-coast, and in the midst of the elevated land of the West Riding:—

	Halifax. 2 years.	York. 25 years.	Keyingham. 2 years.	Hull. 10 years.	Scarborough. 5 years.
January ...	36°·9	34°·8	38°·6	38°·4	39°·4
April .....	45·4	47·6	44·6	46·2	45·4
July .....	60·5	62·0	62·0	60·8	61·6
October ...	50·5	48·2	49·4	50·2	50·4

Hence it appears that the warming influence of the sea begins to be sensible in October, and becomes very marked in January, but is exchanged for a cooling influence in April. Invalids may probably be advised to prolong their stay on the coast till January, but on no account to face the unfavourable temperature of the early spring. In mountain countries the masses of elevated land operate in a similar manner on the valleys which divide them, and thus warm the late autumn and mitigate the extremity of winter cold.

We may exhibit the effect of the sea air in moderating the extremes of daily heat and cold, by placing in comparison the temperatures of the warmest part of the day and coldest part of the night at York, Keyingham, and Hull.

*Temperature of the warmest part of the day.*

	York.	Keyingham.	Hull.
On the average of the year ...	52°·9	50°·7	54°·9
On the warmest day.....	84·0	83·0	85·5
On the coldest day .....	19·0	20·0	28·5

*Temperature of the coldest part of the night.*

On the average of the year ...	40°·9	46°·8	43°·3
On the coldest night .....	0·5	20·0	18·0
On the warmest night .....	65·0	61·0	64·0

It is rather by warming the night hours than by cooling the day hours, that the beneficial action of the sea is apparent on our littoral climate, which on the whole year is somewhat warmer than the inland climate.

We may now compare the temperature of York with that of a selected number of places around it, as Durham, Newcastle, Carlisle, Kendal, Manchester, Derby, Nottingham.

Mean annual temperature.								
York. 1800 to 1824.	Durham. 1843 to 1847.	New- castle. 1847.	Carlisle. 1801 to 1824.	Kendal. 1823 to 1847.	Man- chester.	Derby. 1846 to 1848.	Notting- ham.	
48·2	46·4	49·2	47·4	45·2	48·8	49·1	50·0	
Mean of the warmest year.								
50·8	48·7	...	49·0	48·9				
Mean of the coldest year.								
44·7	44·8	...	45·1	44·8				
Mean temperature of the four critical months.								
	York.	Durham.	Newcastle.	Carlisle.	Kendal.	Manchester.	Derby.	Nottingham.
Jan.	34·8	37·5	36·9	37·6	34·9	36·9	35·1	37·5
April	47·6	44·1	44·7	45·1	45·0	46·6	43·6	47·4
July	62·0	59·4	63·8	59·2	58·6	60·2	63·9	66·4
Oct.	48·2	46·5	50·4	48·4	47·4	50·5	50·7	48·5

Temperature of the hottest part of the day on the average of the year.

York.	Durham.	Derby.
52·9	52·8	57·3

On the warmest day.

84·0	84·5	81·0
------	------	------

On the coldest day.

19·0	27·0	32·0
------	------	------

Temperature of the coldest part of the night on the average of the year.

40·9	41·1	40·8
------	------	------

On the coldest night.

0·5	14·0	11·0
-----	------	------

On the warmest night.

65·0	62·3	62·0
------	------	------

The results which have now been stated relate to the temperature of the air at elevations not greatly above the level of the

sea. As we ascend above that level, the mean temperatures diminish in exposed situations; but we have no sufficient observations to determine the rate of diminution. At Huggate on the Wolds, which is about 500 feet above the sea, the annual mean temperature is reduced from  $48^{\circ}2$  to  $46^{\circ}5$ . At Harrogate, which is about 300 feet above the sea, it is about the same.

The temperature of the earth and of springs issuing from it has not been sufficiently studied in Yorkshire. In my many wanderings through the county I have been usually intent on other matters, and have in consequence seldom been able to make observations on this subject. On Mickle Fell, at a height of 2000 feet, a spring was found to have the temperature of  $46^{\circ}$ , on the 3rd of Sept. 1851. On Ingleborough, at a height of 1900 feet, a spring gave  $46^{\circ}$  on the 2nd Oct. 1851.

On the temperature of the sea, my friends at Scarborough have lately supplied me with valuable information, confirming the statements in pp. 147, 150. (See Appendix.)

#### HUMIDITY OF THE AIR.

There is no such thing in nature as an absolutely dry atmosphere, though in some countries rain may be entirely unknown; there is also no part of the earth's surface constantly loaded with mist, though in the dreary regions of Tierra del Fuego this latter condition is almost reached; while Africa and Arabia yield types of remarkable dryness.

Rain, hail, and snow afford by their frequency, and the vertical depth of water which they yield in a year or month, not so much an accurate measure of the humidity of the air over the place of the observation, as of fluctuations and displacements in the mass of the atmosphere to the height of a few thousand feet—these changes being sometimes the result of causes put in action at some far-distant part of the globe, and sometimes the effect of local peculiarities, such as proximity to the sea, or to mountainous lands running in given directions.

Mists, on the other hand, afford a direct indication that the air at the place and time of their occurrence is *loaded* with moisture—in this sense absolutely *humid*—but they happen neither so regularly nor so frequently in Yorkshire as to yield more than slight characters for its general climate. They, however, mark some periodical recurrences of particular conditions which deserve attention.

The most important information on the state of moisture in the air, is to be had by experiment on the *evaporation* which takes place from wet surfaces, and the *deposition of dew* on bodies which are cooled below the temperature of the air; and these are precisely the observations which till within a few years were much, and almost generally, neglected in England.

We had in fact no satisfactory basis to proceed upon, till Dalton's sagacity and Daniell's inventiveness gave us the Dew-point Hygrometer, and Apjohn's calculations showed us how to determine the degree of moisture in the air, from the mere power of cooling which is well known to accompany evaporation.

The average depth of the rain which falls in a year at York is found to be nearly 24 inches, the greatest observed depth being 36·02 inches (in 1848), the least being 15·93 inches (in 1834).

This quantity is pretty nearly the average of what falls on the eastern or flatter side of the island, from London, which receives 24·80\* inches, to Edinburgh, which registers 23·50\*. The quantity received near the *eastern coast* is perhaps generally less, as at Keyingham 18 inches; and that measured farther inland, or toward the *western mountains*, is always greater, the augmentation being the more marked the farther we go to the west and north-west, till round the Lake district it becomes above twice, and in certain parts of it six times as much as at York (see Mr. Miller's researches in the Phil. Trans.).

At Settle the mean annual depth being 43·3, from 1837 to

\* The numbers marked thus are from Sir J. Clark's interesting work on Climate. 4th edition.



1850, we find the greatest quantity in a year to be 57·49 (1848), and the least (27·44) in 1844 (Mr. Tatham's Observations).

The distribution of rain in the different months at York appears in the following tables of average results by Mr. Gray and Mr. Ford.

	Mr. Gray. 1811 to 1824.	Mr. Ford. 1831 to 1840.	Mr. Ford. 1841 to 1850.
	inches.	inches.	inches.
January .....	1·64	1·717	1·612
February ...	1·50	1·706	1·496—
March .....	1·48—	1·711	1·530
April .....	1·62	1·551	1·738
May .....	2·19	1·467—	1·843
June .....	1·90	2·385	2·520
July .....	2·66	2·579	2·859
August .....	2·19	2·456	2·747
September...	1·88	2·144	1·913
October.....	2·82+	1·981	2·911+
November ...	1·86	2·591+	2·038
December ...	2·01	1·727	1·627
Annual fall ..	23·75	24·015	24·834

On regarding this table with attention, we perceive that most rain falls in the latter half of the year, as long since pointed out by Dr. Dalton in his 'Essays on the Meteorology of Kendal' (1793).

In each series the maximum, marked by +, occurs in the latter half of the year, the minimum, marked by —, in the earlier months. The maximum, 2·911, occurs in October; the minimum, 1·467, in May, the proportions being nearly 2 to 1.

Collecting into one average the rain observed from 1811 to 1824, and from 1831 to 1853 (thirty-seven years), we find the quantity in the first six months 10·44, in the latter 13·62,—the inequality being rather less at York than at London (10·15 to 14·60), much less than at Manchester (14·45 to 21·74), and very much less than at Edinburgh (8·29 to 15·21).

By taking the average of the thirty-seven years, we find the numbers placed in the first column of the following table; those in the second being given by Howard for London (Reports,

Brit. Assoc. 1844), those in the third by Mr. Lowe for Nottingham, 1844 to 1851.

	York.		London.		Nottingham.
January .....	1·69	}	..... 1·84	}	..... 1·79
February .....	1·54		..... 1·51		..... 1·42
March .....	1·55		..... 1·59		..... 1·86
April .....	1·58		..... 2·04		..... 1·90
May .....	1·80		..... 2·24		..... 1·99
June .....	2·30	}	..... 2·15	}	..... 2·55
July .....	2·66		..... 2·44		..... 2·72
August .....	2·39		..... 2·17		..... 2·67
September .....	2·02		..... 2·40		..... 2·46
October .....	2·60		..... 2·49		..... 2·75
November .....	2·14	}	..... 2·38	}	..... 1·76
December .....	1·81		..... 2·39		..... 2·34
Annual fall...	24·08		25·64		26·21

The half-year in which most rain falls, extends, at York, from June to November; at London, from July to December; and at Nottingham (only five years' observation) from May to October.

The depth of rain which falls in different parts of Yorkshire may be judged of by the following tables.

*Depths of Rain in Inches as measured at the following Stations in Yorkshire in the year 1844, which was drier than usual.*

Places west of the Vale of York.	In the Vale of York.	Places east of the Vale of York.
Ackworth ..... 18·82	York ..... 19·65	Huggate ..... 17·15
Settle ..... 27·44	Doncaster ... 18·18	Middleton ... 19·05

*Depths of Rain in Inches as measured at the following Stations in Yorkshire in the year 1834.*

Ackworth ..... 23·74	York ..... 20·70	Huggate ..... 26·36
Moat Hall, Kirby 23·26		Middleton ..... 20·18
Bolton by Bol-land ..... } 47·36		Brandsby ..... 22·60
		Rooss near Hedon 18·03

*Number of Days on which Rain, Hail, or Snow, more or less,  
fell at York, by Mr. Ford's observations.*

	1841.	1842.	1843.	1844.	1845.	1846.	1847.	Means.
January ...	8	7	14	16	16	14	14	12·7
February ..	10	8	14	13	5	3	15	9·7
March.....	12	16	11	17	13	11	16	13·7
April .....	14	2	20	6	11	20	16	12·7
May .....	14	16	17	9	19	11	19	15·0
June .....	10	8	11	13	15	6	20	11·9
July .....	18	9	16	16	13	11	6	12·7
August ...	13	10	10	16	18	14	11	13·1
September	11	15	8	10	10	10	15	11·3
October ...	23	6	20	15	16	23	16	17·0
November	10	17	21	16	15	13	16	15·4
December	15	11	7	6	17	8	16	11·4
	153	125	169	153	168	144	180	

In this way of judging, the most rainy month appears to be October, the least so February.

The degree of moisture in the air, though easily measured by the wet-bulb or dew-point hygrometer, and really of paramount importance to health and scientific agriculture, has been much neglected by meteorological observers in Yorkshire. My own registers supply the following series of wet-bulb observations at 10 A.M. for each month of one year at York.

The numbers in the third column are an approximate (not an accurate) expression of the relative dryness of the months.

	Dry Therm.	Wet Therm.	Diff.
January .....	38·3	37·1	1·2
February ...	38·7	36·1	2·6
March .....	40·7	37·3	3·4
April .....	51·1	47·1	4·0
May .....	53·8	50·3	3·5
June .....	59·9	54·2	5·7
July .....	60·2	55·7	4·5
August .....	65·2	60·8	5·2
September...	57·0	52·6	4·4
October .....	51·1	48·2	2·9
November ...	46·6	44·1	2·5
December ...	39·6	36·3	3·3

The annual fall of rain is not the same in amount on a plain as on a hill; not the same on the hill-top as on the surface sloping away from it: during any one shower it is not the same on the windward side as on the leeward side of a mountain. Nor is the same quantity of rain collected in a gauge placed at some height above the ground, as in another placed level with the surface of the ground.

On the variation of the quantity of rain according to the height of ground, the only information of value which we can produce from researches in Yorkshire may be obtained by comparing the depths of rain in the elevated and level districts, as given pp. 3-5. From these data it clearly appears that more rain falls in hilly districts,—and we may add, in the immediate vicinity of hilly districts,—than in level tracts. Elevated ground, in fact, causes deflection of the air-currents, and specially forces upward into cooler regions the air which near the surface of the earth is both warmer and more highly charged with moisture. Thus carried up to a higher region in which it is expanded by the diminution of gravity, this damp air is cooled, the moisture which accompanies it cannot all be retained in a vaporous state at the diminished temperature, and some portion is separated and floats about the summits in mist, or falls in rain according to momentary circumstances.

According to Mr. Miller's important experiments in the mountain region which surrounds Sca Fell, it is neither on the summit nor yet at the base of the mountains that the maximum of rain is collected. The greatest quantity seems to be at a height somewhat below 2000 feet. As far as can be at present determined, it is on the leeward side, with reference to the west and south-west winds, that the maximum of rain is to be looked for. In Borrowdale, for example, more rain falls than in Wastdale.

Some experiments, commencing with 1839, at four points in the great Penine ridge, between Glossop and Hathersage, the two extremes being on low ground, and the two middle stations

on high ground, gave the following results, recorded by Mr. Bateman (Manchester Memoirs, 1845) :—

	Near Glossop. 300 ft.	Head of Hurst Brook Valley. 1500 ft.	Head of Ashopdale. 1600 feet.	Near Hathersage. 300 feet.
1839.	inches. 44·5	inches. 64·0	inches. .....	inches. .....
1840.	45·2	63·0	74·8	38·8
1841.	.....	72·6	80·1	42·9

It is to be regretted that so few observations of this interesting kind have found their way to the Proceedings of our Local Philosophical Societies. By observations continued for three years at York by Mr. Gray and myself, with a variety of gauges, it is found that the quantity of rain collected at different heights above the surface grows less continually as we ascend to a height of above 200 feet. The ground in front of the Museum, the top of the Museum 43·66 feet above it, and the top of a pole elevated 9 feet above the great tower of the Minster, which is itself 203·83 feet above the lowest gauge, were the three stations chosen. The quantities of rain collected from February to February were as follows (snow excluded) :—

	Minster.	Museum.	Ground.
	inches.	inches.	inches.
1832-3.	15·715	20·182	23·785
1833-4.	14·963	19·852	25·706
1834-5.	8·294	12·135	15·939

The differences in the quantities of rain at the different elevations are found to vary with the season of the year. If we express the quantity on the ground always by the number 100, and class the results in warm and cold months, we have the following table :—

	Minster.	Museum.	Ground.
Three summer months...	inches. 66·35	inches. 85·83	inches. 100
Five warmer months ...	64·82	84·50	100
Five colder months .....	52·60	73·62	100
Three winter months ...	49·94	70·26	100

Here it appears very clearly that the greatest disproportion is in the coldest season, and the least in the warmest months. If we take the differences between the numbers which express the rain on the Minster and Museum, and 100, we have the column marked  $d+d'$  in the table below. In the column next to this, the mean temperature of the seasons is placed; that of the whole year being  $48^{\circ}\cdot 2$ . Thus it clearly appears that as the mean temperature rises, the difference between the high and low gauges diminishes. The third column is formed by multiplying together the numbers in columns I. and II. The near equality of these numbers shows the dependence of this curious phænomenon on temperature to be very close and essential. The mathematical computations to which the subject leads will be found in the original memoirs (Brit. Assoc. Reports for 1833, 34, 35).

	I. $d+d'$ .	II. Mean Temp.	III.
Three summer months...	47 <sup>o</sup> ·82	60·8	2907·4
Five warmer months ...	50·68	58·5	2964·7
Five colder months .....	73·78	39·3	2899·5
Three winter months ...	79·80	36·3	2896·7

It is only necessary to say here, that the theory to which the whole investigation appears to conduct is very simple. "The difference in the quantity of rain, at different heights above the surface of the neighbouring ground, is caused by the continual augmentation of each drop of rain from the commencement to the end of its descent. As it traverses successively the humid

strata of air, they deposit moisture upon it, because it is relatively cold, having in fact the temperature of a higher region."

A curious though common illustration of this theory has occurred to me while traversing the north-western part of Yorkshire, where I have seen a shower fall at the same moment on a mountain and on the lower ground round it. On the former it fell as small hail; on the latter it was rain;—the drop started as ice, and before reaching the lower ground was melted—having, no doubt, increased in weight during the fusion. I believe that a considerable proportion of our ordinary rain commences its descent in a frozen state; that snow is often the parent of rain; and that hail is not congealed rain more frequently than rain is melted hail.

Such experiments as these on York Minster have been made in many other situations, seldom so free from objection. The results are generally of the same kind, but often the effect of eddy winds is so great as to complicate and exaggerate the effect. All buildings are in some degree objectionable as supports for rain-gauges, for they generate strong deflections of the air.

Desirous of knowing how far we could obtain sensible results at much smaller elevations *free from buildings*, I tried, some years ago, many experiments in my garden with five gauges placed at  $1\frac{1}{2}$ , 3, 6, 12, and 24 French feet above the surface. The results obtained in parts of two years, viz. January 9 to October 14, 1843, and January 1 to September 2, 1844, which were read off for me by Mr. Cooke, are appended.

French feet above surface.	1843.	1844.
24.....	inches. 14·618	inches. 9·540
12.....	15·419	10·620
6.....	15·549	10·640
3.....	15·608	10·690
$1\frac{1}{2}$ .....	15·619	10·940

These experiments, which require great care in the arrangements, can only be made satisfactorily in open ground. They confirm the general view already presented, though the differences are less.

## WINDS.

The wind, itself originating in the inequality of temperature, which is derived from solar action on the unequal surface of land and water, is one of the principal determining elements of local climate and weather. The wind, if it blows long from the cold quarter, may bring the chill of winter over the roses of July; if it set in long from the warmer quarter, the lassitude of summer may surprise us even in January. The powerful influence of wind on temperature is very manifest, in every trustworthy set of observations. The relative prevalence of winds at York will be seen in the following summary of ten years' daily observations (1800 to 1809).

	N	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
January ...	23	17	29	55	46	59+	42	32
February ..	37	17	20	21	36	65	48	37
March.....	33	58+	34	36	35	34	47	30
April .....	38	51	20	23	23	57+	59+	34
May .....	23	47	40	37	32	58	36	36
June .....	31	34	13	24	23	48	76+	51
July .....	21	35	28	26	25	75	79+	31
August ...	12	10	14	19	23	81	98+	37
September.	34	18	16	17	33	81+	55	38
October ...	27	18	24	22	33	65+	52	37
November.	40	32	20	26	36	59+	38	48
December.	22	24	15	36	31	85+	47	44
Totals ...	341	361	273	342	376	767	677	455
	1317				2275			

On considering this table with attention, we perceive a decided superiority of westerly over easterly winds. Of the eight points here tabulated, the S.W. is that from which the wind most frequently blows; and this is the most prevalent wind in seven out

M



of twelve months. Next to this is the west wind, which is the predominant wind in four out of twelve months. The north-east wind, dreadful to invalids, is the prevalent wind in March, and is very frequent in April.

Supposing the winds to blow from each quarter on an average with the same velocity\* (say 20 miles an hour), particles of air vertical over York at the commencement of *an average day*, would be removed at the termination of that day about 100 miles to E.N.E. It appears from Sir W. Harris's computations† that at Greenwich the air is displaced *on an average day* about 116 miles to E.N.E.; at Devonport about 100 miles to E. by N.; and near Portsmouth about 92 miles to a little S. of E. Undoubtedly the most general stream of air over the British Islands is from the west and south-west.

The effect of these winds may now be traced on the temperature of the several months. In the following table the temperature of the several winds is given from 120 observations of each at 8 A.M.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
January ...	31·7	30·3	34·0	34·5	37·0	40·5	42·2	33·6
February ..	37·0	34·3	33·0	37·5	35·8	40·2	42·2	32·5
March.....	35·6	37·3	38·0	39·6	36·3	44·3	47·3	38·2
April .....	42·0	46·0	51·5	47·2	49·0	50·3	49·2	42·6
May.....	50·0	50·5	52·2	52·3	58·0	55·1	51·7	51·3
June .....	57·0	55·0	58·0	57·2	60·5	62·5	60·7	56·6
July.....	59·1	60·0	63·5	62·2	60·5	62·7	62·5	60·7
August ....	63·5	64·0	63·0	64·2	64·3	63·5	62·1	60·5
September	52·7	57·5	59·0	54·7	55·6	54·0	54·5	58·6
October ...	46·6	47·0	51·5	47·5	47·2	50·0	48·5	43·0
November	39·6	39·0	41·0	41·0	39·0	42·5	39·5	36·5
December.	34·1	33·7	35·5	34·2	38·2	38·8	37·5	29·6
Means...	45·7	46·2	48·5	47·7	48·4	50·4	49·8	45·4

General mean 47·76.

The coldest wind appears to be nearly in the line from N.N.W.

\* The south-west wind is undoubtedly stronger than the average; 20 miles an hour is about the average for the whole year at Greenwich.

† British Association Reports for 1844.

to S.S.E., which is the *longest line* that can be drawn from York *over colder land*; and the warmest wind from a point nearly S.W.; or in other words in the *shortest line over land* that can be drawn from York to the warm basin of the Atlantic.

Generally speaking, especially at the commencement of winter, the snow arrives at York from the N.N.W.; but in seasons when winter falls on France and Germany with uncommon severity, extreme colds are sometimes accompanied by southerly or south-westerly winds. In ordinary seasons these are productive of rain, and obscure weather; the west wind is frequently fresh, delightful, and invigorating, with a clear sunny sky.

It is in the colder half of the year, especially in January, February and March, that the superior temperature imparted by the S.W. and W. winds is most manifest; in July, August, and September, the east wind gives rather the highest temperatures, a circumstance possibly attributable to the greater amount of unclouded sunshine which that dry wind allows.

From a long series of observations with the old-fashioned oat-beard hygrometer, made at Brandsby, ten miles due north of York, by Francis Cholmeley, Esq., I extract (in sequence) the following results to indicate the *comparative dampness* of each wind at that place, as it would affect the senses, or manifest itself on organic tissues.

N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
48·54—	54·43	52·75	62·71+	62·30	54·26	54·39	51·56

In this series the driest wind is from the north, or rather a little west of north, while the dampest winds are from the south and S.S.E.; the former being the direction of the longest tract of land, and the coldest region, which consequently sends forth air to grow warm and *gather more moisture*; the latter yielding warmer currents, which have traversed a surface of water and arrive to *deposit* moisture. The S.W. winds might have been

expected to show most dampness; but they have already discharged part of their moisture on the hills of Derbyshire and the West Riding.

It is to be regretted that no continuous observations have been made, in Yorkshire, on the quantities of rain brought by different winds. I have constructed an instrument for this purpose, which gives accurate indications of the direction in which rain comes, and the angle of inclination at which it falls, but too frequent absence from home has prevented more than a partial use of this method of observation. As a general result it may be stated that the greatest proportion of rain comes with southerly and south-westerly winds; but long-continued rains with northerly and north-easterly winds are not unfrequent. This last rain is often in small or even almost elementary drops, and very cold, as if generated from vapours condensing at a small height above the ground; while the rain from the southern quarter is heavier and warmer.

The great masses of cumulated cloud usually come up from the west and south-west,—this is the quarter for thunder; it is also the point from whence our most violent hurricanes blow, such as that in January 1839, by which the streets of York were strewed with fallen chimneys and roof materials, and the neighbouring country oppressed with uprooted and broken trees.

It is much to be desired that a good Anemometer were mounted at York, and its results compared with that at Liverpool. If the relative quantities of rain brought by each wind; the height of the clouds they transport; the moisture they impart to the air; and their effects on temperature, vegetation, and health, were diligently registered by the Yorkshire Philosophical Society, new and valuable results might be expected to accrue to meteorology, agriculture, and medical science.

The effect of the wind on the height of mercury in the barometer is sensible when a large mass of observations are tabulated. By taking 100 observations of barometric pressure at 12 o'clock,

registered by F. Cholmeley, Esq., at Brandsby (200 feet above the sea), we have the following results, corrected to mean temperature ( $47^{\circ}8$ ) :—

N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
29·8163	29·7862	29·8293	29·6834	29·6126	29·7323	29·6769	29·7007

The highest pressure is observed with east winds, the lowest with south winds; the difference between them being  $0\cdot2167$  inch.

The barometer is subject to daily fluctuations or tides of such a nature, that in the latitude of Britain it rises twice to maxima (about 9 or 10 A.M. and 9 or 10 P.M.), and sinks twice to minima (about 4 A.M. and 4 P.M.). The amount of this fluctuation diminishes from the equator northward to lat.  $64^{\circ} 8' N.$ , where it is reduced to nothing. Farther to the north it re-appears, but in such a manner as to sink in the late morning and evening, and rise in the early morning and afternoon. On ascending above the general level of the earth in the latitude of Yorkshire, an effect happens of the same kind as that which is experienced on proceeding toward the pole\*.

I was able, by combining the labours of some friends, in 1832, 1833, and 1834, to obtain the values of these curious oscillations at York.

The height of the barometer is on the average greatest nearly at 9 A.M., least at 4 P.M.; the second maximum occurs nearly at 9 P.M., and the second minimum at 4 A.M. If we take as the standard the barometrical readings at 4 P.M., the general result is this† :—

A.M.			P.M.		
4	8	9	4	9	10
+	+	+	Standard.	+	+
·0075	·0163	·0178		·0170	·0162

\* Forbes, in Edinb. Trans. 1831.

† See Reports of Yorkshire Phil. Soc. for 1832, 1833, and 1834.

If 9 A.M. be our standard, the readings are—

A.M.			P.M.		
4	8	9	4	9	10
·0103	·0015	Standard.	·0178	·0008	·0016

I regret that much absence from Yorkshire of late years has prevented me from yet making observations on this oscillation of the barometer at a height of 1200 feet above the sea,—an experiment which promises very curious results.

## CHAPTER VI.

### MAGNETISM.

UNDER this head I shall merely state some of the angular measures and numerical values of the magnetic elements in Yorkshire. The direction taken by an iron bar or wire free to move under the influence of the earth's magnetism at York, is in a vertical plane intersecting the plane of the meridian, at an angle of  $24^\circ$  to the west of north, and inclined downwards from the horizon  $70\frac{1}{4}$ . The angle of deviation to the west has grown up to its present value of  $24^\circ$  in the course of 200 years\*, and now appears to be slowly diminishing; the angle of inclination from the horizon has been growing less by about  $2\cdot3$  in the year, for the last thirty years, and probably for a much longer period, and this rate of diminution (subject to much fluctuation however) still continues.

The line along which the *deviation* of the needle to the west is the same as at York, is not ascertained.

\* In the middle of the 17th century (1657 according to Cavallo) the needle pointed due north and south.

The line along which the *inclination* of the needle from the horizon is the same as at York (isoclinal line), runs on the average to the east of north  $70^{\circ} 31'$ ; and there is an interval of 1.72 geographical mile between two isoclinal lines, along which the inclination differs one minute of a degree. Between the south-eastern and north-western extremities of the county, the inclination of the needle varies about 50 minutes of a degree.

On the average, as before observed, the isoclinal lines cross the meridian lines in Yorkshire at angles of  $70^{\circ} 31'$  and  $109^{\circ} 29'$ , but they are not free from twists and irregularities depending on the nature of the rocks and the masses of land. I find a systematic arrangement of these local deviations from the general direction of the isoclinal lines. They appear to bend southward in crossing the great Vale of York, and to turn up to the northward on the hilly districts which rise to the east and to the west.

The *force* with which the magnetic needle is retained in the position which it occupies is found to vary in different parts of the country, and to increase toward the north-west. It is greater at York than at London, in the proportion of 1.0114 to 1.0000. The line along which the force is equal (isodynamic line) crosses the meridian in Yorkshire at an angle of  $63^{\circ} 51'$  to the east of north; and for a change in this force amounting to  $\frac{1}{100}$ th part, we must pass to the north-west about 84.4 geographical miles\*.

\* The results of my observations were first given by Col. Sabine in the "Magnetic Survey of the British Islands." (Reports of British Association for 1838.) I have since repeated them at many stations, and the general conclusions will appear in the next Part of the Proceedings of the Yorkshire Philosophical Society. The lines in Yorkshire pass, on the whole, more nearly east and west than in other parts of the island.

## CHAPTER VII.

## GEOLOGICAL HISTORY.

THE natural history of the land which is now Yorkshire goes very far back beyond the remotest point of time which can be assigned or conjectured for the first appearance of its human inhabitants. Still farther back we seek the geological history of the successive steps by which the ancient ocean gave birth and place to that land. There is an immensity of the past during which the forces of nature were employed by the Ruler of Nature in preparing a suitable place for the comfortable existence of intelligent man, even as there is an immensity of the future, in which we may hope that existence will be prolonged, that intelligence enlarged.

Even as the life of an individual man occupies but a small space on the scale of time which measures the duration of his race, the whole period during which mankind have existed on the earth is but a small part of the slowly elapsed ages of nature. If history enables us to measure back with confidence a hundred generations of men without reaching the origin of the human race, geology recalls to our view many successive assemblages of organic life in which man had no part, and which followed one another after intervals of time immensely longer than those which separated Sesostrius and Alexander; Nearchus and Columbus; the advent of Cæsar and the Conquest of William.

*How much longer* we cannot say; for the great periods disclosed by geology are of a *different order* from those measured by chronology; they are the durations of distinct systems of life, suited to peculiar conditions of nature, and can only be faintly

illustrated by the extinction of feebler tribes like the Red Men of America, or too conspicuous species like the sluggish pigeon of the Mauritius and the giant runner of New Zealand\*.

The duration of man as a race of created life can only be put in comparison with that of any other and earlier race of beings by some class of evidence applicable to both. *History*, in a large sense, belongs to both; *Geology* is part of primæval history, though *Chronology* can only be stated for a few of the numerous families of man †.

If we place in the order of their successive existence on the earth, the several characteristic groups of life which Palæontology has revealed, we shall construct a scale, which, though not indeed a chronology of the earth, is the first step towards such a scale of time. It represents *Life Periods*, which if they cannot now be referred to astronomical vicissitudes, are nevertheless so related to them and dependent upon them, that to find common measures of both is not an inconceivable, though it may be an impracticable problem; it is not obviously impossible, though it may be really attended with insuperable difficulty. Even as the motions of the once 'fixed' stars begin to be traced into system, and their almost inexpressible distance to be measurable from the opposite parts of the earth's orbit; so the ancient phænomena of terrestrial life acquire consistent positions, and stand in intelligible relations to the duration of man.

Many such scales of 'Life Periods' may be constructed, according as the phænomena are more or less analysed; but they must all express the same general truths. The following may be an example, and we pray the reader who dislikes hard names, to excuse in this case what can seldom be avoided in advancing branches of knowledge, the use of new terms to express new relations of thought. To modern geologists, terms and ideas of *this order* are quite familiar.

\* See monograph on Dodo, by Strickland; and papers on Moa, by Mantell and Owen (Phil. Trans. &c.).

† See Kenrick on Primæval History.



## PERIOD OF MAN IN YORKSHIRE.

Cainozoic or Tertiary Periods .....	{ Post-glacial..... _____ Glacial..... _____ Pre-glacial ....., _____ Palæotherian ....., _____ }	Ages of extinct Mam- malia.
<hr/>		
Mesozoic or Second- ary Periods .....	{ Mosasaurian ....., _____ Megalosaurian..... _____ Teleosaurian ....., _____ Palæosaurian ....., _____ }	Ages of extinct Saurians and Cephalopoda.
<hr/>		
Palæozoic or Pri- mary Periods.....	{ Palæoniscian ....., _____ Megalichthyan ....., _____ Pterichthyan ....., _____ Palichthyan..... _____ Proichthyan ....., _____ }	Ages of extinct Fishes, Trilobites and Brachio- poda.
<hr/>		

Unknown ; possibly Prozoic or Azoic Periods.

Thus three grand recognizable groups of 'Life Periods' in the natural history of the globe arise, in the latest of which Man—the minister and interpreter of nature\*—occupies the last place. Earlier than all these are monuments which entirely elude our grasp—rocks which contain no traces of life, and may perhaps, as many geologists suppose †, have really been formed before the appearance of organic life even in the sea. Let us briefly trace the history of these life-periods.

\* "Homo, naturæ minister et interpres."—BACON.

† Murchison calls them Azoic.

**PROICHTHYAN? PERIOD.**—It is to the sea that the oldest trace of life which geology has discovered belongs. There is no mark of the existence of land in any part of the area now occupied by Yorkshire in all the older palæozoic period. It was then part of the sea-bed, continually growing upward by additions of argillaceous and arenaceous sediment, and the exuviæ of fucoid plants, Zoophyta, Mollusca, Annulosa, and Crustacea. Singular to say, we have not yet found in the strata of this period any sure traces of the race of fishes. This negative character may, however, fail under further and more fortunate research.

The monuments of this period which exist in Yorkshire are the slaty and flaggy rocks of Hougill Fells, the slaty rocks of Ingleton, and the flags of Ribblesdale. Of these, possibly the greenish slate of Ingleton may be counted oldest,—may be of the same age as the slate of Coniston Fells, in which I have found some traces of life. The flaggy series of Hougill and Ribblesdale may in a large sense be regarded as of like age, but the group of strata in each is so thick, that the lowest part approaches in age to the limestone of Coniston Water Head, and the upper to the arenaceous and argillaceous beds some thousand feet above it\*. By Murchison they are called Lower Silurian, by Sedgwick Upper Cambrian. Life-remains are plentiful in the Ribblesdale flags, but difficult to extract in good condition. By the help of Sedgwick's last memoir †, and some notes of my own, it appears that the earliest Yorkshire forms of life included only the natural marine groups of Zoophyta, Brachiopoda, Cephalopoda, and Trilobites, in all about seventeen species.

**PALICHTHYAN PERIOD.**—Of the calcareous, argillaceous and arenaceous strata which, in a beautiful order of succession, are enriched with multitudes of ancient forms of life, along the borders of Wales, there constituting the Upper Silurian series of Murchison, we have in Yorkshire no ascertained trace. Had the county now extended to its old Brigantian limit,—had it even stretched a few miles westward to the Lune, at Kirkby

\* Sedgwick, in Geol. Proceedings, 1851.

† Ibid.

Lonsdale, we should have had an instructive group of laminated Upper Ludlow rocks, and tilestones, with plenty of small littoral shells, Spongarix, Aviculæ, Cypricardiæ, Orthocerata, &c. Such forms of life very probably existed over the sea-bed within the area which we are considering; they may have been imbedded in Upper Silurian strata, and have been raised from their place even to constitute land, but if so, they have been wasted away and removed by a process soon to be traced. The fishes of this period, so far as we know them, were very small\*, and belong to the upper strata of the series.

**PTERICHTHYAN PERIOD.**—No monuments of this period remain in Yorkshire, unless the sandstone beds, which I have described elsewhere† beneath the limestone of Moughton Fell in Ribblesdale, should be referred to it. But in the neighbouring valley of the Lune at Kirkby Lonsdale, we have the coloured marls and massive conglomerates which accompany the Old Red Sandstone series, the characteristic strata of this period round the English lakes and the Lammermuir hills, well exhibited.

When we proceed farther north and reach the Grampians and the great Caledonian valley, the Red Sandstone yields a considerable number of the strange fishes known as Pterichthys, Cephalaspis, Coccosteus, &c., which have furnished to Mr. Miller the theme of a pleasing and instructive volume‡. Mantell has recently described a reptile (*Telerpeton Elginense*) from these strata, and eggs of Batrachians are supposed to have been discovered in them. But though no monuments of the period, strictly so called,—rocks or fossils,—can be traced, there are some marks for its history in Yorkshire; for previous to it the older strata were uplifted by some great subterranean force, certain main features of our physical geography were sketched out, and it is probable that land was above the waves in a considerable part of what is now Cumbria, Scotland, and Ireland. One

\* Murchison's 'Silurian System.'

† Illustrations of the Geology of Yorkshire, Part II.

‡ 'The Old Red Sandstone.'

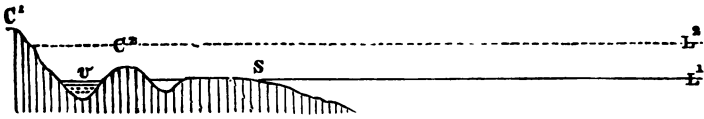
very simple proof of this is to be seen in the valley of the Lune at Kirkby Lonsdale. Here the valley, excavated in the Upper Silurian strata, is filled to a considerable extent with conglomerates of Old Red, full of pebbles of the lower groups of Hougill, and the other high slaty fells which give springs to the Lune. In other situations the Old Red rests on older beds of the slaty series, so as to be clearly unconformed to the whole of it. From this it follows that those older strata had been greatly disturbed, placed in new positions, and excavated into valleys, and that these valleys were filled with the violently aggregated detritus, which had been swept down them from about their sources. It is probable they formed land, and gave birth to streams, which ran down valleys into estuaries, and entered seas now obliterated by later convulsions.

In Yorkshire we have no trace of these very ancient valleys, no conglomerates of the Old Red; but we see, in the region below Whernside, Ingleborough, and Penyghent, the displacement of the old slaty strata; the dips in various directions which they have acquired; and, what is very remarkable, the summits of the anticlinals thus occasioned are ground, worn, or rather, we may almost say, *planed* down to a nearly level surface (some bands are a little prominent as being less abraded), and this surface is covered and preserved to us by nearly level strata of mountain limestone, contrasting strongly with the highly inclined slate, and containing in their lowest beds *pebbles* of that slate. (See Pl. 31.)

This is the fact, and most remarkable it is. What is the explanation? According to modern geology this is the effect of the sea, acting, as we see it act in particular cases, on a *shore*\*; it is the gradual work of the breakers of a Palæozoic sea; an effect anterior to the deposition of the mountain limestone, and probably part of that system of natural agencies which roughly excavated the valley of the Lune, and filled it with conglome-

\* See De la Beche's Geological Observer for excellent observations on this subject.

rates characteristic of the period immediately following the Palichthyan age. This old shore is now almost 1200 feet above the modern sea.



This diagram shows the supposed first appearance of the *land* which is now Cumbria, C¹; the ridge of Casterton Fell, C²; the valley of the Lune, *v*, excavated in Silurian strata, and filled with old red conglomerates; and the old (levelled) shore, S; and the sea-level, L¹. As mentioned in the next paragraph, the land was depressed again, so as to be covered in great part by water, whose relative level may be represented by the line L². Then were deposited Mountain Limestone, Millstone Grit, and Coal-measures.

**MEGALICHTHYAN PERIOD.**—The mountains already indicated not far to the west of Yorkshire, were *depressed* again, and with them the shore, which had been formed on the Yorkshire Silurians—so as to receive a thick deposit of mountain limestone, the fruit of waters charged with a salt of lime, and innumerable shells and corals to which this salt yielded the materials for their stony fabrics. As yet the area on which we are intent was Sea—but in many beds of sandstone, shale and coal which alternate with the mountain limestone, we see evidence of currents drifting spoils from *neighbouring lands*; probably from the upraised Cumbrian Alps, and other high ground farther west and farther north; for then the Highlands of North Britain might perhaps be continuous to the Fells of Norway.

This drift of materials from land is the more manifest, the farther we go to the north. Under Ingleborough the Scar limestone contains almost none of them; when we reach the base of Cross Fell it is broken up into many beds by these interpolations. This drift did not in that period reach so far south as Ingleborough; and Derbyshire, Flintshire, and the south of England and Wales, are equally free from any traces of it.

But in the Yoredale rocks which come on above, the drift which is still more prevalent in the north,—there yielding thick sandstones, shales, coal and ironstone between the limestones,—is abundant in Ingleborough and farther south. It is however more argillaceous, less arenaceous, and yields much less trace of coal,—circumstances which agree with the view that the land was to the north, the deeper ocean to the south. The plants which accompany the coal are for the most part of terrestrial growth. None of them are known to *stand erect in place and attitude of growth*, so as positively to mark the fact of the elevation of land in any part of the Yorkshire district of mountain limestone.

The life of the Period was still for the most part marine, and consisted, beside a few fucoids, of many Zoophyta, Crinoidea, and Mollusca, a few Annulosa and Trilobites, with a small number of rather large cartilaginous fishes. A few land plants are found in some of the alternating shales and sandstones, but not in their place of growth.

Marks of the existence of *neighbouring* land grow stronger continually as we ascend through the next mass of Palæozoic strata—the millstone grit—which contains more abundant remains of plants and greater variety of sediments, such as rivers might transport, especially quartz gravel beds in great thickness, for such is really the basis of our millstone grit. In the next class of deposits, or the Coal formation, we have proof of *land* in Yorkshire, for among these deposits are certain strata of sandstone in which the stems of trees *stand erect*, and beneath several of the coal-seams are the *roots of trees* extended in their natural positions. The coal beds are certainly composed of terrestrial plants, probably accumulated round the trees and above their roots, often by the agency of water, which has left parts of its living tenants even in the substance of the coal, as the defensive fin-bones of cartilaginous fishes (*Gyracanthus*) and estuary shells (*Unionidæ*). But there is no reason from these facts to infer that the land was greatly elevated. A low and even swampy region only just raised above the flow of waters may be admitted

where now the coal strata extend, and much beyond their actual extent. And there is no doubt that the elevation of this tract into great ranges of hills is the work of a somewhat later geological period.

The region of the coal strata indeed, and all the area connected with it, was undoubtedly sinking continually until the completion of the latest of these strata. But afterwards a great change took place. The whole great area of the sea-bed, in this part of the globe, was displaced, in some places raised to the extent of some few thousand feet, so as to constitute ridges of dry and *elevated land*. This as applied to Yorkshire caused the production of the great Penine Chain, which extends southward through Derbyshire, and northward through Durham and Northumberland. We have thus the distinct appearance of a *part of the land of Yorkshire* above the Primæval Ocean.



The augmentation of land in this diagram, as compared with the former one (p. 174), is in the Penine chain of the west of Yorkshire, P. Where the land sloping from this passes, at S, under the sea-level of the period, L, it is worn nearly to a sloping plane. On this, and farther to the east, the sea deposited the Magnesian Limestone, New Red, Lias, Oolites, and Chalk.

The life of this period is partly marine, partly freshwater, partly terrestrial. Of marine life we have the following main groups:—

Foraminifera.	
Polyparia .....	41
Crinoidea .....	40
Echinida .....	3
Conchifera Dimyaria .....	32
Conchifera Monomyaria.....	24
Brachiopoda.....	100
Gasteropoda.....	91

Heteropoda .....	10
Cephalopoda .....	69
Trilobites.....	8
Annulosa .....	6
Fishes .....	A few, especially of the genera <i>Megalichthys</i> and <i>Holoptychius</i> .

Freshwater life is probably indicated, rather than fully illustrated, by several of the fishes, as *Megalichthys*—the *Unionidæ*—and certain tribes of fossil plants, as *Equisetacæ*?, *Hydaticæ*, &c., and insects; but of these latter forms we have none yet recorded from Yorkshire.

Terrestrial life is abundantly marked, but only by plants. Of these we have a large catalogue, including the following groups, among which *Ferns*, *Lepidodendra*, and *Sigillariæ* are predominant.

Asterophyllites.	F. <i>Pecopteris</i> .
F. <i>Alethopteris</i> .	<i>Pinites</i> .
<i>Calamites</i> .	<i>Sagenaria</i> .
F. <i>Cyclopteris</i> .	<i>Sigillaria</i> .
<i>Halonia</i> .	F. <i>Sphenopteris</i> .
<i>Lepidodendron</i> .	<i>Ulodendron</i> .
F. <i>Neuropteris</i> .	

Of fruits the most remarkable are *Trigonocarpon* and *Cardiocarpon*. The prefix F. marks genera of Ferns.

PALÆONISCIAN PERIOD.—Thus, toward the close of the Palæozoic creations, we have in this region unequivocal disclosure of broad surfaces of the old sea-bed in a state fitted for abundant vegetation; this is followed by an epoch of great and extensive disturbance, resulting in the production of a mass of land, on the east of which is a very extensive sea. And again, we perceive the singular effect of watery violence,—extensive wearing and partial levelling of the surface of the uplifted coal-measures and older strata, before the next class of deposits was produced. This fact is evident in the range of country northward from Aberford, as far as the Tees; but, from the unequal hardness of the materials, the surface is far less uniform than in the admirable example of the Palæozoic series. In this sea new



deposits happened, so as to cover its bed very widely, first with peculiar calcareous deposits (magnesian limestone), in which occur for the last time a few of the old forms of life (*Productæ*, *Crinoidea*, &c.).

The magnesian limestone of Yorkshire has yielded only the following marine families of animal life; the remarkable fishes called *Palæoniscus*, which abound in Durham and Northumberland, not being yet discovered in these strata in Yorkshire:—

*Polypteria*.  
*Brachiopoda*.  
*Monomyaria*.

*Dimyaria*.  
*Cephalopoda*.

**PALÆOSAURIAN PERIOD.**—The magnesian limestone is followed by arenaceous and argillaceous deposits, richly coloured by peroxide of iron (*New Red formations*). These are almost devoid of all trace of life; and if we were to judge by their aspect in the North of England, we might regard them as belonging to a period really deficient of organic forms,—a sort of interregnum of nature—separating the old Palæozoic from the new Mesozoic life. But this is not the true explanation. Elsewhere in the South of England, and more conspicuously in Europe, the new red formation contains both plants and animals, and they belong to the Mesozoic type. Among them are the Saurians of Bristol, called *Palæosaurus*.

**TELEOSAURIAN PERIOD.**—There is no proof that land had been raised to represent any other part of the area of Yorkshire, than that already indicated in the western part of the county, during the long period which elapsed while the Lias, with its numerous Saurians, Ammonites, and Belemnites, was deposited far to the east of the Penine hills.

This thick series of deposits has generally an argillaceous character—such as might be produced in parts of an ocean removed from violent currents, and receiving in abundance only the finer portions of matter which could be transported far before subsiding to the bottom. One exception to this occurs in the midst of the deposit. The marlstone and ironstone series

—the latter now so valuable in Cleveland, Eskdale, and the Vale of Mowbray,—contain so much of sandy aggregates as to imply the temporary influence of stronger but not violent currents. Perhaps the *depression*, which may be supposed to have gone on generally and uniformly during the greater part of the liassic accumulations, was at this epoch interrupted. The cause must have been very extensive, for the marlstone beds are traced without real interruption from Yorkshire into Somersetshire.

In the liassic ocean nature was prolific of life. The sea was too muddy for corals or Echinida to be plentiful; in the lowest calcareous bands Pentacrinites, and in the marlstone series both Star-fishes and Pentacrinites, occur in great beauty, as at Staithes. Belemnites, never seen in the older strata, now abound. Ammonites, of many and quite different groups from the older forms of involute Cephalopods, are equally plentiful. We have no Trilobites, but many of the ordinary long-tailed Crustacea; abundance of fishes *with symmetrical tails*, and a great series of aquatic reptiles, especially Ichthyosaurus, Plesiosaurus, and Teleosaurus, in which the structures of Fish and Cetacea, of Turtle and Crocodile, are harmonized by nature into the same antique system which includes the winged Pterodactyls. So perfect are the skeletons of these mighty denizens of the old sea, that all their structure is disclosed to the anatomist—the very globe of the eye is represented by its sclerotic plates—the very skin and dermal scuta can be traced, and the bones of the fingers counted and compared with the component parts of the fin of the Whale, the paddle of the Turtle, and the wing of the Bat (see the Museums at York, Whitby, and Scarborough).

We may gather a condensed view of the rich variety of life of this period in a tabular form.

Marine life is represented by a few Algæ and many animal remains.

Asterida.  
Crinoidea, especially Pentacrinites.  
Echinida.

Dimyaria.  
Monomyaria.  
Brachiopoda.

Gasteropoda.	Annulosa.
Cephalopoda.	Fishes.
Crustacea.	Enaliosauria.

Of freshwater animals and plants, we have perhaps none in the Lias; but terrestrial plants are represented by fragments of coniferous trees of considerable magnitude, often converted to brilliant jet.

**MEGALOSAURIAN PERIOD.**—The depression of the sea-bed during the period which succeeded the Lias must have been subject to several interruptions and renewals. For in this series, as it appears in Yorkshire, we have several alternations of oolite, the product of salts dissolved in the sea-water; shales widely diffused in that water; sandstones full of false bedding, indicative of shallow and variable currents; ironstone and beds of coal, which imply not far distant land. Swampy land, if not river channels bearing fresh water, we may perhaps readily admit even in the very area of Yorkshire, for stems of *Equiseta* stand upright in certain sandstones near Whitby and Osmotherley\*, like the *Sigillariæ* and *Lepidodendra* of the older deposits, and like them are associated with coal. But we cannot from this occurrence, or from the bones of land lizards (*Megalosaurus*) in the Coralline Oolite, conclude that there was *elevated* land in the region where now the North York Moors rise 1485 feet above the sea.

Marine plants are but slightly traced in any of the strata of this period in Yorkshire, but marine animals abound in all the limestones, and many of the sandstones and clays. The following are the main groups:—

Amorphozoa.	Dimyaria.
Polyparia.	Monomyaria.
Foraminifera.	Brachiopoda.
Asterida.	Gasteropoda.
Echinida.	Cephalopoda.
Crinoidea.	Crustacea.

\* The observation at Osmotherley is due to Murchison.

Annulosa.

Fishes.

Dinosauria.

Enaliosauria.

Crocodilia.

Remains of freshwater plants occur in the carbonaceous sandstones and shales, with Unionidæ, and many land plants, especially Ferns, Cycadaceæ, Lycopodiaceæ, and Equiseta.

After the completion of probably the whole oolitic series of rocks, the downward movement, to which in these regions the sea-bed was subject, was interrupted, at least locally, by a remarkable elevation. The effect of this is conspicuous on the line of the Wolds, where the strata of the oolitic series are bent into a broad anticlinal, of which the axis passes near Bishop Wilton, probably in a direction from west to east. The oolitic and lias strata dipping from this axis on one side to the north, and on the other to the south (but very moderately), are, as in the cases already given,—the Silurians and the coal-measures,—wasted and worn down to a surface horizontal or slightly inclined, on which the chalk rests *unconformably*; just as the mountain limestone rests on the Silurians, and the magnesian limestone on the coal. At Bishop Wilton the removal of the oolite and lias is so nearly complete, that only a small thickness of lias separates the chalk from the new red marls. At Huggate also, within the area of the Wolds, lias was found immediately below the chalk.

There is no sufficient evidence to show whether this elevation was occasioned by gradual or sudden application of power. The level of the wasted surface of the oolites and lias, below the chalk of the Wolds, is about 1000 feet below that of the highest points of the North York Moors. If, according to the now generally received opinions in geology, we admit that the waste of the surface referred to was accomplished at a small depth under the sea, these Moor-lands, not in their present form indeed, may have been, and probably they were at that epoch, above the level of the sea.

MOSASAURIAN PERIOD.—The depression of the sea-bed con-

tinuing or being renewed, we find the sediments changed; chalk replaces the oolites—perhaps because the ocean was now opened to new sources, and closed against those which had been long in action. The sandstones and shales of the oolitic series in Yorkshire came by inundations from the north; the oolitic element was in great degree the effect of lime separated from the sea by the functions of animal life. The chalk, in like manner, contains evidence of the effect of such vital powers, but not so abundantly in Yorkshire as in the southern counties. Its numerous bands of flint nodules are in a lower part of the mass than in other parts of England. Sponges are not usually found in these nodules, but lie in the chalk itself (the upper part), and are remarkably distinct in appearance and character, because their tissue is siliceous\*. With them lie many Marsupites, Apiocrinites, Echinida, and Belemnites; other Cephalopoda and some Fishes do occur, but they are not frequent.

*Organic remains.*—These are purely marine, and wholly of animal origin. The groups at present discovered are fewer in Yorkshire than in the south of England; Dimyaria, Gasteropoda, and Reptiles being as yet unknown here. The Reptile from which the group is named (*Mosasaurus*) occurs in the south of England. The most numerous of all are the Amorphozoa, Crinoidea, Echinida, and Belemnites.

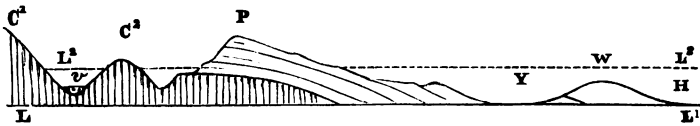
Amorphozoa.	Monomyaria.
Foraminifera.	Brachiopoda.
Polyparia.	Annulosa.
Asterida.	Cephalopoda.
Crinoidea.	Fishes.
Echinida.	

**PALÆOTHERIAN PERIOD.**—No monuments of this, the Eocene period of Lyell, occur in Yorkshire, nor is any special fact observed from which the state of things here at that time may be correctly *inferred*. The absence from Yorkshire of the deposits

\* Mr. Charlesworth has availed himself of this property, and by immersion in dilute acid has obtained for the Yorkshire Museum beautiful specimens.

and the fossils which belong to this period in the basins of London and Hampshire is complete, and we lose an important link in the chain of life-periods. The fact is positive, the explanation not so. *Perhaps*, while the Palæotherium and Anoplotherium were roaming by the freshwater lakes of the south, and the innumerable shells, so like those of the existing ocean, and so unlike all of earlier date, were in the sea which occupied what is now the valley of the Thames, our Yorkshire hills may have stood above the waves.

This appears the more probable if we remember that the next series of deposits known in the south of England, the Coralline Crag, is also unknown in Yorkshire, and that only the later, perhaps the very latest of the Crag deposits, corresponding to the Mammaliferous Crag of the Eastern counties, has been found in our coast sections at Bridlington. According to this supposition, after the deposition of the chalk, the land was raised again gradually—there is at least no trace of violent movement—and remained very long above water, divided into islands by the long sea-channel of the Vale of York, and the shorter gulf of the Vale of Pickering.



In this condition of things the land of Yorkshire is in the state of one great mass on the west, and two smaller masses on the east, one of which, the Wold (W), is shown. The sea flows down the vale of York (Y), and covers Holderness, H. L¹ is the sea-level. In the glacial period which follows, the land is depressed again, so that L² may be the sea-level as measured on the land.

PRE-GLACIAL PERIOD.—We have thus the main elements of the land of Yorkshire defined, and rendered suitable for the reception of animal and vegetable life. Plants and animals appeared upon it, not, we suppose, by creation here, but by transference of seeds through air and water, and by the various modes

of migration from one region to another, which nature is continually employing. To determine the position of the local centres from which, by these processes long continued, our earliest British fauna and flora were derived, is a problem which every naturalist will acknowledge to be difficult, but which we ought not to abandon as impracticable, until we find unavailing in this case the methods of research which have been so eminently successful in tracing the geographical distribution of the animals and plants now in existence.

Species of Elephant, Rhinoceros, and Hippopotamus ; of Lion, Hyæna, Bear, and Wolf ; of Ox, Deer, and Horse, very similar to existing races, yet for the most part really distinct, were among the earliest tenants of the Yorkshire hills and plains ; and not of these only, for the same conclusion has been drawn from observations in many parts of England.

One proof of this is in the fact, that in the gravel and clay which spread round these hills in considerable quantities, and contain masses of stone drifted from the hills, lie bones of the animals named. Another proof is the occurrence in fissures and caverns of the remains of many of these animals, together with others, under circumstances which leave no doubt of their having lived in the immediate vicinity, or actually, as in the case of Kirkdale is well ascertained, in the cavern itself.

GLACIAL PERIOD.—But again subsidence occurred, so as to plunge considerable portions of the dry and inhabited surface beneath the sea-level, and allow of their being covered by great quantities of bluish clay (boulder clay) full of fragments derived from the old lands of Cumbria, the Penine chain, the northern moorlands and the chalk hills,—fragments procured by the waste and breaking up of the surface of these districts, consequent on the littoral action of water, aided perhaps by the operation of glaciers on the land and icebergs in the sea ; for this was a *glacial sea*, a cold ocean, as the shells which it has left among the drifted masses which it deposited testify. Above the boulder clay are usually extensive deposits of various gravels and sands,

sometimes shelly, which contain fragments washed out of the older clay, and worn and rounded in various degrees.

POST-GLACIAL PERIOD.—To this submersion we may perhaps attribute the extinction in our district of many of these “antediluvian” or “pre-glacial” animals; for after the land rose again, so as to admit of freshwater lakes in hollows of the boulder clay and gravel beds, we find but few of the forms of life analogous to tropical species. It is the Irish Elk, the Red Deer, and Fallow Deer, which most frequently lie in the old lacustrine deposits.

This last great elevation laid dry the old sea-channels of the Vale of York, the Vale of Pickering, and Holderness; exposing in each the boulder clay and other aggregations of the glacial period to rapid waste by shore currents and land streams. These causes are still in operation, following out the design of perpetual but regulated change on the face of nature; nor does any evidence appear that they have ever been interrupted here by epochs of great violence. No sudden movement has disturbed the relative level of the land and sea; no extraordinary change of climate has destroyed the races of animals and plants, or greatly modified the qualities of the atmosphere. The land and sea, the hills and valleys, the rains and winds, the clouds and atmosphere of the present day, may be regarded as unaltered in main features since the retirement of the boreal ocean; it cannot therefore be surprising that remains of man and the works of man should appear in the deposits of this age, though not in the earliest of them, along with bones of many animals essential to the comfort of human existence.

#### FAUNA OF YORKSHIRE.

Let us now survey the successive phases of animal and vegetable life which occupy the latest æras of geology, and consider them in relation to the earliest historic periods.

The pre-glacial fauna of Yorkshire is chiefly known to us by the



famous discoveries in the Cavern of Kirkdale, on the northern side of the Vale of Pickering. As already observed, these are the reliquiæ of animals which lived in the vicinity,

The list of Kirkdale animals, as first given by Buckland in the 'Reliquiæ Diluvianæ,' is still very nearly a sufficient catalogue of the earliest known birds and mammalia of Yorkshire.

CARNIVORA . . . . .	Hyæna, Lion, Tiger, Bear, Wolf, Fox, Weasel.
PACHYDERMATA . . .	Elephant, Rhinoceros, Hippopotamus, Horse.
RUMINANTIA . . . . .	Ox, Deer (three species).
RODENTIA . . . . .	Hare, Rabbit, Water-rat, Mouse.
BIRDS . . . . .	Raven, Pigeon, Lark, Duck, Partridge.

Considerable as this catalogue is, and containing examples of carnivorous and herbivorous, of dry land and fluviatile races, denizens of air and water, it can only be regarded as an index to the animal life of the period.

I cannot produce *evidence* that the vegetation which this fauna requires existed in Yorkshire; but the subterranean forests on the Norfolk coast, which consist of fir-trees, are undoubtedly of this æra, for they are *rooted on* the mammaliferous crag and *covered by* the boulder clay.

In a marl deposit at Bielbecks, which may be of the pre-glacial period, but which has also been regarded as of later or post-glacial date\*, we have several of the same quadrupeds, as *Elephas primigenius*, *Rhinoceros tichorhinus*, *Urus antiquus*, large Deer, large Horse, *Felis speleæ*, and Wolf. A Duck was the only bird; a *Chrysomela* the only insect; an umbellate plant was recognized by its seeds. Three terrestrial shells were found, viz. *Helix nemoralis*, *H. caperata*, and *Pupa marginata*; one swamp shell, viz. *Succinea amphibia*; and nine freshwater shells, viz. *Limnæa limosa*, *L. palustris*, *Planorbis complanatus*, *P. vortex*, *P. contortus*, *P. nitidus*, *P. spirorbis*, *Valvata cristata*, and (the only bivalve) *Pisidium amnicum*.

When we compare with the Kirkdale *pre-glacial* quadrupeds the species (which have left remains) in peat, marsh, buried

\* Trimmer, in Geological Proceedings, 1851.

forests, and lacustrine marls, certainly of *post-glacial* date, we find in Yorkshire a great and prevalent difference: the Elephant, Rhinoceros, Hippopotamus, Lion, Tiger, and Hyæna, are absent. We find the great Irish Elk, the Red Deer, the Fallow Deer, the *Bos longifrons*, the common Ox, the Goat, Sheep, Horse, and Boar.

By the absence of the great pachydermata and carnivora, this fauna differs from that of the pre-glacial period, but by no characters is it clearly separable from the series of mammalia now inhabiting this country. The Irish Elk and *Bos longifrons* may perhaps be appealed to for this purpose, for both are now extinct; but the latter at least survived to accompany some of the old British tribes, and its skull has been found with that of the Red Deer, from which the antlers had been *cut off*. There is nothing in the vegetable remains which occur in the peat and lacustrine marls different from what now grows in this region, and we are not warranted in refusing to connect the later part of this post-glacial fauna with the earliest known human inhabitants of the British Isles.

So that we have now passed the æra of what have been called earlier creations—

. . . . . ecœtaque tellus  
Vix animalia parva creat, quæ cuncta creavit  
Sæcla.—*Lucretius*.

In fact, the great buried forests of Hatfield Chace and Thorne Waste furnish positive proof that their æra, which is apparently that of the later post-glacial period, was within the historical ages of Britain. In them Mr. De la Pryme\* found “vast multitudes of the roots and trunks of trees of all sizes, great and small, and of most of the sorts that this island either formerly did, or that at present it does produce; as firs, oaks, birch, beech, yew, thorn, willow, ash, &c. . . . Many of the trees have been burnt, sometimes quite through; others chopped, squared,

\* Philosophical Transactions, 1701.

bored through or split, with large wooden wedges and stones in them, and broken axe-heads somewhat like sacrificing axes in shape, and this at depths and under circumstances which exclude all supposition of their having been touched since the destruction of the forest. . . . Near a large root in the parish of Hatfield were found eight or nine coins of some of the Roman emperors, exceedingly defaced with time."

#### ORIGIN OF THE FAUNA AND FLORA OF YORKSHIRE.

Whence came the fauna and flora to the insulated area of Britain? It will be useless to invoke a special creation within this area, because the species are not confined to it, and there will be the same difficulty in spreading them from it as in bringing them to it. It will not be enough to call in the aid of sea-currents, or aerial wanderers, to disseminate even a small portion of the animals and plants. There remains then one only mode to be further considered,—a change of physical circumstances, such that a land communication existed for a long period of time between Britain and the Continent, whereby animals might arrive by the usual processes of nature.

In such a case *migration*, the process by which animals adapt themselves to varying climate, procure suitable food, and obtain the requisite conditions for reproduction, might bring us the Elephant, Urus and Deer, with their followers, the Lion, Tiger and Wolf. The irregular distribution of seeds and ova, which takes place in many unexpected ways through air and water, might give us the aquatic and terrestrial mollusca and plants; while the steady process of *diffusion* from a central space, may be appealed to for the more easy examples of animals less dependent on climate, and less restrained from locomotion. Such a state of physical geography would be represented, if, with De la Beche, we raise the bed of the northern seas only 600 feet, a quantity much within the admitted measures of moderate geological movements.

With such a character of surface long continued, there would be no difficulty in admitting the gradual distribution over the British Isles of a large proportion of the terrestrial forms of Europe, quadrupeds, birds, reptiles, insects, land mollusca, and plants; the difficulty would be greater in regard to the denizens of rivers and lakes; and in fact there are some considerable local distinctions in respect of these, not only in contrasting Britain with the continent, but also in comparing one of our rivers with another.

One such migration must be supposed to have happened in the pre-glacial period: were all the animals and plants of this colony destroyed by the glacial ocean; and is it necessary to admit another migration after that ocean had been withdrawn? If the glacial ocean covered all our islands, the second migration must be admitted; but there is no proof that that ocean did cover all our mountains. On the contrary, there seems reason to limit its height, as a general rule, in the north of England and Wales, to something less than 1500 feet. This indeed would reduce everywhere to a series of islands what is now the land of Britain,—a condition under which some races of animals and plants must perish; yet the islands might preserve many species, which on the retirement of the sea would spread downward from the mountains as far as climatal conditions allowed, according to the notion long since put forth by Linnæus in his treatise ‘*De Telluris Orbis Incremento.*’ Some species, however, would remain confined to the mountains.

This is the fact in regard to some species of plants, which occur on the mountains of Scotland and Cumberland and the most elevated regions of Yorkshire, and which appear to be parts of a Scandinavian flora, communicated to Britain before the glacial period, and now preserved on certain elevated tracts which, during that period, stood above the water.

As examples of the plants here alluded to, we may quote from Baines’s ‘*Flora of Yorkshire*’ the following well-known species:—

- Cornus suecica* . . . . In the vicinity of Pickering and Scarborough.  
*Trientalis europæa* . . Hambleton Hills, Swill Hill near Halifax, Rumeley's Moor, Holwick in Teesdale.  
*Potentilla alpestris* . . In the north-western region about Malham and Cronkley.  
*Sedum villosum* . . . . Weathercote Cave, Malham, Baldersdale, &c.  
*Salix herbacea* . . . . On Ingleborough.

My friend Mr. Backhouse, by whom the prolific region of Teesdale has been repeatedly explored, has found *Myosotis suaveolens* flowering in abundance on the high limestone at the east end of the top of Mickle Fell at the end of June. *Polygala uliginosa*, Reich., has also rewarded his re-examination of the botanically celebrated Cronkley Scar. These are also Scandinavian plants.

The localities of these plants, it will be observed, lie in the elevated parts of the north-western and north-eastern districts of Yorkshire; but, excepting perhaps *Salix herbacea*, they are not confined to the highest parts. These same elevated districts are as remarkably deficient in land mollusca as are the mountainous tracts of Scandinavia; they do not contain all the species of our actual fauna and flora, or even a large proportion of it, nor is it conceivable that they ever did contain them, so as to be the source from which they spread over the islands.

Therefore, although we admit that the glacial inundation did not cover all our land, and that some species may have been saved from it on the mountains, this does not the less render it necessary to suppose a second migration for the replenishing of the lower grounds with species which cannot be traced to those mountains. Now the greater part of our flora and fauna is in this condition. It is essentially allied to, or rather identical with, the plants and animals of Germany, and its general distribution, not in Yorkshire only, but in all the British Islands, seems to require positively the admission, that after the glacial period the bed of the German Ocean (which had been a glacial sea) was raised above the water so as to constitute a dry-land communication with the east and south-east.

Thus we appear conducted to the conclusion that Yorkshire contains evidence of two ancient periods, during which migrations of plants and animals happened from the continent of Europe, bringing to us Scandinavian and German forms of life ; that these were separated by a period of oceanic overflow and glacial temperature ; and that since the last migration—which brought our Germanic flora and fauna—the German Ocean has been formed. If we carry out the inquiry with reference to the south of England and to Ireland, we shall find reason to admit that since that migration, the Straits of Dover have been cut, the Irish Channel excavated, and even more extensive alterations in physical geography occasioned\*.

To complete the series of life in Britain, Teutons followed the archaic flora and fauna from Scandinavia and Germany, and settled in a region full of the productions of the country they had quitted ; even as—to continue the analogy—the Belgæ followed the Gallic flora to the south-east of England, and the Iberi reached the southern districts of Ireland which had already received the plants of the Asturias. At what point of post-glacial time the advent of man happened we cannot say. He has left no monuments in the earliest of the deposits of even this the latest geological period. Remains of men do occur in the more recent deposits of this period, but such facts do not appear sufficient to determine when the human race first penetrated to the far west.

Nothing yet positively ascertained by science forbids the conjecture that the fathers of the British race may have come by land ; that coracles and canoes may have been the earliest vessels which they navigated ; and that they might justly call themselves, as Cæsar says they did, “aborigines,” in comparison with the mercantile settlers of later days.

We may contrast with this the popular tradition or bardic invention which brings Hu the mighty, over the hazy sea, from

\* See Prof. E. Forbes “On the Geological Relations of the existing Fauna and Flora of the British Isles.”—*Mem. Geol. Survey*, vol. i.

the 'country of Summer,' and we intend no disrespect to the Triad which preserves this statement, by leaving the intelligent reader to choose between the ancient myth and the modern conjecture.

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## CHAPTER VIII.

### THE BRIGANTES.

THUS hath nature worked out her design and given to Yorkshire variety of mineral substance, surface feature, and organic life, preparing it for active human existence. Man came last, in as great variety of aspect, to occupy this surface. Distinct races, in different degrees of civilization, inured to different modes of life, arrived at successive periods from different quarters of the globe. It is for the Ethnographer and the Antiquary to trace the paths of these men, and to distinguish their monuments, until the harmonious mixture of all the races constituted the people of Yorkshire.

The earliest of these inhabitants were the Britons; for by this name were they known to the Greeks, who recorded what the Phœnician or Phocæan navigators had reported of their early discoveries; nor was any other title bestowed upon the whole people by their Roman conquerors, though they distinguished among them many independent tribes.

This general title merely marked their locality; just as Gauls belonged to the country called Gallia, and Germans to the regions beyond the Rhine; it was not a distinction of *race*. Modern writers, indeed, who call the Britons 'Celts,' seem, by their use of this term, to separate them as a race from the 'Teutons'; and those who designate them as 'Cymri,' claim them as spe-

cially the ancestors of the Welsh. But these names were never applied by their contemporaries to the Britons; nor can we by their use determine the problem of the early migrations into these islands. Strabo (Book IV.) indeed points out the physical resemblances which they manifest to the Celts, and notices some curious agreements in the habits of the two nations. The Cymri, as they now appear in Wales, have not the physical characters of the Cimbri, whose language may perhaps be reasonably admitted to have been of the Teutonic class, while the Cymri have preserved one branch of the Celtic tongue. All who spoke this tongue in Gaul were not *Celts*, in the discriminating pages of Cæsar; for he marks a special division of Celtic Gaul: nor were all the *Gauls* light-haired and tall, as some of them are described by Ammianus Marcellinus. The descendants of the true Celts of Gaul are described by Desmoulins as dark-haired, dark-eyed, and of the lower stature which Cæsar expressly assigns to them, in contrast with the Germanic tribes.

It appears from Herodotus that the westernmost parts of Europe were in his days inhabited by the 'Κέλτοι,' which, if a Celtic word, may mean Foresters or Woodlanders (from Coill, Gellt, &c., denoting wood). The *language* of these people has given names to mountains and streams through a considerable part of Western Europe, and can be well exemplified in all parts of Britain. But in Gaul and Britain, we are assured by the descriptions of Cæsar and Tacitus, that this language was spoken by at least two different races of men—the extremes of which are the Iberi and Germani of Tacitus—the black-eyed southern and the blue-eyed northern types—of the great western colonies of man. From both of them the Belgæ of the southern provinces seem to be distinguished as an association rather than as a race, for their language was the same.

Of these very ancient nations, the first great wave of migration seems to have carried the Celtic tongue and printed it on the natural features of the west of Europe; the peculiar dialects of successive settlers of different physical peculiarities were



more or less melted into the original language, so that in Britain *different* men, as the Silures and Caledonii, spoke the same British, and the Celtic settlers and Belgian invaders of Gallia employed the same Gallic tongue, while the *same* races of men, on the opposite sides of the Rhine or the sea, required then and require now the aid of interpreters.

For five centuries before the birth of Christ, the British islands were known to the more adventurous of the voyagers from the Mediterranean, and the coasts of Spain, Gaul, and Germany. The Cassiterides or 'tin islands' had reached the ears of the cautious Father of Grecian History\* (B.C. 450). Perhaps even then beads, obtained from the Electrides, or 'amber islands,' were sold not only to the neighbouring Teutons†, but transported in the keels of the Northmen to adorn the ladies of Britain. Pytheas could not have been the first voyager from Massilia‡, whose keel ploughed the sluggish waves of the northern ocean; but if he touched (after six days' sail northward from Britain) the shore of Iceland in the long days of summer§, when the sun did not set;—if he landed in Britain and (however rudely) estimated its circumference;—if he, in a second voyage, explored the Baltic coast of the fossil amber||; then this Phocæan navigator must be regarded as worthy of the age of Aristotle and Alexander (4th century B.C.), and no mean specimen of an archaic voyager to the North.

Centuries glide away. Gades, Carthage, Massilia, are crushed beneath the heavy arms of Rome; but Britain remains free and populous, guarded by the sea from all the world except the friendly merchants of Gaul. At length, under the most accomplished of the Roman generals, the country is invaded; and from the day when Cæsar landed in Kent (B.C. 55), our country has not only a history, but a chronology.

\* Herodotus, iii. 115—"from which we are said to have our tin."

† Pliny, xxxvii. cap. 2—"proximisque Teutonis vendere."

‡ Marseilles. § Pliny, Hist. Nat. ii. cap. 75; iv. cap. 16.

|| Pliny, xxxvii. cap. 2.

Among the tribes with whom Cæsar came in contact, the Brigantes do not appear. They were separated by wide lands and rivers from the dwellers on the southern coasts; and perhaps still more estranged by difference of race and political interests. The opponents of Cæsar were chiefly Belgæ who had migrated from old Gaul and established themselves by force; for the northern Highlanders\*, hunters, and shepherds, withdrawn from the sound of war behind their shady mountains, were uninjured by the Roman invasion, unmoved by the distresses of Cassivelaun and the capture of his city.

This want of unanimity among the British tribes †, by which each of the petty sovereignties or republics which existed in the country was left to contend alone against a mightier enemy, proved fatal to all in succession. Nearly a century, however, passed before the attempt of Cæsar was repeated. Then Aulus Plautius (A.D. 43) was encountered by the sons of Cunobelin of Camalodunum, who had been the ally of Rome, and whose coins, bearing the effigy of the Horse, indicate the free communication of Roman art. These sons, Cataractus and Togodumnus, were defeated, and Camalodunum was taken by the Emperor Claudius; but the north of Britain still remained unscathed by Roman war and unnoticed in Roman story.

The Brigantes acquire both name and fame in the pages of Tacitus. This writer, speaking of the exploits of Ostorius Scapula, about A.D. 50, represents that commander marching from the overthrown Iceni (Cambridgeshire) to the Cangi (Denbighshire? and Flintshire), and then returning from this unfinished expedition to suppress internal discord among the Brigantes (Tac. Ann. xii.).

It may be thought these disturbances were of the nature of insurrections against the sovereign, who had perhaps already

\* The Brigantes are by their etymology Highlanders,—on similar grounds the Coritani appear to have been dalesmen.

† “Neque aliud adversus validissimas gentes pro nobis utilius quam quod in commune non consulunt.”—*Tacitus, Vit. Agric.*

earned the dangerous protection of Rome, by acts of perfidy which preceded the betrayal of Caractacus. That generous prince, so long the glory of his nation and the terror of the legionaries, had fought his last fight; his wife and daughter and brothers were captives to Ostorius. He had watched with firmness till the last chance for courage was gone, but even then he yielded not to despair. Retiring from the rugged camps on the Malvern or the Breiddyn hills\*, to ford or perhaps to swim the Severn, in darkness, we follow in imagination the gallant chief through the Cannock Forest and across the old *Via Devana*, to the foot of the Penine Hills, the southern frontier of the Brigantes. Here, amidst the rough miners as yet untaxed by Rome, or surrounded by warriors in the mysterious circle of Arbelow, he may have found strong hands and resolute hearts to strike again for liberty.

The Druid haunts of Brimham may have given him favourable oracles; he may have passed in exultation the four great stones which marked the approach to *Isu Brigantum*, and have supplicated the sovereign of the most powerful British nation for aid against his country's foe (A.D. 51). This sovereign—*Cartismandua*—was his own relation; yet she delivered him bound to swell the triumph of his victorious enemy, and gratify the respectful admiration of Italy and Rome. The further history of this false queen and infamous woman is twice and strongly pictured in the pages of Tacitus. She was driven away by the insurgent Britons, headed by the husband whom she had deserted. She escaped by the aid of the soldiers of *Didius*; but *Venutius*, skilled in war—the worthy representative of *Caractacus*—successfully defended the state against the disordered power of the empire (A.D. 51–57).

From the statement of Tacitus we may gather that the Romans had stationed a few cohorts in the territory of the Brigantes, as

\* In his work entitled '*Salopia Antiqua*,' Mr. Hartshorne has investigated in detail the retiring lines of defence adopted by the Silurian chief, and supposes the final battle to have been on the Breiddyn.

among a friendly but independent people, and that, overpowered by insurrection, they had with difficulty saved and carried off the queen, who is never mentioned again. The nation appears to have universally taken arms and supported Venutius, who successfully maintained his authority against the somewhat feeble efforts of old Didius and his lieutenants.

Veranius followed Didius, and a greater than either, Suetonius Paulinus, commanded the legions, but the people of the south of England found him occupation enough, and the slaughter of the Druids in Anglesey was avenged in the almost utter extinction of the Roman name by Boadicea and the Iceni. The Brigantes remained unconquered—perhaps they were not attacked—by the generals who ruled in South Britain till the days of Vespasian.

The nation then sunk under the continued assaults of larger bodies of troops under Petilius Cerealis, and great part of the Brigantian territory was “acquired by victory or ruined by war,” A.D. 70–78. The full conquest was reserved for Agricola, A.D. 78–79.

From this time the Brigantes of Britain are mentioned no more as struggling for liberty, except in the address of Galgacus, who, though speaking of their queen as burning a colony and storming a camp, evidently refers to Boadicea and the Iceni, a tribe of Cambridgeshire, between whom and the true Brigantes there may have been some affinity, not now admitting of explanation\*.

The Brigantian soon became a favoured province, full of roads, camps, and villas, and never again provoked the Roman sword †, except in the days of Antoninus Pius, when, “for harassing the

\* “Brigantes fœmina duce exurere coloniam, expugnare castra, ac nisi felicitas in socordiam vertisset, exuere jugum potuere.”—*Tac. Vit. Agric.*

† Yet we read (Juv. 14. 196)—

“Dirue Maurorum attegias, Castella Brigantum.”

The Brigantian power was then great enough to be respected.

Genunii, allies of Rome, part of their land was taken away\*." Who were these Genunii? And what measure of freedom belonged to the Brigantes, if they thus engaged in war with another state which was friendly to Rome?

By this extension of Roman power the British Islands became widely rather than accurately known: Pliny (iv. 16), writing before the appointment of Agricola, speaks of thirty years' war having carried the knowledge of Britain only to the vicinity of the Caledonian forests. It was no doubt by the campaigns of Agricola that the fullest knowledge was acquired; for his fleets circumnavigated the wild regions of the north, and his soldiers penetrated farther and remained longer than even those of Severus, among the solitudes of the Grampian Mountains.

The Brigantes, as their name implies, were 'highlanders,' that is to say, inhabitants of the hilly country toward the north of Britain, and having communication by river navigation to ports both on the east and west. They extended from the German Ocean to the Irish Sea.

Their principal settlements appear to have been in Yorkshire; Isu Brigantum, the port or water station of the tribe, being at or near Aldborough—the Roman Isurium. But there appears reason to include in their territory the elevated parts of Derbyshire, and thus we should assign to this 'most numerous nation' a great part of the large area which extends from the Trent to the Tyne: there is no other important tribe mentioned between these rivers, except the Parisoi, in the south-east of Yorkshire.

From this large country the Roman commanders, in the course of thirty years' frequent and often bloody war, had torn away the southern portions, and at last the whole became a conquered province, subject to tribute, encircled by camps and traversed by military roads, and honoured by the births, lives and deaths of emperors and tyrants.

\* Pausanias, *APKAΔΙΚΑ*, viii. xliii. 3. The general who effected this was Lollius Urbicus.

Nor can we separate this people as known to the Romans from any earlier and more strictly aboriginal race. It is true that our tumuli disclose remains of Britons very unequally advanced in the arts of peace and war—men who tipped their arrows with flint, and employed hammers of stone, as well as others who were acquainted with bronze and iron. But the ages of stone, bronze, and iron, however distinctly marked they may appear to be in Scandinavia, are not so firmly separated here, as to give any well-grounded hope of thus defining a Pre-Brigantian race. Nor have the few examples of authentic British crania which have been procured by the opening of the tumuli, yet afforded any clear testimony of successive *races* of early British inhabitants. The Brigantes may have been settlers among an earlier population, but we have no sure evidence of it, and the facts known appear quite reconcilable with the hypothesis of gradual change in the condition and customs of a long-settled and numerous tribe.

## LANGUAGE.

The language of the Brigantes remains in their own name, the names of their cities and chiefs, and the unforgotten designations of some of their mountains and rivers. The Anglian invaders extinguished much, but some evidence remains, and that is decisive. Taking first the rivers, we find the following characteristic names and explanations in British, Gaelic, and Erse (chiefly from Chalmers's 'Caledonia' and Owen's Dictionary).

AIRE . . . . .	Air, B., bright ; Arw, G., rapid stream.
ALNE—ALLEN . . . . .	Alwen, B. ; Alain, E., white or bright stream.
BANNEY . . . . .	Ban, Bain, G., white.
CALDER . . . . .	Cell-dwr, B. ; Coilldwr, E., woody water.
DON or DUN . . . . .	Dwn, B. ; Don, E., dark, dusky.
DERWENT . . . . .	Dwr-wen, B., fair water.
DOVE . . . . .	Du, B. ; Dubh, E., black.
DOUGLAS . . . . .	Dwr-glas, B., blue or gray water.
EDEN . . . . .	Eddain, B., a gliding stream.
ESK—WISK . . . . .	Wysg, B. ; Easc, Uisg, E. ; Esc, Wysc, G., water.
GRETA . . . . .	Rhe, B., swift.

GELT . . . . .	Gellt, B., a grove.
HUMBER* . . . .	Comar, G., a confluence of two or more waters.
KEN . . . . .	Ken, B., white, clear.
LEITH . . . . .	Llith, B., flood.
LEVEN . . . . .	Lleven, B., smooth.
LUNE . . . . .	Lun, Lon, Lyn, Linn, Llyn, B. (Elauna of the Romans.)
NID—NITH . . .	Nedd, Neth, B., that whirls or turns.
OUSE—EWES . .	Uisg, Wysg, G., water.
RYE . . . . .	Rhe, B.; Rea, Rica, E., swift; Ri, Rhiu, G., stream.
RIBBLE . . . . .	Rhe, B., and bel, tumultuous.
TYNE . . . . .	Tain, B. G., river.
URE . . . . .	Ur, Uire, G. E., lively, brisk; Gwyr, B.; Ura, Basque.
WHARFE . . . .	Garbh, G., rough; Garw, B. (Verbeia of the Romans.)
WENT . . . . .	Gwent, B., fair.

Of the names of rivers, a large proportion is well explicable either by Gaelic, Erse, or Cymraic elements. It is remarkable that the generic word Avon, now so common in Wales, is not preserved in a single stream of the Brigantes.

Perhaps Swale, Tees, Hull, and some other names of streams may be explained on a Teutonic basis.

Turning now to the mountains and promontories on the sea-coast, we find, amidst many Scandinavian names, a few of their British precursors. Mickle Fell and Whernside, the two loftiest of our Yorkshire hills, must be resigned to the Teuton; Ingleburg, Ingleborough, may be contested, yet this fire mountain seems well expressed by the Gaelic Aingeal, fire, and barr, barrach, elevated. The following have escaped change.

Penyghent, Penygent, or Penygant, is evidently British; Pen-y-gynt, head of the prominence, being perhaps a better etymon than that sometimes given, viz. Pen-y-gwynt, head of the winds. Pen Hill in Wensleydale, and Pendle Hill, go to the same Cymraic root. Wild Boar or Wiltber Fell seems to require no change, yet it may be a corrupted form of Gwylfa, a beacon in Cymraic. The promontory named by Ptolemy *Ἰκελον ἄκρον*, evidently contains the Cymraic *uchel*, elevated; which

\* Dr. Latham has suggested that Humber may be the Gallic and East British form of the Cymraic Aber and the Gaelic Inver—mouth of a river. (*Germania*, Epilegomena cx.)

appears in the 'Ochill' hills. Baildon (p. 94) may be Bal-or-Beal-dun,—the fire-hill or the hill of God.

Very many of the Yorkshire hills are girdled by precipices, which receive the name of Scar, a word as well derived from the British or Gaelic element *sgor*, as from the Teutonic '*scaur*'; while the generic name of Craig is the unchanged British word for 'rock.'

The most ancient sites of population also are still traceable by Celtic names, as York, derived through Saxon forms from Eboracum, which is itself the latinized Ebor-ach (confluence by the bank or mound) or Evr-ach, the mound by the Eur. Catterick, Cataractonium, Cathair-rigd, fortified city. Verteræ and Lavatræ, on the road from Catterick to Carlisle, contain the element *ræ*, which remains in Rey Cross on Stainmoor, and is the British *rha*, the Gaelic *ra*, and Erse *rath*, for a fort or strong place.

Even the names which are left us of Brigantian personages are explicable as of Cymraic origin. Thus the Queen of the Brigantes, Cartismandua, has a name expressive of locality—Cathair ys maen du, or Caer[t]ys maen du—perhaps of her seat of sovereignty by the black druidical stones, the precursors of the Roman camp of Isurium. Venutius her husband seems to be Gwynedd. Finally, the Brigantes seem clearly to be named from Braighe, G., pl. Braighèacan, elevated grounds, which in Cymraic takes even the form of Brigant, a moun-taineer\*.

It is probable that this list may be very much augmented by carrying the analysis to greater detail. I find, for example, reason to conclude that such a name as Thorne Waste is not properly understood without calling in the Celtic etymon *gwastad*, level; that Waghén near Beverley is the British Gwaun, a marsh or fen; and Beverley itself, instead of being Bever-lac, owing its

\* The Coritani seem to be dalesmen, 'men of the valley,' from Coire, a hollow, and Daoine, people. The Parisoi had Gallic representatives, living by the island of the Seine, as these by the peninsulated lands on the Humber. Fearis would mean men of the Islands, Fearaisg, a ferryman.



name to beavers and lakes, is simply Pedwar-llech, the ancient Petouaria, marked, as other British towns seem to have been, by 'four stones'—in this instance, stones of sanctuary, a privilege of higher antiquity, it is probable, than Athelstane, by whom it is said to have been granted after the victory of Brunanburgh.

#### HOUSES.

The manners and customs of the Brigantes are chiefly to be gathered by interpreting what remains of their dwellings and tombs, their towns and camps, their stones of memorial and circles of assembly, their weapons and tools, ordinary earthenware and principal ornaments. Most of these are but incidentally noticed by the historians and poets of Greece and Rome, and seldom referred to at all by the Welsh Bards and Saxon Chroniclers. Cæsar, speaking of the southern parts of Britain, which had been filled with Belgian settlers, says, that the buildings were numerous and much like those of Gaul (v. 12). The houses therefore were tapering huts, constructed of wood on a circular basis. Of these humble structures we have only the foundations, and of such there appear to be three varieties. In the first example, which in Yorkshire occurs frequently in the north-eastern and south-eastern districts, the ground is excavated in a circular shape, so as to make a pit from 6 to 8, or even 16 or 18 feet in diameter, with a raised border, and of the depth of 3, 4 or 5 feet. Over this cavity we must suppose the branches of trees placed to form a conical roof, which perhaps might be made weather-proof by wattling, a covering of rushes, or sods. The opening we may believe to have been placed on the side removed from the prevalent wind. Fire in the centre of the hut thus constructed has left traces in many of those examined at Egton Grange\*. The pits in Westerdale are called 'Refholes,' *i. e.* Roofholes, for our Saxon word Roof has the meaning of the Icelandic *raf* and Swedish *ref*.

In several places these pits are associated in such considerable

\* Young, Hist. of Whitby, vol. ii. p. 680.

numbers as to give the idea of a village; such are the Killing Pits, on the gritstone hill, less than one mile south of Goadland Chapel; the pits in Harwood Dale\*; those which encircle Rosebury Topping; besides many on the side of Glaizedale and in other situations. But the most instructive in this respect are those which have been described by Dr. Young † on Danby Moor, between Danby Beacon and Wapley. Here the pits are in two parallel lines, bounded externally by banks, and divided internally by an open space like a street. A stream divides the settlement into two parts. There are no walls at the end of the streets. In the most westerly part is a circular walled space 35 feet in diameter. Some 'druidical remains' occur in this part: to the north are several tall stones, and 100 paces to the south are three large tumuli about 70 feet in diameter and 100 feet apart. East of these tumuli is a large mound, with a fossa round it above the base, a form which seems not to be sepulchral, but to be often expressed by the word 'Rath.'

A second type, and not the least singular, of these foundations of huts, was observed south of the village of Skipwith, near Riccall, S.E. of York. These were oval or circular rings slightly excavated in the heathy surface, on the drier parts of the common, the space within which was a little raised by the throwing inward of the excavated earth. On digging into this area marks of fire were found—sometimes specially towards one end—but no trace of bones or burial. They were concluded to be the foundation-lines of huts; enclosed for the most part by single or double mounds and ditches, which had a relation to the most elevated point of the common,—a dry surface apparently suited for residence and capable of some defence. Tumuli of various magnitudes are here seen in considerable numbers, and they yielded to inspection burnt bones and carbonized wood, but except one rather dubious flint arrow-head, no other trace of man or his works.

\* Saull, in his "Notitia Britannicæ," 1845, gives a plan of this settlement.

† Hist. of Whitby, vol. ii. p. 673.

The tumuli were remarkable as being set in *square fossæ*, the sides of which pointed north and south and east and west. Similar facts were observed on the neighbouring common of Thorganby. This locality is evidently in a country which was of importance in Saxon days. At Riccall, Harold Hardrada landed his troops; and Skipwith has a large church with a Saxon tower, more interesting than any other which I have seen in Yorkshire. The vague tradition of the country, preserving the memory of the Norwegian descent, speaks of the tumuli of Skipwith as the Danes' hills—as if they had been raised over the Northmen's dead. But the fight so fatal to the invaders was at Stamford Bridge, and at the time of the battle Christianity had visited the Danes, and the dead were buried, not burnt.

The third form of hut foundation, the incomplete ring of stone walls, has been already sufficiently spoken of in reference to the only place where it has yet been observed distinctly in Yorkshire—the summit of Ingleborough (p. 27). They are of larger dimensions than those usual in the eastern parts of Yorkshire; no tumuli appear in connexion with them. In principle of construction, these huts, of which we have thus traced the foundations, are the Cyttiau of Wales, the antecedents of the cottages of England,—a low wall foundation, a roof formed by inclined rafters, and covered by boughs, heath, rushes, grass, straw, or sods. The relative dates surely admit of no doubt. The huts and walls of Ingleborough exhibit principles of construction which remove them from the catalogue of barbarian works.

#### TUMULI.

From the hut of the living it is but a step to the house of the dead, over whose bodies or ashes, earth and stones were laid in a conical or dome-shaped heap, to the height of 3, 5, 10, or more feet, and with a diameter of 3, 10, 20, or more yards. Thus the dead was provided with a receptacle not unlike his home, so that when placed in it he lay

Mit dem Anstand, den er hatte  
Als er's Licht noch sah.

Burial of the entire body in slight excavations of the ground was very generally practised by the British natives of the north of England, but it was not usual among their Anglo-Saxon successors; and until a tumulus is opened we cannot positively say whether it belonged to Briton or Roman, Saxon or Northman. Heaps of earth, even if not originally similar, lose in time some of their distinctive marks, and tumuli, whether raised over Greek or barbarian heroes, are pretty much alike in outward show. Only one material character has occurred to us in the fossa which surrounds the tumulus—this is usually circular; but all the tumuli at Skipwith and Thorganby are environed by square fossæ, and one of those at Arras, near Weighton, has the same character.

The experience we have gained in opening Barrows in Yorkshire seems to indicate as of Anglian work the larger and lower mounds; while a few high steep tumuli, and many smaller and lower, are often associated in British burial-places. But our data are too few for the establishment of any general rule.

The larger tumuli have often yielded little or no remains beyond a few bits of charcoal of the oak. Perhaps these were barbarian cenotaphs, erected in honour of warriors of widely extended renown, whose bodies may have been laid in other graves, or, in the spirit of the old religion, prepared for disembodied souls which, for want of the due solemnities, might otherwise wander for a hundred years before entering the Elysian plain.

When opened, the difficulty of determining the owners of the barrows soon vanishes. No purely Roman tumuli have, I believe, been opened in Yorkshire, while a great number of Roman burials without sepulchral mounds have been recognized. A few Anglian tumuli have been opened; but the far greater proportion of hundreds of these mounds in the eastern parts of Yorkshire may safely be pronounced British.

In some of these the skeleton, in others the burnt ashes, and in a few both modes of burial occurred. The skeleton was either

laid naked among the flints, chalk, or stone, or these materials were in some degree compacted about it, or it was enclosed in a walled cell or kist, or placed in an excavated wooden coffin. Usually the body was laid on the back, or on one side, with the legs drawn up, and the arms bent so that elbows and knees touched or approached each other. It was not placed constantly in one position, such as with the head to the west, so as to face the rising sun—a Greek custom—but was frequently in a north and south direction, with the head to the south or north.

Many of the tumuli which were opened on Acklam Wold in 1850, by the Yorkshire Antiquarian Club, yielded entire skeletons, which had been quietly interred; but the articles useful in savage life were very rare. Two remarkable bone needles of great length (one was 9 inches long) were found, and several urns, all of rude construction; not made by help of the potter's wheel, but ornamented by the point of a stick. Some of these urns contained the ashes of burnt human bodies and the bones of small animals; but others were placed in the earth either empty, or filled with perishable matters—perhaps food. In one tumulus we had a buried skeleton and burnt remains, so placed that the contemporaneity of cremation and burial is certainly proved\*.

The circumstances which accompany the interment of the aborigines of Britain vary with the district, and probably with the tribes. Along the chalk districts the material of the funeral mound is in a considerable degree derived from the flint and chalk rubble of the adjoining surface; the dryness of the ground allowed of simple burial in or upon the rock; and as arrow-heads and other weapons or instruments of flint were common among the living, they are sometimes found with the dead. In a tumulus on the Acklam Wold, however, it was observed that the centre was occupied by blue clay; perhaps the clay from which the rudely constructed urn, full of burnt remains, was made. This

\* See the recent publication of Mr. Wellbeloved, entitled 'Descriptive Account of the Antiquities in the Yorkshire Museum.'

clay may have been obtained in small quantity from hollows on the surface, or more abundantly from the deposit of Kimmeridge clay at the base of the chalk. In the oolitic district to the north, the native materials are different, and sandstone takes the place of the chalk and flint rubble, or a split log is hollowed into a coffin. The description of one such coffin found at Gristhorp has been given (p. 131).

This sepulture is remarkable for the absence of pottery, the presence of wicker-work and misleto, and the concurrence of flint and bronze instruments, and ornamental horn-work. It is perhaps impracticable in Britain to mark with distinct intervals the ages of stone, bronze, and iron; the metals must have been gradually introduced, and slowly communicated from one locality to another. At Acklam we have had proof of the contemporaneity of cremation and burial, and at York we find bodies wrapped in lead, or placed in stone, or represented by a handful of ashes in a tiled grave, and yet all certainly of Roman date. In the same place we find wooden coffins of the Saxon period, hardly less rude than the split log of the aboriginal of Gristhorp.

If we count the tumuli in the districts where they are most abundant, and make large allowance for degradation by the plough, their number will be expressed in hundreds; and as each tumulus contains usually but one interment, we see clearly that only a small proportion of the natives of a country described by Cæsar as containing an 'infinite multitude' of men, were consigned to such conspicuous tombs.

The vicinity of Driffield has yielded to Lord Londesborough's researches many valuable facts touching British burials. By his direction in 1851, Mr. W. Bowman opened several tumuli. In a pasture called King's Mill, two skeletons and several flint spear-heads were found. In a field near Allamanwath Bridge, a high tumulus covered an irregular vault, 4 or 5 feet long, 3 feet broad, and  $2\frac{1}{2}$  feet deep. It was formed of untooled slabs on the sides and ends, covered with another slab, and paved with smaller stones. In it was a large skeleton with the legs

drawn up, the head placed toward the east; near the knees was a fine urn, with the usual zigzag British ornament. Near the right arm was an unique object—a piece of bone six inches long, squared at the ends, with four golden rivets, two at each end. In the vault were a bronze dagger, three large beads of amber, bone, and stone, the upper part of a hawk's beak, a piece of woollen stuff, or leather, and a buckle. *No trace of iron* in the tumulus. On every side of this vault were found skeletons buried with little symmetry or ceremony. Marks of much cremation; some charcoal, half-burned human bones, and reddened soil. Flint spear-heads were found, and fragments of urns, some British, others Anglo-Saxon. The mound was probably used for burials long after the central hero was laid to rest.

In tumuli supposed to be British or Romano-British, opened by the Rev. E. W. Stillingfleet and his friends in 1815, 1816, and 1817, a much greater variety of objects was found than is usual in the Wold burials. The situation is near Arras and Hesleskeugh, about three miles from Weighton on the Beverley road. From the number of tumuli and earth-mounds, this may be regarded as a settlement of the Brigantes. Flat dotted ornaments and beads and bracelets of jet (or Kimmeridge coal), a miniature *bronze* celt only one inch long, with a pin and a small light blue glass bead, were among the more elegant objects discovered.

In a conspicuous barrow, called the 'Queen's barrow,' an iron knob was found placed over a kist. The kist contained a female skeleton, with the feet gathered up, the head toward the north. Near the head and upper part of the body, about one hundred glass beads were found; some had a blue ground, spotted or zigzagged by white; others were of a clear green, entwined by a serpentine white thread. A ring of red amber was found near the breast. A radiated brooch and a singular round ornament had been covered with a paste, and varnished. Two bracelets, a small ring, a pair of tweezers, and a pin with a ring at the end

were also buried with this lady, and, to crown all, a gold ring, clasped in front with a kind of rose or quatrefoil.

Two barrows of British Charioteers were opened. "In a kist almost circular, excavated to the depth of about one foot and a half in a chalky rock, the skeleton of a British Charioteer presented itself; surrounded by what in life formed the sources of his pride and delight, and no inconsiderable part of his possessions." He lay on his back, the head to the north, the arms crossed on the breast; the leg and thigh bones crossed. Very near his head were the heads of two wild boars. Inclining from the skeleton on each side had been placed a wheel, the *iron* tire and ornaments of the nave of the wheel only remaining. The tire of the wheel on the east was preserved in the ground, but broke on removal; small fragments of the original oak still adhered to it. The diameter of the wheel was about 2 feet 11 inches; the width of the iron tire 1 inch and  $\frac{5}{8}$ ths. The rim of the nave, nearly 6 inches in diameter, had been plated with copper. Under each wheel was what remained of the skeleton of a horse, apparently of small size—a pony. Some rings and links and pins were found, which appeared to be parts of horse-gear—one of them a bit; they are of iron, plated with copper.

In a smaller barrow, only 2 feet high and 8 feet in diameter, the skeleton of a warrior was found resting on his shield, the bosses of which measured  $4\frac{1}{2}$  inches; wood adhered to one of the bosses; the rim of the shield was iron, one inch in width. On each side had been a wheel and an iron bridle-bit, with iron rings, which had belonged to the chariot or to its trappings. The diameter of the wheel was 2 feet 8 inches; of the iron rim of the nave about 5 inches. Oak was found attached to the tire, and the riveting nails. Two wild boars' tusks lay on the body; one of them enclosed in a thin case of brass, perforated with a hole, by which, perhaps, it was suspended from the neck or girdle of the hunter who was here interred\*.

\* For Mr. Stillingfleet's graphic and interesting description of these curious discoveries, see the *Memoirs of the York Meeting of the Arch. Inst.* 1846.



The discoveries here narrated are on many accounts the most remarkable yet made in the tumuli of Yorkshire. The presence, nay, the *abundance* of iron, the variety of ornaments, wrought in different materials, the glass, the jet, amber, gold, &c., might lead us to assign a comparatively late date to these tumuli, and to separate them by many centuries from the mounds which contain no metal of any sort. No urn is mentioned.

In May 1836, I was one of a numerous party who proceeded with the late Mr. Jonathan Gray from the house of the Vicar of Kirkby Moorside, to inspect and open some of the tumuli and cairns which are scattered over the dreary hills north of the Vale of Pickering. Our route lay along the line of moorland road from Kirkby Moorside through Gillamoor to Ingleby. We were soon joined by large groups of the country people, and their ready and vigorous arms opened for us several mounds. Most of them had been explored before, but two of the excavations deserve notice. One was on the edge of a broad and elevated terrace, sloping rapidly in a westerly direction toward Bransdale. Here, under a slight heathy mound, was found a 'wide natural fissure of the rock, and in this an urn of unbaked clay, large, thick, and rude in design, with no mark of the wheel, irregularly scratched, rather than ornamented, by the point of some hard substance. This was undoubtedly a British interment, and probably of very early date. Such burials in fissures and caves may have preceded all *ὑπόγυια* or artificial graves.

Near the line of road which has been mentioned, a conspicuous object for many miles round, was the large conical heap of stones called Obtrush Roque. In the dales of this part of Yorkshire we might expect to find, if anywhere, traces of the old superstitions of the Northmen, as well as their independence and hospitality, and we do find that Obtrush Roque was haunted by the goblin\*. But 'Hob' was also a familiar and troublesome visitor of one of the farmers, and caused him so much vexation and petty loss, that he resolved to quit his house in Farndale

\* 'Hobthrust, or rather Hob o' the Hurst, a spirit supposed to haunt woods only.'—Grose, *Provinc. Gloss.* Roque=Ruck, a *heap*.

and seek some other home. Very early in the morning, as he was trudging on his way, with all his household goods and gods in a cart, he was accosted in good Yorkshire by a restless neighbour, with "I see you're flitting." The reply came from Hob out of the churn—"Ay, we're flutting." Upon which the farmer, concluding that change of air would not rid him of the dæmon, turned his horse's head homeward. This story is in substance the same as that narrated on the Scottish Border\*, and in Scandinavia; and may serve to show for how long a period and with what conformity, even to the play on the vowel, some traditions may be preserved in secluded districts.

This goblin-haunted mound was elevated several feet above the moorland, and was covered with heath. Under this was a great collection of sandstones loosely thrown together, which had been gathered from the neighbouring surface. On removing them, a circle of broader and larger stones appeared set on edge, in number 25, or, allowing for a vacant place, 26. Within this was another circle, composed of smaller stones set edgeways, in number 25 or 26; and the centre of the inner space was occupied by a rectangular kist, composed of four flagstones set edgeways. The sides of this kist pointed east and west and north and south; the greatest length being from east to west. On arriving at this fortunate result of our labour, our expectations were a little raised as to what might follow. But within the kist were no urns, no bones, no treasures of any kind, except a tail-feather from some farmyard chanticleer. The countrymen said this place of ancient burial had been opened many years ago, and that then gold was found in it. It seemed to us that it must have been recently visited by a fox.

Considering the position of the kist, set with careful attention to the cardinal points; the two circles of stone; the number of these stones, which if completed appeared to be 26; it seemed no unreasonable conjecture, that the construction contained traces of astronomical knowledge, of the solar year, and

\* Antiquities of the Scottish Border, by Sir W. Scott, Bart.

weekly periods. I dare not confidently affirm this. Was this a relique of an early British chief, or of a later Scandinavian warrior? for such circles have been raised in Scandinavia and the Orkney Islands by the Northmen, and this is a district which the Northmen colonized. A similar circle of stones occurs at Cloughton near Scarborough.

#### RATHS.

Under this name it is proposed to notice mounds of greater size than ordinary tumuli, which appear to have a somewhat different construction, and a different relation to the old centres of population. These mounds are sometimes wholly artificial, but as frequently some natural feature of the ground has been exaggerated into a dome-shaped mass, as by cutting off the end of a tongue of land. The mound is usually encircled by a ditch at some distance down the slope, and by a more or less conspicuous bank at the outer edge of this ditch, as if formed by the earth thrown out from it. In plain ground the whole mound is surrounded by the hollow from which the materials were gathered; but in other cases the slope is continued downward from the bank to the surrounding surface. Other mounds, in which these features are less obvious, seem to have the same relation to the sites of population, and to be neither tumuli nor military posts.

Such conspicuous heaps of earth are not unfrequent at or near the termination of old villages in Yorkshire. At Lofthouse and Kildale, in the north-eastern district, and at Middleton-one-Row, the rath is placed to the west of the village; and at the old British village on Danby Moor, it lies to the east. At Kippax it is to the west of the church; and the same is the case with the greater mound at Barwick in Elmet, which we regard as a fort. At Westow it is on the western side.

A little south of the village of Acklam is a considerable mound which may probably be put in the same catalogue, but its form is not very distinct. Aldrow, on the hill above Birdsall, is of an uncommon form, at an angle of the double dike, which here

seems to twist itself into a knot, and thus constitute the Rath, to which we suppose the name refers. As some of these mounds have never been opened, we cannot affirm positively that they are in no degree sepulchral.

There is a large mound of this kind at Cropton, north-west of Pickering; near it are tumuli and double dikes, and not far off the well-known Roman Camps. At Duggleby, near Malton, and at Bishop Burton, near Beverley, are great mounds of the same general character.

The mound of Barwick in Elmet is one of the most remarkable of these works, and must be regarded as combining the character which we have endeavoured to assign to the Rath, with the strength of a military post. The centre of this system of works is a conical mass about 28 feet above the general level, surrounded by a ditch about 2 yards below that level. The outer edge of this ditch is about 270 yards round. A flat four-sided space surrounds the ditch, about 150 yards by 120, and is terminated by a bank. The bank is curved on the west against naturally steep ground; very bold and rather sinuous on the south against an old hollow road; straight against another road on the north; and distinctly traceable on the east. There is a space at the S.E. angle where the bank is deficient, and an entrance is practicable to the ditch and inner mound (see the Plan of this work, Pl. 35).

If this be admitted as a British fortress, the same claim may probably be urged for the somewhat smaller camp at Hutton Ambo, and the still smaller entrenchment at Langton.

#### CAMPS.

The post at Hutton Ambo, on the right bank of the Derwent, is known by the name of Gateskeugh. It is of a rhomboidal figure, with the angles much rounded off. The external boundary is on three sides a deep ditch excavated in the calcareous gritstone, the materials being thrown inward to constitute a

bank ; the fourth or eastern side is naturally on the edge of a very steep descent to the river. Here the bank is very slight ; elsewhere it is bold, and at the south-west, north-west and south-east points rises into conspicuous mounds. There are two entrances, one in the northern face near the north angle, the other in the south-eastern angle. An old hollow road passes by the south side, which is the boldest of all, as at Barwick.

From this post, Aldrow, Langton, and Wharram Clump are visible. It is presumed that a line of old road passed this way from near Aldby to join Wade's Causeway, and the name seems to be some evidence, but there is no proof of its being a Roman Way.

At Langton, on the south side of the high wold which separates this village from Malton, and on the north side of the little beck, is a small irregular post, strongly entrenched, and, like the two cases last noticed, presenting one side to a hollow road. The ground slopes to the south-west, in which direction the enclosure is longest, and measures about 80 yards; at right angles to this line the space measures about 45 yards. The whole figure is somewhat triangular, the limit on the south being the scarped side of the hill, and toward the east also natural swells, modified by art.

Half a mile lower down, on the same side of the stream, at Thornthorpe, is an earth-work, placed to guard the passage on the old road from Acklam Wold to Malton, which has been called a Roman road. A double ditch parallel to the stream can still be recognized. If, as is most likely, the valley was marshy, these defences might be effectual.

#### DIKES.

Imperfectly as we understand them, much information regarding the life of the ancient Britons is derived from the numerous and extensive earth-works which they constructed for defence,

for the enclosure of cattle, and perhaps for the separation of districts. Such are the dike at Flamborough, the great mounds between the Swale and the Tees, and the numerous banks and trenches on the Wolds. If it be asked for what reason these are regarded as British rather than Saxon works, we must reply that wherever the system of these earth-works can be studied, so as to bring into one point of view the probable abode, way of life, and mode of burial, the result is in favour of the British claim. This may be exemplified on Acklam Wold, where double and even triple dikes extend widely over the Wolds, embrace the springs, and enclose many large and small sepulchral tumuli, which contain only British remains.

Of British cities in Yorkshire, using the word in its modern sense, the dikes to which we have referred are not evidence, though local groups of population seem to be indicated by them. Nor do they mark at all clearly any large British camps, if we mean by this term complete defensive enclosures. But if in a large sense we accept the definition of Cæsar, British 'oppida' may be claimed.

The British fortified places, if we may in this case so translate *Oppida*, are described by Cæsar as places of refuge; points naturally strong by difficult ground, marshes or wood, and still further secured by mounds and ditches. To the ample area thus protected, cattle and men retreated from hostile incursions\*. They were a sort of expanded encampment, cutting off large promontories of hill, or fronting long valleys,—not necessarily completed like a Roman or Danish camp, though it often was so in limited areas, as at Gadbury, Wall Hills, and the Herefordshire Beacon. The banks and ditches were often double, or even triple, as on Acklam Wold, at Garraby Hill, and Ampleforth Common, in Yorkshire. It is singular that many of these enclosures contain no spring or other obvious source of water,—such, however, being not unfrequently near to them (as Walm's Well, under the Herefordshire Beacon). The Acklam

\* Bell. Gall. v. 21.

dikes which cross the high wolds, but cease on their westward and northward slopes, do thus include springs, and probably ancient villages.

The most remarkable of the great works comprehended under the name of 'Dike,' are between Catterick on the Swale and Gainford on the Tees—about Wincobank and Mexborough north of the Dun—between Pickering and Scarborough, on the north side of the Vale of Pickering—between Malton and Flamborough, on the northern frontier of the Wolds—and between Malton and Cave near their western brow. As a single work, what is called the 'Dane's Dike,' at Flamborough, is very prominent, and appears distinctly destined to guard the promontory, and constitute it an 'Oppidum.' A good general idea of this class of works may be had by consulting the Plan of a part of the Wolds, above Acklam and Birdsall, where dikes are numerous and of great extent, and are seen in connexion with tumuli of unequivocal British character. The word 'dike' has the general meaning of a fence, or mark of division. From this source flow two applications of the word which appear diametrically opposite. In the higher parts of Yorkshire, as in Scotland, dikes are walls or long mounds of earth (*τεῖχος*, Gr. ; Dig, Gael.) ; but in the low marshy grounds, the ditches, and even canals, becks, and rivers are so called: the former is its meaning in this volume (see Pl. 35).

#### STONE MONUMENTS.

Stones have been set up in memory of remarkable events in all periods of history ; but there can be little hesitation in referring to the earlier periods some of the rudest and most conspicuous of these. The British origin of some is indicated by the Saxon name, as Stanton Drew ; of others by the native name, as Leckenfield, near the Stones of Beverley ; but in general the names and traditions which still cling to these mysterious works of other days are out of keeping with their history. The 'Rudstone' seems never to have been a cross ;

the 'Devil's Arrows' are desecrated by an appellation from which we can only infer that to the Anglo-Saxons their origin was unknown, just as Ald Wark and Auld Gang mark walls and mines of Roman and British date. The tradition has been already alluded to which places a British stone where 'Rey Cross' stands, and connects it with a story of King Marius, who succeeded—by favour of Geoffrey of Monmouth—his father Arviragus, the friend of Claudius !

The 'Long Stone' is so placed near the old British village on Danby Moor, as to be without doubt referable to the system of which that little community made part. Several other stones are near it. Near Swarthou, which is a cairn in the same neighbourhood, is a tall stone. Wade's Graves,—for tradition gives him two, near Goldsborough and East Barnby,—are examples of stones 5 feet high ; and many others may be seen on these north-eastern moorlands, but their dates and meaning are uncertain, though to several the name 'Cross' is added, as 'John a Man Cross,'—where 'Man' seems British. Perhaps Wada was Woden (Young, ii. 666).

Between Hunsley Beacon and Drewton, a small village near Hotham, is a stone called by the name of St. Austin. Near it is the name of Rudstone Walk. Here what appears an old road by the Beacon crossed the Roman Street. The stones are probably British—perhaps, as the name of Drewton may indicate, 'Druidical.' The 'Pikes,' or single stones on a few of the summits in the north-west, and on many of the hills in the south-west of the county, have the same indefinite interest for the antiquary. Circles and irregular groups of stone are frequent on the north-eastern hills, and not rare in the south-west of the county ; they are less common in the north-west, and hardly known in the south-east of Yorkshire. In some degree this is explicable by the prevalence of gritstone rock in the west of Yorkshire, and the want of it in the south-east. On Mr. Newton's map several of these are marked and named. It is almost impracticable to make a complete and at the same time satisfactory list of them,



because in many instances natural phænomena have been referred to the Druids,—‘rocking-stones’ derived from erratic blocks, and ‘altars’ from cliffs wasted by the atmosphere. The ‘Cow and Calf,’ near Ilkley, are natural objects; so are most of the picturesque crags and standing stones of Brimham; evidences of operations which began long before the Druids exercised their spells. Some of the ‘rocking-stones’ near Settle are blocks of the slate of Ribblesdale, drifted by the force of water or floated by ice, and dropped on the bare surface of the limestone. Among many such some are so shaped, and may be so placed, as to be easily moved backward and forward, through small spaces, and thus become ‘rocking’ stones (Pl. 5).

Still, after omitting these exceptions, cases of *arrangement* of stones in groups of three or four, and in rude circles or rings, remain to prove the respect, if not veneration, with which these durable memorials of forgotten events and banished creeds were formerly regarded. Mr. Wright views the circles of stone as being often but the remains of a cairn or mound, the earth of which has been removed. This suggestion, though it can seldom be applied to the wild and deserted moors on which many of these stones are placed in Yorkshire, ought not to be lost sight of. It is extremely probable that the two classes of works are based on the same fundamental idea—an enclosed space for assemblies—for families—and for the dead, and this increases the probability that they may have been constructed by the same people.

This idea is not characteristically Celtic; for it is fully recognized in Scandinavia, in the conical earth-mounds, cairns containing one or two circles of stone, and in such circles independent of mounds. Nor are single memorial stones, or enclosures marked by four stones, uncommon there. Nor are the contents of their earlier tumuli—the work of their age of stone—when opened, different in general characters from what we find in ours,—skeletons, in similar position, surrounded by the same materials,—ashes, urns, instruments of bone, the animals killed

in the chase, the flint arrow-head, the stone hammer; and in later periods, the bronze celt, palstave, and sword,—the sacred rings of gold,—succeeded by the iron spear, caparisoned horses, wooden coffins, spirals and serpentine ornaments on stone pillars, with Runic inscriptions. Such Scandinavian relics occur in the Orkneys, which they colonized; in the Western Islands and on the Irish coasts, which they frequented; and to the corresponding objects in the north of England, the Northmen's names are commonly given. Our *hows* are their *hoie*, designated by names like Hother's Hoie, Rolf's Hoie, the Six Hills, &c.\*

## CIRCLES.—RINGS.

The tendency to circular arrangement in the earth-works and stone-works of the Britons is well manifested in the singular monument of Arbelow in Derbyshire. Analogous to that in important respects are the three circular entrenchments of Nosterfield already described (p. 63). There are two other works of similar character in the vicinity of Penistone, marked on the Ordnance Map as Camps. One of these, situated to the west of Rough Birchworth, about  $1\frac{1}{2}$  mile to the south-west of Penistone, is about 300 yards in circumference, measured on the bank. There were two opposite openings, as in the circles of Nosterfield and Arbelow, one to the north, the other to the south; the bank appears to have been formed of unwrought stones, and in the leveling of it a large heap has been collected. The ditch external to the vallum is still traceable; there is no trace of an inner ditch: in this it differs from the Arbelow circle, and may with more probability be regarded as a defensive work (Pl. 35).

Perhaps we ought to reckon the half-destroyed Camp on Eston Nab as of this order (Pl. 35).

It does not appear that any circular camp in Britain is positively known to be Roman. General Roy (Milit. Antiq. pl. 8)

\* See on this subject Lord Ellesmere's Guide to Northern Archæology.

gives an example of a small circular hill-fort, at Wood Castle near Lochmaben, with a double bank and two opposite gates, which he regards as Roman. The circumference on the outer bank is about 1000 feet. We may compare with this the circular camp near Penistone, whose circumference is above 900 feet; the larger enclosures of Nosterfield (p. 63), whose circumference is about twice as great; and the circle of Arbelow, which measures about 730 feet. In each of the last two examples, and perhaps in the first, the line passing through the gates points to the N.N.W., and in each the great fossa is internal, an arrangement quite opposite to the Roman plan of defence.

#### POTTERY.

So far as we know it, the pottery of our ancient grave-mounds is peculiar, distinguishable from Scandinavian, Anglian, and Roman work (see Pl. 33).

The most frequent examples of British pottery in Yorkshire are the cinerary and other urns found in the tumuli. These are of various magnitude, from one, two, or three inches, to two feet in height. They are composed of clay, dried in the sun, or slightly reddened by fire on the outside; never thoroughly baked. On this account the largest of them are generally a good deal crushed, so that an entire specimen, such as one in the Yorkshire Museum from near Beverley, is unusual.

These vessels were moulded by the hand, without the assistance of the potter's wheel. On this account they are somewhat clumsy and unsymmetrical, and their thickness is often disproportionately great. Their figure is formed on no classical model, but, if I rightly conjecture, contains the idea of the wicker basket, or *bascauda*, for which Britain was celebrated. Thus viewed the encircling ornaments assume the character of hoops, and the short linear markings made with some hard point, and set in the herring-bone fashion, may be regarded as imitations of interlacing twigs.

In studying British urns we soon perceive two varieties of this *bascaudal* style, if we may so term it. In the coarser ware there is one broad encircling band, in the upper part, which is made so as to be prominent over the lower part of the vessel—perhaps for the facility of handling. The ornamental strokes on these urns are very rudely arranged, often vertical in the band, and in herring-bone fashion elsewhere; the upper edge is flattened so as to bear a wreath of short oblique lines. The substance is coarsely tempered. The other variety is exemplified in smaller and handsomer vessels of thinner substance, better tempered, more reddened by fire, with more numerous belts and lines of strokes, and a greater freedom and undulation of contour. These do not appear to have had the benefit of the wheel, but it would seem as if some better models had been before the workman. Were they of later date? Were they Romano-British? They are least rare in the district near Malton, being found both on the Wolds and the Pickering hills\*,—a district where good brick-earth is to be had in many places. These vessels have been found in the tumuli empty. Were they frumentaria?

A rare shape of this pottery is a low, smooth spheroidal cup, like a saltcellar, made very thick of a coarse clay.

Neither jet nor amber-ornaments are common in our northern tumuli, except they be of Anglo-Saxon date, a circumstance which agrees with the ornament assigned to Hengist in the ‘Gododin’—the huge amber beads round the neck of the ‘freckled chief’ †.

#### DISTRIBUTION OF THE PEOPLE.

Cities, properly so called, are first mentioned in Britain by Tacitus; and he notices only three, all in the south of the island, perhaps all founded by the Romans, viz. Camalodunum, Londinium, and Verulamium. Ptolemy recounts no less than

\* The tumuli of this vicinity have been successfully explored by Mr. Kendall.

† Davies’s Mythology of the British Druids.

nine in the Brigantian territory alone;—so improved was the country, or so enlarged the knowledge of it in half a century. In the earliest period of British history corresponding to the pit houses and earthen tumuli, there were perhaps no cities, nor were the ‘oppida,’ which were defended by banks, destined for more than temporary protection. Near such enclosures, however, we may be sure the population was gathered, and thus an important clue is gained for tracing the distribution of the early inhabitants, in addition to the pits and tumuli, the situation of the Roman stations, and the lines of their military ways.

The green dales of the north-west of Yorkshire nourish but a spare population at the present day, and bear but a small proportion to the vast area of moorlands, which, even with the aid of modern improvements, yield but a stinted pasturage for cattle. In these valleys there are but slight traces of early settlements beyond the last reliques of the Romans, at Greta Bridge, Reeth, and Bainbridge. In the country below these points the marks of population of every age become more numerous.

The vicinity of Catterick is remarkable for long connected dikes, which seem in part to be boundary-lines, and in part to be defences, of the simple and antique cast of the British oppida. The space here enclosed between the Tees and the Swale is rich in the sites of castles and camps, and many names of Celtic origin connect the occupation of the country with the Brigantes. In later times, Roman roads, Saxon and Norman castles have increased the interest of the territory. Mr. MacLaughlan has carefully surveyed this district, at the request of the Duke of Northumberland, whose Stanwick estate is in the midst of entrenchments\*. A great dike has been traced by Mr. MacLaughlan, from Hindwath on the Swale to near Gainforth on the Tees. This is about  $9\frac{1}{2}$  miles in a straight line, and is four times as long as the great dike at Flamborough. It is seldom straight for more than half a mile, and is occasionally bent sud-

\* Archæological Journal, Nos. 23 and 24. 1849.

denly from its main course, and complicated with additional works, apparently defensive; one of these is a small camp at Cauldwell, about 90 yards square. It is usually a 'double dike,' enclosing a ditch, and it is remarked as a general rule that the dike on the west side is higher than that on the east, as if the rampart was to be a defence against the east.

Stanwick, on the line of the dike, surrounded by extensive entrenchments, has, on the elevated space called the Tofts, an appropriate place for a British citadel, strengthened on two sides by entrenchments, and furnished with a covered way to Forcett. Mr. Maclaughlan agrees with Dr. Whitaker in regarding these remains as belonging to a British tribe before the Roman conquest. In this district monoliths, cromlechs, and the excavated bases of houses seem to be unknown.

Mr. Maclaughlan describes an ancient camp with double rampart at *Howbury*, a little below Wycliffe, on the Tees; another at *Castlesteads*, above Dalton, in the parish of Kirkby Ravensworth; and a third at Kirkby Ravensworth village. Maiden Castle, one mile S.W. of Reeth, where the Arkle joins the Swale, is a strongly fortified point. "The church-yard at Catterick has apparently formed the interior of an ancient camp;" but whether of a date anterior to the Roman station at Thornbrough (Cataractonium), or subsequently constructed by the Saxons, cannot now be determined. About a mile S.E. of Catterick is an entrenchment called Castle Hills, believed to be of Anglian or Danish work, and compared with the Camps at Sedburgh on the Rother, and at Hornby on the Lune. Tumuli occur near Castlesteads, above Dalton, close by Catterick, and in the Thrummy Fields near Thornbrough (south of Cataractonium).

*Vicinity of Ilkley.*—If we now transport ourselves to the Wharfe, we find a considerable number of entrenchments and camps, 'rocking-stones' and tumuli, around the perpetual springs near the Roman station of Olicana. The frequency of conspicuous stones is an obvious consequence of the abundance

of gritstone in all the hills, especially on Rumeley's Moor, where Saxon Crosses have succeeded the memorial stones of the Druids.

*Vicinity of Cambodunum.*—In like manner the gritstone districts round the upper branches of the Calder, are full of entrenchments, 'castles,' 'rocking' stones, 'Round' rings, 'Bull' rings, 'Bride' stones, 'Tower' hills, 'Miller's' graves, and other marks of long occupation, varied with such names as Street and Causeway, the only indications now remaining of what were once Roman roads. No round pits have been described in this tract. Cambodunum may be regarded as bearing the same relation to this district as Cataractonium maintained to the little regnum around that northern city.

We may in the same spirit group together the camps, causeways, dikes, banks, rings, rocking-stones and monoliths, which are frequent in the region round the headwaters of the Dun, and the country of Rotherham and Conisborough. Here we have the combined entrenchments of Wincobank and Mexborough comparable with those between the Swale and the Tees; the camps of Conisborough, Rawmarsh, Castle Holmes, Wincobank, and Bradfield; the circular camps near Penistone; and the fine old mound of Stainborough. Of this region, the Roman stations at Templebrough and Doncaster seem to be the centre, communicating westward by the Long causeway to Brough, near Hope, and both northward and southward by the Rykniel Way. Tumuli are rare in this district, and British pits are not at all mentioned.

Defended in a military sense by marshes on the east and by mountains on the west, the Dun was here more easily attempted and required more considerable defences. They are on the whole most numerous on the north side of the valley, especially the long mounds; and may perhaps mark contests in which the defence was made from the north against attacks from the south. Was the Brigantian strength here opposed to the Roman legions? Is the name of Austerfield near Doncaster a memorial of Ostorius?

Another centre of ancient population which is distinctly connected with British and Saxon history, may be fixed at the strong mound of Barwick in Elmet; part of a system of earthworks which embraced Killingbeck near Leeds, Aberford, and Bramham Moor. The expulsion from this country of Cerdic or Cereiticus has been mentioned.

A palace in Loidis is mentioned by Bede, and at 'Eamot' Athelstane made peace with his humbled enemies (A.D. 926).

Another of these centres of population ought perhaps to be placed by the four great stones near which the Roman tents were pitched at Isu Brigantum (Aldbrough), near the head of the tide in the Eure. We have here, however, no extensive system of earthworks, no great number of tumuli, and no pit-houses; so that it might appear as if this was at first a Roman *præsidium* rather than a British town. 'Isu Brigantum,' however, seems to indicate it as the water station of the tribe.

What is now one of the poorest and most unpromising parts of Yorkshire, the great Moorland district in the north-east, is full of British remains—entrenchments, camps, dikes, tumuli, 'Bride' stones, 'Standing' stones, and 'Pits.' We may indicate the collections of pits near Wapley Inn, Egton Grange, Goadland, Cloughton, Scamridge, Stone Hags, and Rosebury Topping, as eminently characteristic of the district. The number of these objects, as well as of the entrenchments, camps, remarkable stones and tumuli, appears to augment toward the sea-coast. This must have been a scattered population of shepherds, who have left traces of long, but not altogether peaceful occupation. There was no Roman city in the district, and only one of the Camps at Cawthorn was a permanent and carefully protected station.

Along the southern edge of the Moors we have a line of ancient villages, settled by beautiful springs and streams, with pasture lands above and the lake-like Vale of Pickering below. Above these villages are mounds and tumuli and camps on the dry hills, and we are guided by the history of the early monas-



teries of Lasingham and Whitby to within a few centuries of the Roman Camps at Cawthorn, which were planted amidst British dikes, like those of Scamridge, and British villages like that of Egton Grange.

On the eastern side of the Vale of York, the dry Wold hills were thickly peopled along their edges;—not that the tribes were mainly gathered on the Wold, though a few ‘pit’ stations appear there; these dry hills formed, no doubt, an extended sheep-pasture, defended by many dikes, for the dwellers by the springs of Acklam, Leavening, Knapton, Ganton, and Reighton; and the towns of Kilham, Driffield, and Beverley, have claims to great antiquity. Southward from Acklam the dikes and tumuli continue above many villages and springs, by Godmundisham, where perhaps British paganism preceded the Saxon idolatry; by Londesborough, Warter, and Weighton; and collect into a final group about Cave, and the road to Beverley, by St. Austin’s Stone, Hunsley Beacon, and the mound of Bishop Burton.

The country all round Malton is thus shown to have been in early times the most peopled part of Yorkshire, and so it remained till a comparatively late period. The range of villages which cling to the foot of the Wolds, from the Humber, round by Malton to Hunmanby and Filey, is remarkable; a similar crowd of large villages runs from Scarborough by Helmsley and Thirsk to the north of the Tees, and from many circumstances there is reason to conclude these lines to have been occupied by settlements in the earliest times. Along them flowed the finest springs; above them were open pastures for sheep, the bustard, the dotterel, and other birds, and below in boundless forests roamed red deer and the wild boar; herons and wild fowl frequented the swamps; wolves, foxes, martens, and other animals of some value for skins, afforded occupation to the arrow, spear, pit or net; while, to complete the happiness of savage life, the roving pirates or merchants of the Baltic and the Elbe might land at the ‘Uchel’ (Ocelum Promontorium, Flamborough), the ‘Dun’ (Dunsley, near Whitby), or the ‘Aberach,’

(Eburacum, York), the coloured glass and amber, which made them amulets and ornaments.

Similar dikes, entrenchments, and tumuli are observed along the chalk wolds and oolitic hills of Lincolnshire and Northamptonshire, and are continued to the Cotswolds of Gloucestershire and the Downs of Wiltshire and Dorsetshire. Thus along the north-eastern and southern coasts, and for a considerable breadth inland, we have similar aspects of nature and corresponding traces of the ancient inhabitants; so that in this manner the most populous part of the Brigantian territory is found to be closely allied to the Belgic provinces of South Britain.

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## CHAPTER IX.

### THE ROMANS.

THE Roman standards were first reared in the Brigantian territory about A.D. 50, by Ostorius Scapula; they were finally withdrawn about A.D. 406, with Constantine. The Sixth Legion, which came to Britain in A.D. 117, was stationed at Eburacum until the general abandonment of the province; for it appears there in the Notitia, at the same moment that the Second Legion had left its quarters at Caerleon, and was ready to embark at Ritupæ. These three centuries were full of military glory and imperial vicissitude. Eburacum was a stern war camp, but around it was a great population. Here emperors received their birth, and submitted to the common lot of humanity. This was the great 'colonia,' probably the only municipium of the North, 'altera Roma,' the seat of the imperial government. From this point, even to the last convulsive struggle, the legions marched

to guard the Wall of Hadrian, or the mound of Antoninus, from the foe they had vainly combated in the Grampian Mountains.

But it is not with their wars that we are now concerned\*. Except along the northern frontier, the sound of battle was rarely heard in the Brigantian province. Traversed by great roads, and guarded by numerous camps, its pastures, rivers, forests, mountains, and mines, gave food, amusement and wealth to the possessors of innumerable villas.

We may judge of the extent of this Romanization by tracing the military roads and camps, and attending to the situation of the principal towns.

The geography of the North of England under Roman government is to be gathered from few sources. The 'Geography' of Ptolemy, the 'Itinera' of Antoninus, the 'Notitia,' and the 'Chorography' of Ravennas, are the most important. The three first-mentioned are indeed of inestimable value, since they give us information of the state of Britain in the days of Hadrian (say A.D. 120), of Antoninus Caracalla (after A.D. 210), and at the very last moment of the Roman sway, before the eternal farewell of the legions (beginning of 5th century).

#### PTOLEMY'S GEOGRAPHY.

Claudius Ptolemy was born at Pelusium or Alexandria about A.D. 70—one hundred and twenty-five years after the arrival of Julius Cæsar. He was eight years old when Agricola began his glorious campaigns (Tacitus being then twenty-two), and fifteen years old when Agricola left the country. The Sixth Legion arrived in Britain (A.D. 117) when Ptolemy was forty-seven years old; Hadrian's Wall was built when he was above fifty; and the northern rampart from the Forth to the Clyde was built by Lollius Urbicus (in the reign of Antoninus Pius), when he might be seventy years of age. Ptolemy mentions the Sixth

\* The Roman history of the Brigantes is that of Eburacum; for which see Mr. Wellbeloved's excellent volume.

Legion at Eburacum—his work cannot therefore have been completed until *at least* thirty-two years after the retirement of Agricola: he makes no mention of either the Hadrian or the Antonine Walls; the part of his work relating to Britain *may* therefore have been completed within thirty-five years after that event; but it is generally referred to a somewhat later date—the reign of Antoninus Pius, which began A.D. 138—or fifty-three years after the end of Agricola's government. Beside the two great Walls, which are entirely unnoticed by this author, a great number of military stations which appear in the next document to be considered, (the 'Itinera' of Antoninus,) are also omitted. In exchange we have British Cities, Rivers, Estuaries and Promontories named in methodical order, and carefully, though not always correctly, registered in their supposed latitudes and longitudes. None of the great roads are mentioned by Ptolemy, nor does he give any obvious preference in his Catalogue of places to the military stations—many of which, as given in the later Itinera, he omits—while other towns are specified which no one else notices.

From the ample materials which he has somewhat unskilfully combined into a general Table, to illustrate a Map of the British Islands, we shall here extract the part which relates to the sea-coasts and interior of the territory of the Brigantes. The Latin version is added, it being more generally referred to than the original Greek.

The western coast—

Greek.	Latin.	Long.	Lat.
Ιτουνα εισχυσις .....	Ituna Æstuarium .....	18° 30'	58° 45'
Μορικαμβη εισχυσις.	Moricambe Æstuarium ...	17 30	58 20
Σεταντων λιμνη .....	Setantiorum Portus .....	17 20	57 45
Βελισαμα εισχυσις...	Belisama Æstuarium .....	17 30	57 20
Σετεια εισχυσις .....	Seteia Æstuarium .....	17 00	57 00

Concerning the situation of the inlets of the coast thus named there is little doubt. Ituna is the Eden, and its estuary is Solway Frith; Morecambe Bay is the Moricambii Sinus—fitting to its Welsh name, the Crooked Sea; the Setantiorun

Portus must be the mouth of the Lune; Belisama is the Ribble, in whose vale are Samlesbury and Ribchester; and Seteia is the estuary of Mersey and Dee.

On the eastern coast we read in Ptolemy:—

Greek.	Latin.	Long.	Lat.
Ονεδρα ποταμου εκβολαι ...	Vedræ fluv. ostia .....	20° 10'	58° 30'
Δουνον κολπος .....	Dunum Sinus .....	20 15	57 30
Γαβραντουικων κολπος.....	Gabrantvicorum Sinus .	21 00	57 00
Οκελου ακρον .....	Oceli Promontorium ...	21 15	56 40
Αβου ποταμου εκβολαι.....	Abi fluv. ostia .....	21 00	56 30

These points are not so chained together by the nature of the coast, as to leave no doubt of their true situation.

By universal consent the Humber estuary claims the old name of Abus (Αβου ποταμου εκβολαι). At some point north of this a projecting part of the land was called Ocelum Promontorium (Οκελου ακρον). Camden supposed the modern name of Kellnsey, a little north of the Spurn, and the old name Ocelum, to be derived from the British *Y-kill*, a promontory, low tongue, or narrow tract of land. But the words of the Greek author imply elevation, really a cape or headland, not a mere extension of land. For *ακρον* seems to be merely a translation of the British name given before, as that is clearly derived from *Uchel*, elevated. By later writers, especially Mr. Walker of Malton, the place of this promontory is fixed at Flamborough Head.

Farther to the north was Gabrantvicorum sinus (Γαβραντουικων ὁ και λεγομενος Ευλιμενος κολπος,—the bay of the Gabrantvici, also called the well-havened Bay. Camden places this at Sewerby (as if that were ‘sure-bay’) near Bridlington, deriving the name from *Gaffran*, the Welsh for goat, an animal which, he says, was abundant at Flamborough. By later writers it is carried farther north to Filey Bay (as if that were the Portus Felix\*). Still farther to the north we have Dunum Sinus

\* The following are conjectures on the word *Gabrantvic*. 1. Is it not a mistake for *Brigantvic*,—there being no other mention of such a tribe as Gabrantvici, while the Brigantes are expressly said to stretch from sea to

(*Δουνον κολπος*), which by general consent, following the dictum of Camden, is placed in Dunsley Bay, near Whitby. According to this reference Ptolemy took no notice of the Tees.

The description given by Ptolemy of the interior is in these words:—

“ South from the *Elgovæ* and the *Otadeni*, stretching from sea to sea, are the **BRIGANTES**, among whose cities—

Greek.	Latin.	Long.	Lat.
<i>Επειακον</i> .....	<i>Epiacum</i> .....	18° 30'	58° 30'
<i>Ουινοβιον</i> .....	<i>Vinnovium</i> .....	17 30	58 00
<i>Κατουρρακτονιον</i> ...	<i>Catarractonium</i> .....	20 00	58 00
<i>Καλατον</i> .....	<i>Calatum</i> .....	19 00	57 45
<i>Ισουριον</i> .....	<i>Isurium</i> .....	20 00	57 40
<i>Ριγοδουνον</i> .....	<i>Rigodunum</i> .....	18 00	57 30
<i>Ολικανα</i> .....	<i>Olicana</i> .....	19 00	57 30
<i>Εβορακον</i> .....	<i>Eboracum</i> .....	20 00	57 20

(Under this last place is written **LEGION THE SIXTH, CONQUERING**)

*Καμουνοδουνον*..... *Cambodunum?* .....

Beside these about the well-havened bay are the **PARISOI**, and the City

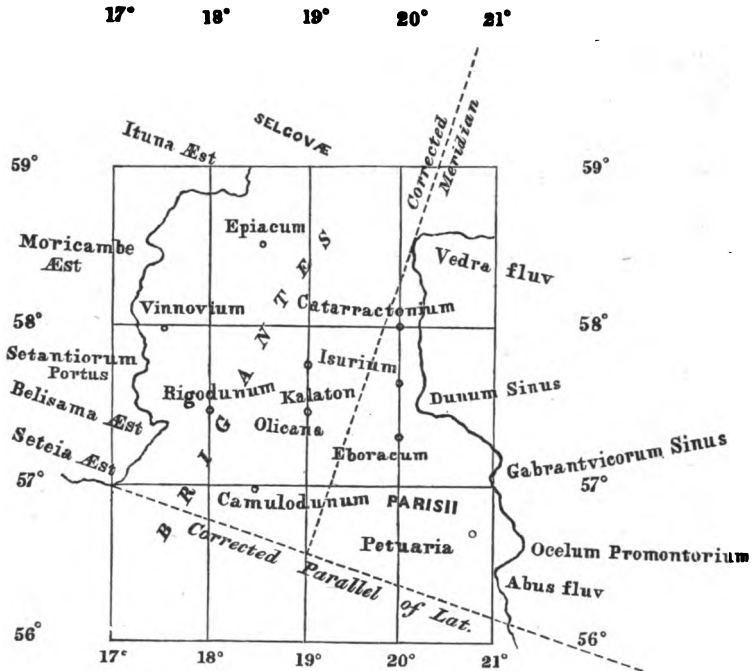
*Πετουαρια* .....

Of these places *Epiacum* and *Vinnovium* are in the County of Durham, and both lie to the north of *Catarractonium*; *Calatum* is indeterminate; *Rigodunum* has been conjecturally referred to Ribchester, but that is also supposed to be *Coccium*. If *Camounlodounon* be the *Cambodunum* of later date, it is somewhere in the West Riding. The other places, viz. *Catarractonium*, *Isurium*, *Olicana* and *Eboracum*, are satisfactorily determined in Yorkshire, by lines of road, camps and inscriptions. *Petvaria* has been variously placed by different writers, but I think Beverley is its true representative.

If we now combine into a map the data given by Ptolemy, we obtain the subjoined delineation of the Brigantian and Parisian territory, the first meridian being in the Fortunate Isles, far to

sea? 2. Does it mean dwellers on the Cliff (*Gavr* or *gant* and *uigon*), as Baxter supposes? 3. Has it not a Teutonic aspect, like *Haiburnwyk*, north of Scarborough—*wyk* meaning a small inlet of the sea?

the West. The names are put in the Latin form, except Kalaton, which is only mentioned by Ptolemy.



The errors of this map are great and obvious. The latitudes and longitudes are fictitious, that is to say, they were never observed (except the latitude of Catarractonium), and are merely introduced as measures of the length and breadth, to suit the eye-draughts which Ptolemy probably consulted. The west coast is too far north, or the east coast too far south, to suit the interior. And it is remarkable that while the proper Yorkshire towns are not ill-placed with respect to each other, the Yorkshire coast is drawn with almost no relation to them. This coast is only at all like the truth in the southern part: nothing is right from the Gabrantvic Bay northward. In the interior Epicum and Vinnovium are carried from 1 to 2 degrees too far west, but all the other towns are pretty well placed. Hence it appears that the western coast (along which Agricola marched) was better known than the eastern: that the towns round Eboracum were

correctly known, but those at a distance conjecturally marked. The Brigantian towns are indeed better placed than those round London. A great error of the map may be corrected by drawing the lines of latitude and longitude so as to make an angle of 20° with these lines as used by Ptolemy, and then turning the whole map round to the westward. With all these imperfections it is a most valuable document.

The Itinera of Antoninus, which relate to the Brigantes, contain the following information:—

ITER I. is entitled 'From the boundary to the Prætorium,' 156 miles, but it begins at a point far within the Antonine Vallum.

	Mill. pass.	
From Bremenium to Corstopitum ...	20	Corbridge.
to Vindomora.....	9	Ebchester.
to Vinnovium.....	19	Binchester.
(The route now enters Yorkshire.)		
to Catarractonium	22	Now Catterick in Yorkshire.
to Isurium .....	24	Aldborough.
to Eburacum .....	14	York.
to Derventio .....	7	} These stations are in York- shire, but their exact place is disputed.
to Delgovitia .....	13	
to Prætorium .....	22	

The sum of the distances as usually given 150

ITER II. From the Wall to Ritupæ (Richborough) in Kent.

	Mill. pass.	
From Blatum Bulgium to Castra exploratorum	15	
to Luguwallium.....	12	Carlisle.
to Voreda .....	14	} Plumpton Wall, Old Penrith.
to Brovonacæ' .....	13	
to Verteræ.....	13	Kirby Thure.
to Broughin Westmorel.	13	
(The route now enters Yorkshire.)		
to Lavatræ.....	14	Bowes in Yorkshire.
to Catarractonium...	13	Catterick.
to Isurium .....	24	Aldborough.
to Eburacum.....	17	York.
to Calcaria .....	9	Tadcaster.
to Cambodunum ...	20	} In the West Riding of Yorkshire.
to Manutium or Mancunium ...	18	



The route then proceeds to Chester, and afterwards to London and the Coast of Kent.

ITER V. From Londinium (London) to Luguwallium (Carlisle).

This route leads through Cambridge to Lincoln, where we begin our extract.

	Mill. pass.		
From Lindum to Segelocum.....	14	Littleborough on the Trent.	
to Danum .....	21	Doncaster	} in Yorkshire.
to Legeolium.....	16	Castleford	
to Eburacum .....	21	York	
to Isu Brigantum	17	Aldborough	
to Catarractonium	24	Catterick	
to Lavatræ.....	18	Bowes	} in Westmoreland.
to Verteræ.....	14	Brough	
to Brocavum.....	20	Brougham	
to Luguwallium...	22	Carlisle.	

Here Isurium is called Isu Brigantum.

ITER VIII. From Eburacum to Londinium.

	Mill. pass.		
From Eburacum to Lagecium	21	Castleford	} in Yorkshire.
to Danum...	16	Doncaster	
to Agelocum	21	Littleborough.	
to Lindum ..	14	Lincoln.	

Here Lagecium is substituted for Legeolium, and Agelocum for Segelocum.

The tenth Iter, the most perplexing of all, will conclude our extract—possibly no part of it lay within the limits of Yorkshire, except where it crossed Bolland Forest.

ITER X. From Clanoventa to Mediolanum.

	Mill. pass.		
From Clanoventa to Galava .....	18	} In the Lake District?	
to Alone .....	12		
to Gallacum .....	19		
to Bremetonacæ ..	27	(Overburrow?)	
to Coccium .....	20	(Ribchester?)	
to Mancunium ...	18		

The Iter proceeds to Condate (Kinderton) and Mediolanum (Meifod); and it is perhaps not too much to say, that excepting these places and Mancunium, there is not one station on the road firmly and by general consent agreed upon. Coccium (Coch, *Br. red*) has been commonly given to Ribchester, and Bremetonacæ to Overburrow; but there is no inscription, or other positive proof that either is right. Probability there is, and perhaps a high probability, that this line of road did pass through these places, for in almost every other direction from Mancunium the country is pre-occupied by known roads or stations, inconsistent with this Iter—and there is a Roman road leading in the northerly direction to Ribchester and Overburrow. If these places be rightly assumed, the others may be confidently placed somewhere on the line from Kirby Lonsdale to the north, or north-west.

The Notitia is a sort of military return of the troops stationed in Britain at the very termination of the Roman sway\*. It shows clearly that at this time the Second Legion had withdrawn from Caerleon, and was concentrated at Ritupæ and other places on the coast, in Britannia Prima, the south-east of the island, prior to embarkation, under the orders of the Comes Littoris Saxonici. In the north, under the Dux Britanniarum, the Sixth Legion still held Eburacum, and the war camps which had defended the Valentian Province. The other Legions had left the country; Caledonia and the region north of the Wall of Hadrian were finally abandoned to the insurgent natives (Picts); the mountains of Cambria and Cornwall were left without a soldier. Two provinces were defended. On the north the Picts were repelled from the whole length of the Wall, and on the

\* The date usually allowed (A.D. 423 to 453) to this composition is much beyond that of the latest Roman troops in Britain. The words in the title 'Ultra Arcadii Honorique tempora,' which are partly relied on for this date, may perhaps allow of being differently interpreted. If the compilation were by an author of more modern date, may he not, looking back on elapsed time, speak of days prior to the misfortunes of these emperors as beyond their time? The words may, however, have been added by another hand than the author's.

south the Saxons were kept off from the Coast, which was soon to be their prey, along the whole extent from the estuary of the Wash (Metaris) and the Marshes of Lynn, to the western extremity of Sussex.

The command of the *Dux Britanniarum* is stated in two parts: first are mentioned a number of stations distributed among the Brigantes, and along the great road to the north; then a greater series of stations on the line of the Vallum. They appear all to be garrisoned by the Sixth Legion, now in almost the 300th year of its glorious occupation of Eburacum.

*Sub Dispositione Viri Spectabilis Ducis Britanniae.*

		Names of Places in Notitia.	Modern names where certainly known.
<i>Præfectus Legionis Sextæ.</i>			
<i>Præfectus Equitatus Dalmatarum.</i>		Præsidio.	{ The Garrison at York.
<i>Præfectus Equitatus Crispianorum.</i>		Dano.	Doncaster.
<i>Præfectus Equitatus Cataphractoriorum.</i>		Morbio.	
<hr/>			
<i>Præfectus Numeri</i>	<i>Barcariorum</i>	} Arbeia.	
	<i>Tigrisiensium.</i>		
<i>Præfectus Numeri</i>	<i>Nerviorum</i>	} Dicti.	
	<i>Dictiensium.</i>		
<hr/>			
<i>Præfectus Numeri</i>	<i>Vigilum.</i>	Concangios.	
<i>Præfectus Numeri</i>	<i>Exploratorum.</i>	Lavatis.	Bowes.
<i>Præfectus Numeri</i>	<i>Directorum.</i>	Verteris.	Brough.
<i>Præfectus Numeri</i>	<i>Defensorum.</i>	Braboniaco.	{ (Brovonacæ) Kirby Thure.
<hr/>			
<i>Præfectus Numeri</i>	<i>Solensium.</i>	Maglovæ.	
<i>Præfectus Numeri</i>	<i>Pacensium.</i>	Magis.	
<i>Præfectus Numeri</i>	<i>Longovicariorum.</i>	Longovico.	
<i>Præfectus Numeri</i>	<i>Dervationensis.</i>	Dervatione.	

On this list we may remark, that it is in military, not geographical order. The cavalry is mentioned first; then two numeri of troops, which appear to be of foreign origin, but to have received additional designations from the places to which

they were long or permanently attached\*: next four numeri, named from the duties which belong to advanced posts, all stationed northward from York, or toward the dangerous frontier: and, finally, four numeri, which, if we judge from the last two, may be regarded as local soldiery specially attached to, if not raised by the towns whose name they bear,—a circumstance not at all inconsistent with the probable state of Britain at the moment when their Protectors were about to retire.

It is remarkable that Isurium and Catarractonium on the north, Olicana on the west, Delgovitia and Prætorium on the east, and Calcaria and Legeolium on the south, have no troops, and that nothing remains at Eburacum but the Dalmatian Horse. These circumstances seem to show that the country for a long space round York was free from alarm, and indicate that the Derventio here mentioned is not that station which is placed at VII. miles from Eburacum. As neither Morbium, Arbeia, Dictis, Concangium, Maglovæ, Magis or Longovicus, are mentioned by Ptolemy or in the Itinera, it may be a fruitless labour to seek their true places. Still something may be attempted.

Probably the third troop of cavalry—the Cuirassiers—were, like the others, retained within command of the Præfect of the Legion at York, ready to defend, if necessary, the eastern coast and river. Morbium, its station at this time, would by its etymology (*Mor, Br.*, is the sea) be placed on the sea-coast (as, for example, at Swine in Holderness); or by some Marsh (*Morfa*), such as occur near Thorne. It is a conjecture of Horsley, that it may be put at Brough-hill (Templebrough) near Rotherham.

For Arbeia and Dictis, with their peculiar and perhaps long stationary garrisons, we have no definite place. They are mentioned in no other document. Arbeia has been written against Moresby in Cumberland, and Dictis at Ambleside. If they were placed on our coast, the document would be consistent, and all

\* Just as the foreign troops stationed on the Saxon shore receive in the same document the additional names of Branodunensis at Branodunum, and Gariannonensis at Gariannonum.

the places round to Longovicus and Derventio would be in geographical sequence.

Concangium, by the title of its company and its position before three known stations on the great road, may claim place somewhere on the Tees, as at Pierse Bridge (Coniscliffe) or Greta Bridge.

For the situations of Maglovæ, Magæ, and Longovicus, we have only conjecture; nor is it clear what Derventio here signifies. It seems not likely that a company of foot should be permanently established at and named from the station supposed to be situated only seven miles from Eburacum; the camp near Derby seems to have a better claim; but Pap Castle, or Cocker-mouth on the Derwent of Cumberland, should not be forgotten. Longovicus, Magæ, and Maglovæ may be in the vicinity of the Lakes, to which Galava, Alone, and Galacum of the Itinerary seem also referable.

The Notitia gives further the distribution of troops along the line of the Hadrian Wall ('per lineam valh'), but on this subject the reader may be referred to the recent volume of Mr. Bruce.

The last of the Documents of Roman date which has been referred to, 'Anonymi Ravennatis Britanniae Chorographia,' will not detain us long. This geographical compilation of the names of places, &c. in the first, second, third and fourth parts of Britain, though but a tasteless performance, is rather less confused than is commonly thought. If a little pains be taken to unravel it, the descriptions are seen to arrange themselves in the order of the British Tribes, beginning with Cornwall and the Damnonii, passing on to the Durotriges and Belgæ; Silures, Dobuni, Atrebatii, Regni, Cantii; Cornavii, Ordovices, Coritani, Catyuechlani, Trinobantes, Iceni; and again by the Coritani to the Brigantes. It then proceeds beyond the Hadrian Vallum, and afterwards beyond the Wall of Agricola. The names appear often to have been taken from a Greek copy; and the terminations are in different cases, as if from different authors. The spelling is often thus known to be erroneous.

## ROMAN ROADS.

Were history silent, the long possession of Britain by the Romans would be sufficiently marked by the military roads and camps, and the foundations of cities which they have left us.

In addition to the great legionary ways preserved to us in the *Itinera*, we find in Yorkshire many other roads leading to stations not marked in that record, or connecting the places which it names in a different manner. The clearest method of description we have discovered is to trace these roads by their connexion with Eburacum, the great military centre.

The troops destined for Britain usually marched through Gaul. Landing in the south-east of the island, their northward route is plain to Lindum—the colonial centre of a peaceful tribe—and their north-westward route to Deva, the quarters of the Twentieth Legion. From either of these places the road to the ‘Wall’ lay through York (*It. ii. v. viii.*). A deviation route appears in *It. x.*—probably on the western side of the Penine ridge; but the stations thereon being for the most part unmentioned in other documents, the exact course of the part north of Manchester is uncertain.

From Eburacum to Lindum were two roads; that of the Antonine *Iter*, which crossed the Wharfe at Tadcaster, the Aire at Legeolium, the Dun at Danum, and the Trent at Segelocum; and the shorter route which crosses the Derwent at Stamford Brig or Kexby, and proceeds by Weighton and Cave to cross the Humber at Brough Ferry. From Eburacum to Mancunium and Deva, the legionary route was by Calcaria, Legeolium, and Cambodunum—a place which must be fixed about the head waters of the Calder, as at Slack or Greetland, and thence over the mountains.

Travellers who were unconnected with military duty, might take another, and possibly an older way to the south, by what is called the Rykniel Street, quitting the 5th and 8th *Iter* near Pontefract, and steering directly south by Darfield and Temple-

brough (camp) to Chesterfield (camp) and Derby (camp). They could also cross to Mancunium by a line which leaves the 5th and 8th Iter near Pontefract, and runs by Wakefield, Ossett, and Kirklees (camp), to Cambodunum; or go from Templebrough, by the Long Causeway, through the north of Derbyshire. They had also a road to Ribchester (station) from Calcaria, over Bramham Moor, through Adel (camp), Olicana, and the low Craven country.

The march of the soldiers to defend the Wall, or carry the Eagles to the Grampian mountains, was always by one great road (It. i. ii. v.), through Isurium and Catarractonium. Here the road forked, so as to conduct by Pierse Bridge (camp) to the eastern, and by Greta Bridge (camp), Lavatræ, and Verteræ, to the western part of the Wall. From Isurium, a cross road over hilly ground led to Olicana, matched by another running eastward by Yearsley (camp), Hovingham (villa), and the street to Malton (camps). There was also a branch north-westward, incompletely traced, by Wath and Thornborough to Bracchium in Uredale.

In the western part several old roads facilitated passage across the hilly ground—as from Catarractonium by Masham, and Grewelthorpe (Nutwith Camp), toward Ripley and Ilkley—from Barnard Castle (street) by Reeth (camp) to Bracchium. From this place roads seem to have led in several directions, as to Garsdale and Sedbergh (camp), Ingleton and Kirkby Lonsdale (camp), to Wharfedale, Grassington (British remains), Flasby (Roman remains), and Gargrave (Roman remains). From Olicana a road is traced toward Mancunium, and from Isurium a direct road runs to Aberford, called in a part of its course Rudgate, and most likely connected by a route over Marston Moor from Green Hammerton to York.

Turning now to the eastern part of Yorkshire, we observe that none of the several inland camps, stations, and towns can be named by direct testimony; nor is either of the Roman roads, which lead from Eburacum in a radiating manner to the

coast, referable without hesitation to the first Antonine Iter. The clearest of these roads runs nearly due east by Stamford Brig, climbing the Wold at Garraby Street near conspicuous entrenchments, and continuing on the high region by Cottam and Kilham to Bridlington, and perhaps onward to Flamborough. If this be the first Iter, Stamford Bridge is *Derventio*; *Delgovitia* must be somewhere about Huggate (great banks) or *Wetwang*, and *Prætorium* at or near Bridlington. Another route parting from this near Stamford Bridge conducts by Gallygap—*Eddlethorpe* (tumuli), *Thorntorpe* (entrenchments and camp near it at Langton), and *Langton Wold* (entrenchments) to Malton. From Gallygap an old road appears to have led by *Westow church* (tumulus) and *Hutton-on-Derwent* (*Gate-skeugh camp*) to *Amotherby* (on the street), and thence by *Barugh* (camp), *Cawthorne* (camps), *Mauley Cross*, *Goadland Dale*, *Leaserigg* (camp), to *Dunsley* and *Whitby*. If this be taken for the first Iter, as Dr. Young first conjectured, the numerals must be incorrect. Malton as *Derventio* would be not VII., but somewhat above XVII. miles from *Eburacum*; *Cawthorne Camps* would be *Delgovitia*; and at *Dunsley Bay*, or *Dunum Sinus*, *Prætorium* would find an uneasy resting-place—for it is claimed in the direction of a third road.

Whether this road crossed the *Derwent* at *Stamford Brig* or *Kexby* is uncertain. It is supposed to have passed nearly as the present road goes by *Barnby Moor*, *Weighton*, and *Cave* to *Brough Ferry*.

If this be the first Iter, as *Camden* supposed, *Stamford Brig* or *Kexby* must be *Derventio*, and *Weighton*, or some place not far from it, *Delgovitia*. *Prætorium*, according to *Horsley*, would be in *Lincolnshire*; according to *Camden*, at *Patrington*; but there is no military road to this place, which has, however, yielded Roman remains.

There is even yet another old road traceable from *York*, northwards by *Stillington*, *Yearsley* (camp), *Oldstead*, and the *Hambleton Hills*, to *Whorlton* (castle) and *Cleveland*—perhaps



to Eston Nab or Barnaby Moor (camp). Roads which appear to be of the Roman period lead from Malton toward the Wolds, as by Wharram-le-Street towards the point between Fimber and Wetwang, agreeing with the supposed position of Delgovitia, on the road to Bridlington. And on the Wolds we see or seem to see ancient tracks leading northward from Beverley and Driffeld, and pointing by Ganton, Sherburn, and Yeddingham, from the camps and entrenchments of the Wolds, to the dikes and camps of the oolitic hills and northern moorlands.

Besides all these are fragments of other roads on the Wolds, and in the West Riding, which it would be tedious to enumerate. They are often designated Street, or Gate, sometimes marked by the words 'wath,' 'brough,' and 'thorn,' the latter seldom far from old camps, and mounds of importance. Were all these roads used by the Romans?—all constructed by them?

The answer must not be given without explanation. Almost every one of these old roads leads between centres of population, marked by Roman stations, so that it is very probable they were all useful to the soldiers. If they were all constructed by them, we must be prepared to admit deviations from straight lines, where nature offered no impediments to that favourite mode of laying the 'strata viarum.' Nor have they all, or indeed any great proportion of them, the solid causeway which has been sometimes noticed, or the elevation above the neighbouring surface, which has procured for some parts of these works the title of 'Roman Ridge,' as west of Ripon, and on Bramham Moor. None of these roads are, properly speaking, circuitous; they are for the most part composed of lengths which meet one another at very obtuse angles, and are straight between one high point and another.

'STREET,' the general name for these roads, recalls their Roman origin. Their proper names in Yorkshire include neither Fosse nor Ermin, though some one of the roads north of Brough Ferry, to which they come in a united stem, may be regarded as the continuation of them. In like manner the

name of Ryknield, which accompanies the long way from Caer-marthen to Derby and Chesterfield, ceases before the border of Yorkshire is reached; but 'Watling Street,' a name which is given to the great route from London toward Chester, is not only applied by Leland in Yorkshire to the line which extends from Aldborough by Castleford to Doncaster, but is also found on the line from Aldborough to Ilkley. Another name of the part between Aldborough and Castleford is 'Rudgate.' Wade's Causeway between Malton and Whitby, the Long Causeway west of Sheffield, and a Causeway between Bolton Bridge and Blueberhouses, seem to mark the Roman construction of the roads to which they belong. Upon the whole it seems that the greater part of the old roads may be ascribed to the Romans, and though antiquaries have desired to except from this rule the Fosse, Ermin, Watling, Ryknield and Akeman Streets, it seems hard to conceive that when Britain was held by dissociated tribes, anything more than pathways over the open hills would be traced by commercial necessity from South Wales, Devonshire, and London, to Lincoln, from North Wales to the coast of Kent, and from London to Bath. But it is easy to see that when Deva, Aquæsolis, Londinium, Verulamium, Camulodunum, and Lindum, became centres of Roman government, they required connexion by Roman roads.

If we regard as originally British ways, those in which the main feature is a clinging to high ridges of open ground, thickly set with tumuli and earthworks, and which exhibit a negligent flexuosity, such as suits the notion of a customary track, rather than a well-planned and firmly-executed road,—the old Wold road from York to Bridlington may claim to be such. The old road which runs from Malton by Thornthorpe to Stamford Brig, and by another branch to Acklam Wold, Wilton Beacon, Givendale, Warter and Londesborough, is of this character. The fortified way from Acklam by Sledmere toward Bridlington, and that which runs among entrenchments and camps from Malton by Settrington toward Bridlington, may be put in the

same class, and contrasted with the firm and decisive lines between Aberford and Castleford, Castleford and Doncaster, and indeed the whole way from Piers Bridge to Lincoln.

The Roman roads have been preserved to our days, not so much by their great solidity, as by their obvious utility. For, connecting as they did considerable places by direct and convenient routes, traversing the rivers by fords or bridges, and the marshy ground by causeways, it was for the common weal that they should be preserved. In many cases the boundaries of parishes and hundreds run along them. Till a late period they were the only roads of importance;—followed by Athelstane as well as Severus, by contending Plantagenets and rival Harolds, they have outlived the coaches, and may possibly overmatch the railways in duration.

#### ROMAN CAMPS AND STATIONS.

Nations habituated to war mark by the permanent fortifications of their cities and the temporary defences which they construct in the field, the results of their military experience. The Lacedæmonians were taught to make circular camps, as admitting of equal defence on every side. The Romans preferred a walled enclosure of rectangular form, as is seen in their cities and permanent military stations (*castra stativa*), no less than in the temporary entrenchments thrown up at the end of a day's march (*castra, mansiones*). Local circumstances might occasion some deviations from this type (Roy, pl. 50), but it is inconceivable that a legionary camp, essentially planned to give free internal movement, should assume the sinuous and irregular outline, and the successively contracted areas of the great earth-mounds on the Malvern, the Breiddyn, the Caradoc, Coxal Knoll, and Cather Thun (Roy, pl. 40, 47, 48). These may safely be adjudged to have been Hill-forts of the Britons; places naturally strong, and further defended by encircling mounds and ditches.

In the later days of the Roman sway in Britain, we may sup-

pose that for retaining and defending with fewer troops the country which had been long before conquered by large armies, many detached posts might be occupied by small bodies of men, and that these forts might be often chosen so as to be guarded as much by difficult ground as by artificial works. And this agrees with what is said by Vegetius (*De Re Militari*, i. 23) writing in the days of Valentinian (A.D. 385), that Roman camps were made square, round, or triangular, to suit the nature of the ground, the most approved form being the oblong, with the length one-third greater than the breadth\*.

It may be doubted, therefore, whether even such posts as those at Langton and Hutton Ambo can be proved to be of British work, by the irregularity of their figure. In the latter case, however, the inequality of the height of the bank, and its rising into tumulary mounds as at Arbelow, increase the probability, and in the former we may appeal with some confidence to the proximity of the 'double dikes.'

The essential parts of the defence are always the external ditch and the internal rampart or wall. The Greek wall (*τειχος*) which stood 'while Hector and Achilles raged,' was flanked by lofty towers (*πυργοι*) furnished with a pair of gates (*πυλαι*), and surrounded by a deep, broad and great palisaded ditch (*ταφρον*), II. vii. 436. It was constructed near the great tumulus raised over the slain (*ib.* 435). The gates being burst open, the entrance was unimpeded.

The Roman temporary camp has only one such ditch (*fossa*) and one bank (*vallum*, *agger*); but the permanent station at Cawthorne has two fossæ and two aggera, across which the road entrance is level. For camps, whether intended to hold a cohort or a legion, four gates are usually assigned: greater camps of the age of Agricola have six gates; there are camps with a still greater number of gates, but their age is not certain (Rey Cross, p. 18, and Kirby Thure). Small posts have sometimes only one opening (Roy, pl. 31).

\* *Dict. of Gr. and Rom. Antiq.* p. 205.

The marches of the Roman generals, by whom the Brigantes were subdued, cannot be traced in Yorkshire, as the route of Agricola is marked in Scotland, by the temporary camps. We cannot fix the site of a single battle, on Brigantian ground, during the whole period of the Roman occupation. According to General Roy, Rey Cross on Stainmoor might be such a camp of the 6th legion, and two of the four camps at Cawthorne are rude enough in design to justify the supposition of their being temporary camps—perhaps thrown up by the 9th legion. Several permanent stations are now represented by towns, where neither banks nor ditches, nor the word ‘caster,’ indicate a guarded camp. This is the case at Castleford, Stamford Bridge, and Brough Ferry. Have they been destroyed by time and change, as the old fortifications of Doncaster and Tadcaster have been, or were they never fortified, but merely villages where small bodies of soldiers on a march might be accommodated by the inhabitants? Derventio and Delgovitia may perhaps never have been marked by camps.

Many of the purely Roman settlements in Britain appear to be simply military, as, for example, the stations ‘on the Wall.’ Few of the Latin names of these stations can be traced to British roots, and few of the stations are now centres of population; the names were perhaps new, and given to new places; the places were abandoned when the legions withdrew, or soon afterwards, and their names were preserved only in the military records and inscriptions.

Of the following Roman camps, stations and towns, vestiges remain in Yorkshire, or their site is indicated by one of the four documents already referred to.

*Temporary Camps.*

Rey Cross Camp, p. 18, and  
Pl. XXXIV.  
Kirklees Camp, p. 98.

Three of the Cawthorne Camps,  
p. 88, and Pl. XXXIV.  
Barugh Camp, p. 241.  
Lease Rigg Camp, p. 24.

*Purely Military Stations, or permanent Camps, distinct from Towns and large Villages.*

One of the Cawthorne Camps, p. 88, and Pl. XXXIV. Templebrough Camp, p. 224.	Greta Bridge Camp, p. 50, and Pl. XXXIV. Longbrough near St. Helen's Ford, p. 83.
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*Stations which became or were placed close to old Towns and Villages.*

Eburacum, p. 75, Pl. XXXIV. Danum, p. 102. Isurium, p. 67, Pl. XXXIV. Lavatræ, p. 48, Pl. XXXIV. Catarractonium, p. 54, Pl. XXXIV. Malton, p. 89. Calcaria, p. 85. Legeolium, p. 95.	Olicana, p. 80. Cambodunum, p. 97. Adel, p. 240. Prætorium near <i>Bridlington?</i> , p. 241. Derventio near <i>Stamford Brig</i> , p. 92. Bracchium, p. 59, Pl. XXXIV.
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*British Towns not stated to have been Military Stations.*

Pedwarleth—the Περουαρια of Ptolemy, who describes it as the city (πολις) of the Parisoi, p. 231, the Beverlac, and Beverley of modern times.

ROMAN BURIALS.

The Romans buried the body, or burned it and deposited the ashes. In neither case was it customary to raise a tumulus over the dead. In many instances the body was enclosed in cloth and placed in a squared stone coffin, made of the gritstone of Brimham, probably brought to Eburacum by way of Isurium, or of the magnesian limestone brought from Calcaria. It was covered by a flat or somewhat coped stone. On one side of the coffin was the inscription recording the name and age and other particulars relating to the deceased, and the name of his relation or friend who dedicated the memorial. In other cases a sheet of lead was cut and folded, or folded without cutting, to form a rectangular chest, over which was placed a leaden cover. There is a rare example in the Yorkshire Museum of burial in a wooden coffin, which was enclosed in a tomb built of ten huge blocks of gritstone.

The body thus placed was covered by a grouting of lime, on which may be seen the impressions of the cloth, and within which many ornaments and other articles are found, as beads of glass and red coral, bracelets of bronze, rings of gold, silver, bronze and jet, and sandal nails of iron.

The ashes of bodies which had been subjected to cremation were sometimes placed in the earth with no urn or coffin, and covered with tiles marked by the name of the legion—a soldier's grave. In other and more numerous cases, urns containing fragments of bone are found with elegant glass phials, but neither tile, stone, nor tumulus. In similar urns many bronze tools, as celts, chisels, and gouges, have been found. These circumstances are mentioned only by way of contrast to the mound-burials of the Britons and Anglians, from the latter of which they seem to differ the least. Roman burials have been recognized by the sides of the road leading out of York even to the distance of a mile; and of stone coffins the number discovered is very considerable\*.

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## CHAPTER X.

### ANGLO-SAXONS AND DANES.

THE interval of time which separates the withdrawal of the Romans from the arrival of the Saxons is not long, yet its exact limits are not defined, nor can it be completely filled by the facts and fictions of the Saxon triumph and British distress. History retired with the Roman Legions, not to return with the Roman Bishops. The retirement of the old masters was not so

\* See Wellbeloved's Eburacum; and his Descriptive Account of Antiquities in the Yorkshire Museum.

sudden, but that they twice returned to expel the disorderly foe from the Hadrian Wall; and the advent of the new warriors was not secured by national compact, until they had given fatal proof of their power by many piratical descents. In her last struggle for Britain, Rome had not only to guard the Wall from the unsubdued Picts of the North, but also to repel the Saxons from the South and the East. When Maximus contended for empire, he carried off to die at Aquileia (A.D. 388) or in Armórica the guardian legions and the warlike youth of Britain; incursions from the north succeeded; petitions went to Rome, and Stilicho sent a legion to the succour of the province (A.D. 397 or 399, according to Turner). Recalled by the invasion of Alaric\* to the great fight at Pollentia (A.D. 402), the victorious troops returned again to expel the Picts from the long-contested Wall. In 406 Constantine was elected their emperor, and his and their arms triumphed in Gaul and Spain, till the treason of his officer Gerontius was succeeded by his captivity at Arles, A.D. 411. In 410 Rome, no longer defended by Stilicho, was sacked by the Goths; but before that (A.D. 409) the Picts and Scots were ravaging the north, and the *cities* of Britain, deprived of their soldiers, refused obedience to the Imperial authority, declared independence, and were abandoned by the despair of Honorius †.

Forty years of civil discord followed—of strife between Roman and British parties—between *civitates* accustomed to municipal privileges and colonial rights, and chieftains who more than ever trusted to the sword. There is no history of these dissensions ‡, but the mournful pages of Gildas declare the result to be interminable civil wars, not ending even in the readmission of the

\* Gibbon, v. 194.

† Zosimus, lib. vi. quoted by Gibbon.

‡ A.D. 418. "In the ninth year after the sacking of Rome by the Goths, those of Roman race who were left in Britain, not bearing the manifold insults of the people, bury their treasures in pits, thinking that hereafter they might have better fortune, which never was the case; and taking a portion, assemble on the coast, spread their canvas to the winds, and seek an exile on the shores of Gaul."—*Ethelwerd's Chronicle*.



hereditary foes from the north\*. The extremity of danger alarmed the nobles, with Gwrtheyrn or Vortigern at their head, into a decisive measure; the Saxons were called to aid. 'The blue-eyed Saxons' came; most probably they had often come before without invitation. Nor can the application to them by a party in Britain be thought strange. Already, 150 years before, Carausius had made a compact with these hardy pirates; again, A.D. 350, Magnentius had aided their progress; and now, the Romans having withdrawn, there was literally no power but that of the Saxons which could be brought to fight the Picts. They had risen to command a powerful confederacy of the German tribes north of the Elbe, and their swords were ready for every encounter.

By universal consent Hengist stands for their leader, and his place of landing with Horsa his brother is in Kent at Wippidsfleet† (A.D. 449). "King Vortigern gave them land in the south-east of this country, on condition that they should fight against the Picts. Then they fought against the Picts, and had the victory wheresoever they came."—*Sax. Chron.*

'It is a pity that we must not believe Geoffrey when he says that Vortigern, after the victory, gave Hengist lands in Lindsey, as much as he could compass with a leathern thong; that Hengist thus encompassed a rocky hill, and built there his Than or Thong Caster; that there his daughter Rowena captivated the weak representative of Brutus, drank his health and shared his throne. The kingdom of Kent was the maiden's dower. By Hengist's advice, Occa (Octa), Ebusa and Cherdich followed with 300 ships and plenty of soldiers to fight the Picts, and settle themselves in the provinces of Deira and Bernicia, which were afterwards united into Northumberland.

There is nothing improbable in the assertion that they did so.

\* According to Gildas aid was supplicated from the Patrician 'Ætius, thrice consul' (his third consulate was in 446); Bede says it was not obtained; yet Gibbon declares the independent Britons implored and *acknowledged* his salutary aid (vol. vi.).

† Turner says, Ebb'sfleet.

For if Ella in 477 came to Sussex, and Cerdic in 495 to Wessex, why are we to suppose the Humber neglected by the Northmen till 547, when Ida began to reign in Northumberland? According to Nennius, this great prince, the ninth in descent from Woden, possessed lands on the 'left-hand side' (*i. e.* on the north) of Britain, *united* Deira and Bernicia, and was the first king in *Caer Ebrauc* (York). But the same author tells us that Soemil, fifth in descent from Woden,—and ancestor of Ella, tenth in descent, who succeeded Ida,—was the first who *separated* Deira from Bernicia. This seems to indicate an Anglian conquest of Deira, four generations before Ida—one generation after Hengist.

The twelve sons of Ida landed at Flamborough with forty ships full of Anglians, to assist their father in his wars\*. At this time, according to the triads of the Kymri, the country between the Humber and the Lowlands of Scotland (perhaps we may say the mountainous district) was under the command of three British sovereigns—Gall, Dyvedel, and Ysgwnell,—'bards and sons of the bard Dysgyfeddawg'†. No record of their opposition survives. Urien was king in Reged, the British kingdom of Stratheluyd; Rhydderc, Gwallog, and Morgant reigned in Cumbria. The poems attributed to Taliesin and Llywarch Hen, and some of the Triads, refer to the contest which these princes firmly maintained against the warlike Anglian chief—'flame-bearing' Ida, and his brave descendants. Llywarch Hen, the great elegiac poet of the Kymri, the personal friend of Urien, stood by the side of the valiant monarch, and embalmed his memory in affectionate and beautiful verses‡. Ida died in 560, perhaps by the sword of Owain, the heroic son of Urien. Reged was saved till a later day; the Bernician chiefs retired to North Wales, and were welcomed by Maelgwn, whose ancestor Cunedda—four generations before—had quitted Bernicia and settled in North Wales. That powerful monarch also received

\* Matthew of Westminster.

† Stephens's *Literature of the Kymri*. The names are differently given by Williams (*Gododin*, p. 3).

‡ *Ibid.*

the Cumbrian bards, and listened to those mighty strains, which for hundreds of after-years animated the mountaineers to glorious war against the Saxon, Norman and English sword. That a considerable portion of the natives might remain under the rule of Ida—who is painted in fair colours as a brave and generous prince—is almost a necessary inference; but we may as freely admit that, long before the days of Ida, detached bands of Northmen had entered Bernicia, for there seem hints that even Taliesin had been brought up at the Court of Norway. The opposition to Ida seems to have been chiefly from the mountainous west, and his rule was on the eastern coast.

Ida and his descendants fought many battles against the Britons, but there is no record, nor any sure ground for affirming, that any of these battles were fought in Yorkshire. It is remarkable that along the whole eastern coast, from the Tweed to the Thames, the very slight narrative of Anglian conquest reads more like a further colonization of lands which were already held by a kindred race, than a violent expulsion of an earlier people. We find indeed, in 620, Edwin employing his power to drive out from the principality of Elmete\*, Cerdic or Cereticus, supposed to have been a British regulus or petty king. And if Mr. Stephens is right in his view of the meaning of the great poem of Aneurin—the Gododin—the fight of Catterick was at Catterick, the assailants were Saxons, and the defenders Britons†. But Mr. Davies explains this interesting composition differently, and extracts from it a full description of the treacherous feast and cruel slaughter at Stonehenge‡.

Nothing, however, prevents our acknowledging that under Ida's immediate successors the subjugation of Northumbria became complete; and from that time the country of the North acquired feelings and interests always distinct from those of the South; always ready to sympathise with the Danes, and to contend with the Saxons and Welshmen.

\* Nennius.

† Literature of the Kymri.

‡ Mythology of the British Druids. See Appendix.

Painful proof of this meets us at every line of the long annals of senseless slaughter, varied by milder ecclesiastical contests, which make a great part of what stands for the history of Northumbria, through five centuries of violence and misrule.

How feeble the influence for good of the Christianity preached with so much devotion by Augustine (597) and Paulinus (601) ! How slight the benefit from the sovereignty of Britain attained by Edwin in 617 ! Slain at Hatfield by the merciless hands of the Christian Cadwalla and the Pagan Penda, his death was at last revenged by the bloody victory at Winwidfield near Leeds (655), and Deira and Bernicia, which had been separated since his death, were again united to pursue the same course of foreign oppression and domestic wrong.

At length the Dane—fit instrument of vengeance—brought 300 years of piratical invasion to complete the misery of the brave but disunited people. We are not compelled to repeat the tale of rapine and devastation which accompanied every step of the 'army,' though York, the stronghold of Northumbria, occasionally felt the fury of the Dane, and the cathedral was often robbed by them. Rapine and slaughter everywhere marked the path of the Danes, and these Pagan warriors spared none of the monasteries in which wealth was to be had by sacrilege. But there is a great difference in the aspect of their incursions according as we look upon them from the Saxon or Anglian districts. Sussex and Wessex, the really Saxon parts of the island, were the constant opponents of the Danes through all the period of these miserable wars ; but in the Anglian kingdoms the invaders were hardly strangers. The five towns given to them were in the Anglian territories—Lincoln, Nottingham, Derby, Leicester, Stamford. The settlers of East Anglia and Northumberland sheltered the Danes from defeat, and furnished horses and men for fresh inroads, which were again repelled by the compact strength of Wessex. Thus we see continued and renewed that internal feud between the north and the south, which was of very early date.

It is more pleasant to extract from the Anglo-Saxon Chronicle a notice that in 876, "Halfdene apportioned the lands of Northumbria, and they thenceforth continued ploughing and tilling them;" and again that in 880, the army settled in East Anglia and apportioned it; for after this, some years of comparative quiet rewarded the wisdom of Alfred.

It is not often, amidst the prosperous fields of the north, that our ploughmen are startled by the perishing remains of Danish or Saxon combatants. It is not easy to point exactly to the spot where Edwin fell at Hatfield (633), and Oswald at Maserfeld (642), and their destroyer Penda at Winwidfield (655). Even Brunanburgh, the greatest Anglo-Saxon victory (937), where Athelstan—"of earls the lord, of heroes the bracelet giver"—three nations crushed, has no fixed place and no settled name. Only a curious eye can trace at Riccall the landing-place, and at Fulford the combat, which opened to Hardrada the gates of York (1066), or find at 'Stamford Brig' the 'Battle-flat' where the warriors of the Baltic lay by thousands round the heroic Northman, on the land he thought to rule.

This was, however, not the last of the 'Danish' invasions. In 1069, three sons of Sweyne came from Denmark with 240 ships into the Humber, and assisted by Waltheof and the Northumbrians, demolished the castle of York. In 1075 the Minster was pillaged by Northmen, and but for a mutiny in the Danish fleet, the year 1085 might have beheld the son of King Sweyne at the head of a mingled army of Danes and Northumbrians, and the battle of Hastings might have been won in vain\*.

\* See, on all points of Saxon and Danish history in England, the Saxon Chronicle, compared in the earlier parts with Bede's Ecclesiastical History, Ethelwerd's Chronicle, and Nennius's History of the Britons; Simeon of Durham, Henry of Huntingdon, William of Malmesbury, for the later events; and the Heimskringla and Egill's Saga for details as to Brunanburgh and Stamford Brig.

## MONUMENTS.

England is the monument of the Anglo-Saxons—the people, laws, manners, customs, language, all bear the strong impress of that powerful race. Many of the cities belong to an earlier period, but the rural population dwells in villages which for the most part are of Anglo-Saxon foundation. In these, however, hardly a wall remains which was laid before the Norman Conquest; only in a few examples do the churches of our forefathers retain arches, pillars, or inscriptions of earlier date. If we search the face of the country, it is only here and there that local names and traditions assign to Anglian warriors the giant dikes and lofty tumuli which seem destined to outlive all the more solid memorials of men.

Nor are these names and traditions often to be trusted. According to tradition the great earth-mounds belong to Druids, Romans, or Danes. We have the Dane's Dike at Flamborough, the Dane's Graves north of Driffild, the Dane's Hills at Skipwith, near York; but I remember no mention of 'Saxon' remains, except in the narratives of some modern rustics, who may be descanting on the mysterious circles of Thornborough, or the King's Mound, near Driffild, in language borrowed from other sources. Whatever their origin, there are few earthworks in England more worthy of study than the Dane's Dike at Flamborough (p. 128), and the circular entrenchments near Thornborough and Nosterfield (p. 63).

The names of the tumuli on the more conspicuous points of the many hills between Scarborough and Whitby, and between Guisborough and Helmsley, are Anglo-Saxon or Danish, mostly combining some personal name with the general epithet How, Houe or Hoe, often followed by Cross: thus Lilhoue Cross; Silhoue; Blakehowe; Loose howe. This does not prove them to be of Teutonic origin, but it deserves attention that what mythological traditions are connected with them (such as that mentioned in p. 210) point in the same direction. The opening of these

tumuli must be looked for with interest ; as far as the inquiry has yet gone, they appear to be most frequently British.

#### TUMULI.

Not many of the grave-mounds of Anglo-Saxons have been opened in Yorkshire. They have been chiefly in the vicinity of Driffield, where indeed, from many circumstances, Anglo-Saxon remains may be expected to be more abundant than elsewhere. One opened by the Yorkshire Antiquarian Club, under the direction of Dr. Thurnam, was of a diameter much greater than any British tumulus yet described, but elevated only a few feet. So great a number of burials were found in it as to indicate that it had been a common place of sepulture for a considerable population. The skeletons were laid in various directions, in several combinations, and were of different ages,—certainly not the remains of slain warriors only, though some warlike instruments were found.

Among the personal ornaments found in the mound at Driffield were many amber beads of unequal size, mostly rough in aspect. Amber occurs on the eastern coasts of England, but not so abundantly as on the Baltic coast, from which the owners of the necklaces probably drew their origin.

The most remarkable objects were rock-crystal pebbles, perforated with a degree of accuracy which implies not only the skilful use of the lathe, but also the possession of emery—a substance not likely to be had except from the island of Naxos. Such beads were probably a part of the treasures of the East, brought to the north of Europe by mercenary soldiers or roving pirates.

No example of an axe has occurred in our Anglo-Saxon tumuli. The iron instruments found have been chiefly knives, and blades and spikes of spears ; the latter placed in the tumulus at Driffield at such a distance from the blade as to indicate a wooden shaft of some 4 or 5 feet in length. One of the most remarkable objects obtained is the iron umbo of a round shield, with four circular iron discs probably placed round it on the

shield. A pair of scissors has been found, and iron rings occur, fitted to links of such a form and size as to indicate horse-bits\*.

Of bronze instruments the most remarkable are fibulæ.

## POTTERY.

This is the least abundant of the old ware found in Yorkshire, only five good specimens, besides fragments, having yet reached the central Museum †. Some of these are in substance as coarse as the rude Brigantian vessels, though thinner and more firmly compacted in the making, and somewhat more thoroughly hardened and blackened; perhaps by smoke-drying and long-continued heat. The style of these urns is entirely different from British specimens; it seems rather to be formed in imitation of metallic vessels, on which small ornaments were repeated by stamping in circular lines, or in the angular compartments of a zigzag wreath, or in clusters. The reflexed lip of the ordinary examples is quite unlike the British hoop, and yet not like the more complete Roman moulding. In the ruder sorts at least the wheel was not used. The general outline seems to show an acquaintance with classical models—as might be expected from the fact, that Roman ware is found in the Anglo-Saxon graves of Kent ‡. The outline is usually concave from the lip downward and to about half the height, and thence convex to the base; so that, at about the middle, the vessel swells out much—the space immediately above the swelling being sometimes suddenly contracted. The small ornaments impressed on our Yorkshire urns are represented in Pl. XXXIII.

Anglo-Saxon combs have ornaments of similar pattern.

## NAMES OF PLACES.

The completeness of the Anglo-Saxon conquest in all the eastern parts of Britain is evident by the almost universal scattering of the termination *ton* in all the more level regions, and

\* Wellbeloved's Descriptive Account.

† Ibid.

‡ Wright, p. 421.



even up many of the more open dales which penetrate among the mountains. Thus in the basin of the Forth and Clyde, between the Grampians and Lammermuirs, round the Cumbrian and Yorkshire Mountains, bordering the heights of Wales and Cornwall, and spreading to the eastern coast, we have this characteristic of Teutonic habitation.

The termination *ton* is very common in Cleveland, on the north side of the Vale of Pickering, and in Holderness. It is attached to several Yorkshire *towns*, as Malton, Bridlington, North Allerton, Patrington, Skipton, Pocklington, Weighton, Peniston. It is rare in East Lincolnshire.

Scarcely less extensive in England is the equally Teutonic termination *ham* (*heim* in South Germany, *um* in Friesland), for this is found far west, as in Malham, Kirkham, Birmingham, Wrexham, and occupies all the eastern parts with some singular exceptions, as in Sheppey, from which *ton* is also nearly or quite absent. Masham, Middleham, Rotherham, Kilham are examples.

*Ley*, another termination belonging to the Saxon occupation, is frequent in Yorkshire, as among towns: Helmsley, Barnsley, Ripley, Bingley, Stokesley, Pateley, Otley.

*Ing*, supposed to be indicative of a family, is rather frequent, as Keyingham, Brantingham, &c. *Ing* often means a meadow.

*Field*, implying a cleared space in a woody country, occurs at Huddersfield, Wakefield, Sheffield; and, as contrasted with the open Wold, at Driffild.

More restricted by far, and running in streams and patches on the eastern and northern side of England, is the termination *by*, which marks a Danish dwelling. This is scarcely known in Norway, but appears in a scattered manner up both sides of the Bothnian and Finland Gulfs, which were exposed to Danish incursion or held in temporary subjection. In a similar manner it is carried round the coasts of Cumberland and Lancashire; but the great mass of the Danish settlements indicated by this syllable is on the eastern side of the mountains, and, as Dr. Latham has remarked, very much collected in the drainage of

the Humber and Trent, which so often gave entrance to their predatory keels. Teesdale, on the Yorkshire side, is rather thickly marked by the termination *by*,—in the country where Baldersdale and Woden's Croft perpetuate the memory of the northern divinities. Eskdale and the Yorkshire coast as far as Bridlington have this affix to many villages; it is frequent in the interior along the Vales of Pickering and York; but fails remarkably in Holderness—the old Saxon realm of Deira—until we reach the Humber bank. In all the western dales of Yorkshire it is traceable, especially in Yoredale and the Valley of the Dun. In East Lincolnshire it is very prevalent, and stretches as far as Rugby and Naseby. Among towns with this termination we may notice Hunmanby, Whitby, Selby, Wetherby, Kirkby Moorside.

To pursue this subject a little farther, we find the traces of Norwegian rather than Danish occupation in the generic names for hills and valleys and streams and churches, through a great part of old Northumbria. Thus all the higher mountains of the north-west of Yorkshire are called 'Fells,'—a name which stretches into Lancashire, Westmoreland and Cumberland; the valleys, even far into Scotland, are called 'Dales'; the streams through nearly all Yorkshire are 'Becks'; the waterfalls, 'Forces'; the churches, 'Kirks.' Of 42 occurrences of Kirby or Kirkby, taken from an 'Index Villarum,' not one is in Northumberland, Durham or Scotland; 17 are in Yorkshire, 7 in Lincolnshire, 4 in Lancashire, 4 in Westmoreland, 3 in Leicestershire, 2 in Nottinghamshire, 2 in Norfolk, and 2 in Essex; 1 in Cheshire. ('Kirk,' like 'by,' is rare in Holderness.) Of 70 occurrences of 'Kirk'—terminal, separate, or followed by some other syllable than 'by'—we have 19 in Yorkshire, 18 in Scotland, 14 in Isle of Man, 6 in Cumberland, 5 in Northumberland, 2 in Lancashire, 2 in Derby, and 1 each in Lincoln, Norfolk, Suffolk, Oxfordshire.

From this it appears probable, that over a very general colour of Saxon population we may spread a Norwegian tint from the

Grampians to the Humber and the upper branches of the Trent, and limited shades for the Danish race, within the eastward drainage of the Trent, Humber, Esk, Tees, and the westward drainage of the Eden, Ellen, Derwent, Kent, Lune, and Ribble.

#### RACES OF MEN IN YORKSHIRE.

The elements of the population of Yorkshire are found in the British Aborigines, the soldiers and colonists brought by Rome, and the Saxons, Anglians, Danes and Northmen. Of these, if we may credit the names of places and the course of history, the most influential must be the races, which, according to all research, came to us from the Fiords of Norway, the shores of the Baltic, and the mouths of the Elbe and neighbouring rivers. Now, all these people, except a part of the Norwegians, are of the blue-eyed Germanic race, as it was understood by Tacitus\*, and as it appears to-day in North Germany, Denmark, and Sweden. Among the Northmen are two races—one identical with the Swedish, the other forming a peculiar Norwegian type—stout rather than tall men, of a deeper, more swarthy tint, darker hair, darker eyes, and a different cast of features.

The Romans brought to this country the blood of Italy, Spain and Gaul; of Germany and Dalmatia; the proportion of the latter races being probably greatest in the decline of the Western empire. In their descendants we can only hope to distinguish two groups; one collecting itself round the Gallo-Germanic type, a tall, fair and long-haired race, the other approaching to the more delicate Iberian people, with embrowned skin, and very dark hair and eyes. Such a colonization of Britain could not materially alter the original aspect of the people, except by increasing the admixture and diminishing the peculiarities of the several varieties.

The British race presented to Tacitus three varieties; one,

\* "(Germanis) omnibus truces et cærulei oculi; rutilæ comæ; magna corpora."—*De Mor. Germ.*

derived from Gaul, occupied the southern and south-eastern coasts; one, allied to Germany, formed the Caledonian people; and the third, exemplified by the Silurian\*, was compared to the Iberians, and believed to be their descendants. The localities of these tribes are clearly marked, but we are not compelled to suppose them strictly confined to these localities; doubtless they were much intermingled, as in later times, in the same regions, similar races have been. There is no word in history which defines the relation of the Brigantes to the three types of Tacitus, and there is no doubt all Britain spoke the same language.

If, without regard to any real or supposed evidence of their national origin, we attempt to class the actual population of Yorkshire in natural groups, we shall find, excluding Irish and some Craven colonists, three main types frequently distinct, but as often confused by interchange of elementary features.

1. Tall, large-boned, muscular persons; visage long, angular; complexion fair, or florid; eyes blue or gray; hair light, brown, or reddish. Such persons in all parts of the country form a considerable part of the population. In the North Riding, from the eastern coast to the western mountains, they are plentiful. Blue-eyed families prevail very much about Lincoln.

2. Person robust; visage oval, full, and rounded; nose often slightly aquiline; complexion somewhat embrowned, florid; eyes brown, or gray; hair brown, or reddish. In the West Riding, especially in the elevated districts, very powerful men have these characters.

3. Persons of lower stature and smaller proportions; visage short, rounded; complexion embrowned; eyes very dark, elongated; hair very dark. (Such eyes and hair are commonly called black.) Individuals having these characters occur in the lower grounds of Yorkshire, as in the Valley of the Aire below Leeds, in the Vale of the Derwent, and the level regions south of York.

\* "Silurum colorati vultus, et torti plerumque crines, et posita contra Hispania, Iberos veteres trajecisse, easque sedes occupasse, fidem faciunt."  
—*Vit. Agric.*

They are still more frequent in Nottinghamshire and Leicestershire, and may be said to abound amidst the true Anglians of Norfolk and Suffolk. The physical characters here traced cannot be, as Dr. Prichard conjectures in a parallel case in Germany, the effect of some centuries of residence in towns, for they are spread like an epidemic among the rural and secluded population as much as among the dwellers in towns. Unless we suppose such varieties of appearance to spring up among the blue-eyed races, we must regard them as a legacy from the Roman colonists and the older Britains, amongst whom, as already stated, the Iberian element was conjecturally admitted.

Adopting this latter view, there is no difficulty in regard to the other groups. They are of North German and Scandinavian origin, and the men of Yorkshire inherit the physical organization, and retain many of the peculiarities of language of their adventurous sires. In the words employed, in the vowel sounds, the elisions, and the construction of sentences, the Yorkshire dialects offer interesting analogies to the old English of Shakespeare and Chaucer, the Anglo-Saxon of the Chronicle, and the Norse, as it is preserved to us by the Icelanders.

I subjoin a few descriptive words common in East Yorkshire, with the English meaning:—

Beck .....	A brook.
Bank .....	A hill.
Brant.....	Applied to a steep hill.
Brig .....	A prominent ledge of rocks on the coast. (In its ordinary sense it is a bridge.)
Breaa.....	Bank of a river. (Brae.)
Barf .....	Detached low ridge or hill.
Birk .....	The Birch tree.
Bugh* ( <i>pron.</i> Buf)	A bough.
Cam .....	The top of a hedge bank.
Clarty .....	Dirty.
Cliff .....	Perpendicular rock.
Cöble.....	A boat.
Cobbles.....	Pebbles.

\* This mode of pronouncing the terminal *gh* is employed in many words.

Croft . . . . .	Enclosed field.
Dale . . . . .	Valley.
Dike . . . . .	Ditch—also Wall or Mound.
Foss—Force . . . . .	Waterfall
Griff . . . . .	Narrow rugged valley.
Grip . . . . .	Drain or narrow channel.
Holm . . . . .	Island in a marshy district.
Hough ( <i>pron.</i> Hauf)	Detached hill=Barf.
How . . . . .	Small round hill.
Holl . . . . .	Deep or narrow valley.
Keld . . . . .	Spring.
Kirk . . . . .	Church.
Knoll. . . . .	Hill-top.
Ling . . . . .	Heath—the plant. (This word, heath, not used.)
Mar . . . . .	Mere or lake.
Marish . . . . .	Marsh.
Moor . . . . .	A hill. (In other districts it is applied to flat peaty grounds.)
Nab . . . . .	End of a hill.
Ness . . . . .	Prominent part of the coast, or conspicuous point of a hill.
Plugh ( <i>pron.</i> Pluf.)	Plough.
Peak . . . . .	Summit of a sea-cliff.
Roak—Reek. . . . .	Smoke.
Scrogs . . . . .	Shrubs.
Scar . . . . .	Very rarely used for a perpendicular cliff; less rarely for a flat rocky shore below a cliff.
Swang . . . . .	Marsh
Strand . . . . .	Sea-coast.
Syke . . . . .	Slow or boggy brook.
Thwaite. . . . .	Single house or small hamlet.
Thorp . . . . .	Farm-house or small hamlet.
Wath. . . . .	A ford (Latin Vadum).
Warp. . . . .	Sediment from rivers.
Well . . . . .	A spring.
Wyke . . . . .	Hollow of the sea-coast; small bay.
Whin. . . . .	Furze or Gorse ( <i>Ulex Europæus</i> ); also a hard stone.
Wold . . . . .	Wold, or open hilly surface.
Yak . . . . .	Oak.

The words Down, Fell, Fen, and Heath, so common elsewhere, are not used in this district.

Among the descriptive words used in the west which scarcely occur in the east, we may enumerate—

Man. . . . .	A conspicuous heap of stones.
Fell . . . . .	High ground.

Tarn.....	A lake.
Moss .....	A peaty surface on a mountain.
Edge .....	Abrupt margin of a hill.
Cleugh.....	A narrow rocky glen.
Water .....	A lake.
Gill .....	A narrow valley.
Scar.....	A precipitous rock.

The word 'ask,' or 'hash' (harsh), signifying dryness, I have only heard in Craven.

Investigations of this kind must not be limited to Yorkshire, for even our dialectic peculiarities spread southward into Derbyshire, westward into Cumberland, and northward to the foot of the Grampians. Though several dialects, or varieties of dialects, exist in Yorkshire, they appear not so different from each other when heard, as when looked at in the disguise of arbitrary spelling.

To enter fully on this subject is not within the scope of this work; nor would it be respectful to do so in the presence of the eminent scholars who have already undertaken it. To the works of Dr. Latham, in particular, the reader may be safely referred as to a treasure of curious thought and research obtained from the yet unexhausted mine of the English language\*.

Here then I pause;—not without hope that many will follow my steps, or strike out new paths among the works of ancient man and the monuments of primæval nature, and gather, as I have done, a thousand pleasant memories from the Rivers, Mountains, and Sea Coast of Yorkshire.

\* 'The English Language,' &c. 'The Germania of Tacitus,' a recent work of this author, may be read with advantage in connexion with Anglo-Saxon history.

# APPENDIX.

## HEIGHTS OF THE MOUNTAINS OF YORKSHIRE\*.

### PART I.

#### CONTAINING THE WESTERN MOUNTAINS.

These mountains (with a few exceptions) are composed of a basis of limestone (*scar limestone*), surmounted by a series of shales, limestones, coal, and sandstones, of which the rock, called *millstone grit*, forms a conspicuous feature.

Authorities.—O.S. Col. Mudge, in the Ordnance Survey of Great Britain. N. Mr. Nixon, in various Papers in the Philosophical Journals. P. Professor Phillips, in his Geology of the Mountain Limestone District. F. Mr. Fowler, in his Map of Yorkshire. G. Mr. Gray.

	HEIGHT. Feet.
Mickle Fell, North-riding, N.W. angle of Yorkshire, P. & G. 2581 . . . . .	} P. 2600
Wherside, West-riding, north of Ingleton . . . . .	{ N. 2414 O.S. 2384
Ingleborough, West-riding, near Ingleton . . . . .	{ N. 2384 O.S. 2361
Shunnor Fell, North-riding, head of Swaledale and Wensleydale . . . . .	{ N. 2351 O.S. 2329
Hugh Seat, North-riding, boundary of Westmoreland and Swaledale, north of Pillar . . . . .	N. 2330

\* Originally compiled in 1836, by my friend Mr. Gray, and inserted in this work, with additions, by his permission. The 'contouring' of the six-inch Ordnance Maps of the county will supply more detailed information.



	HEIGHT. Feet.
Great Whernside, Kettlewelldale . . . . .	N. 2310 O.S. 2263
West Settronside, Buckden Pike, or Buckden Gavel, called also by Col. Mudge, Carnfell, West and North ridings, north side of Kettlewelldale . . . . .	N. 2304 O.S. 2245
Penyghent, West-riding, Ribblesdale . . . . .	N. 2281 O.S. 2270
Pillar, North-riding, head of the rivers Ure and Eden . . . . .	N. 2261
Colm, or Dent Crag, West-riding, south of Dent; York- shire, Westmoreland, and Lancashire . . . . .	N. 2253
Swarth Fell, West-riding, Wensleydale . . . . .	N. 2237
Foxhope Fell, West-riding, near Penyghent . . . . .	N. 2232
Bowfell, Barfell, or Bawfell, West-riding, between Wens- leydale and Lunedale . . . . .	N. 2226
The Calf, West-riding, near Sedbergh, in Hougill Fells ( <i>Lower Silurian</i> , Murch., <i>Upper Cambrian</i> , Sedgw.)	N. 2220 O.S. 2188
Lovely Seat, North-riding, Wensleydale, N. of Hawes . . . . .	N. 2216
Rogans Seat, North-riding, south of Water Crag . . . . .	N. 2207
Knoutberry Hill, or Widdale Fell Top, West and North ridings, head of Dentdale . . . . .	N. 2205
Water Crag, North-riding, Swaledale . . . . .	N. 2192 O.S. 2186
Fountains Fell, North-riding, north-east of Settle . . . . .	N. 2190
The Sayls, North-riding, head of Wensleydale . . . . .	N. 2190
Dod Fell, North-riding, Wensleydale, 4 m. S.W. of Hawes . . . . .	N. 2189
Nine Standards, North-riding, head of Swaledale (York- shire and Westmoreland) . . . . .	N. 2153 O.S. 2136
Simon Fell, part of Ingleborough . . . . .	N. 2125
Yokenthwaite Moor . . . . .	N. 2114
Graygarth, West-riding, near Ingleton (Yorkshire and Lancashire) . . . . .	N. 2060
Coska Moor, West-riding, east of Penyghent . . . . .	N. 2050
Kettlewell Cam, West-riding, Kettlewelldale, south of Set- tronside . . . . .	N. 2047
Bears Head, North-riding, Wensleydale, near Simmerwater . . . . .	N. 2019
Birken . . . . .	N. 2000
Deepdale Moor, North and West ridings, north side of Kettlewelldale . . . . .	N. 1999
Buckden Birks, north side of Littondale . . . . .	N. 1999

	HEIGHT. Feet.
Raisegill Hag, West-riding, north side of Littondale . . . .	N. 1987
Little Whernside, North and West ridings, head of Nid- derdale . . . . .	N. 1985
Low Birks, West-riding, north side of Littondale . . . . .	N. 1949
Cash Knot, West-riding, north of Penyghent . . . . .	N. 1936
Starbotton Birks, West-riding, north side of Littondale ..	N. 1936
Cam Fell, North and West ridings, between Wharfedale, Ribblesdale, and Wensleydale ( <i>limestone top</i> ) . . . . .	N. 1926
Bakestone Edge, North-riding, north-west of Askrigg. . . .	N. 1923
Ten End, North-riding, Wensleydale, south-west of Hawes	N. 1919
Brownhaw, North-riding, Coverdale . . . . .	N. 1909
Greenside, West-riding, head of Simmerdale . . . . .	N. 1903
Brownsey, or Brownseat, North-riding, four miles north- east of Muker . . . . .	N. 1896
Mewpha, West-riding, between Pateley and Kettlewell ..	N. 1891
Wasset Fell, North-riding, Bishopdale . . . . .	N. 1876
East Stonesdale Moor, North-riding, Muker . . . . .	N. 1866
Blake Hill, North-riding, two miles north of Muker . . . .	N. 1864
Holme Moss, West-riding, near Penistone (Yorkshire and Cheshire) . . . . .	O.S. 1859
Pickington Ridge, North-riding, north-east of Askrigg ..	N. 1855
Stake Fell, North-riding, five miles S. of Askrigg . . . . .	N. 1843
Whawfell, or Woefell, West-riding, head of Dentdale . . . .	N. 1833
Rysell, West-riding, between Dent and Garsdale . . . . .	N. 1823
The Hoove, North-riding, north of Arkendale . . . . .	N. 1823
Penhill, North-riding, entrance of Wensleydale . . . . .	N. 1817
High Fleak, North-riding, north of Askrigg . . . . .	N. 1809
Kirby Moor, West-riding, north of Ryeloaf . . . . .	P. 1800
Tail Briggs, four miles south-east of Kirkby-Stephen (York- shire and Westmoreland) . . . . .	N. 1799
Ryeloaf, West-riding, east of Settle . . . . .	N. 1796
Great Haw, North and West ridings, between Coverdale and Nidderdale . . . . .	N. 1786
Snays Fell, North and West ridings, north-west of Cam Fell . . . . .	N. 1782
Gibbon Hill, North-riding, north-west of Bolton Castle (Wensleydale) . . . . .	N. 1781
Satron Hangers, North-riding, south-east of Muker. . . . .	N. 1776
Flock Rake, West-riding, six miles west of Kilnsey . . . . .	N. 1768

	HEIGHT. Feet.
Harlen Fell, North-riding, south of Penhill . . . . .	N. 1765
The Pass between Muker and Hawes, North-riding . . . . .	P. 1760
Hard Flask, near Malham Tarn . . . . .	N. 1746
Boulsworth Hill, West-riding, near Colne, borders of } Lancashire . . . . .	N. 1697 O.S. 1689
The Pass between Muker and Askrigg, North-riding . . . . .	P. 1694
Dod End, North-riding, Muker . . . . .	N. 1683
Grinton Grits, North-riding, north of Bolton Castle . . . . .	N. 1678
Penhill Beacon, North-riding . . . . .	N. 1675
Blaedyke Moss, West-riding, head of Littondale . . . . .	N. 1671
Barden Fell West, West-riding, near Bolton Abbey . . . . .	N. 1663
Cam Rakes, West-riding, north of Penyghent . . . . .	N. 1652
Keason Mount, north of Muker . . . . .	N. 1639
Cover Head, or Park Head, North and West ridings, the pass between Coverdale and Wharfedale . . . . .	N. 1608
Calvey, North-riding, north-west of Reeth . . . . .	N. 1600
Simon Seat, West-riding, near Bolton Abbey . . . . .	N. 1593
Simon Seat East, or Lord's Seat, West-riding, near Bolton Abbey . . . . .	N. 1585
Blea Moor, West-riding, head of Dentdale . . . . .	N. 1578
Addleborough, North-riding, near Simmerwater . . . . .	N. 1565
Harker Fell . . . . .	N. 1531
Rover Crag, east side of Coverdale . . . . .	N. 1527
Great Close Hill . . . . .	N. 1525
Poxstones Moor, West-riding, between Pateley and Bolton	N. 1517
Dubcote Ridge, two miles south-east of Horton Bridge ..	N. 1511
Burnsall Fell, West-riding, near Bolton Abbey . . . . .	N. 1505
Blackstone Edge, Reservoir of the Rochdale Canal . . . . .	1500
Wigstones, West-riding, five miles north-west of Pateley Bridge . . . . .	N. 1497
Caldron Snout Bridge, North-riding, over the Tees, north- west angle of Yorkshire ( <i>basalt</i> ) . . . . .	P. 1489
Kilnsey Moor, Wharfedale, West-riding . . . . .	N. 1475
Carncliffe, or Barden Fell East, West-riding, near Bolton Abbey . . . . .	N. 1471
Stainmoor, North-riding, summit of road . . . . .	P. 1448
Greenhow Hill, West-riding, west of Pateley Bridge . . . . .	N. 1441
Holgate Pasture, North-riding, near Marsk, Swaledale ..	N. 1433
Robincross Hill, North-riding, south of Marrick . . . . .	N. 1407

	HEIGHT. Feet.
Moughton Fell, West-riding, near Clapham ( <i>limestone on grauwacke slate</i> ) .....	N. 1404
Caldbergh Moor, North-riding, Coverdale.....	N. 1369
Crock Rise, West-riding .....	N. 1364
Goldsborough, North-riding, five miles north-west of Bowes	P. 1360
Brown Hill, east of Malham .....	N. 1360
Whitfield Hill, North-riding, north of Leyburn .....	N. 1350
Bordley Limestone Hill, West-riding, east of Malham Tarn	N. 1346
Middleton Moor, West-riding .....	N. 1336
Gaisegill, West-riding, summit of Blueber Fell, near Bolton Abbey.....	N. 1332
High Crag, near Greenhow Hill .....	P. 1325
Rumeleymoore, West-riding, near Ilkley .....	N. 1322
	{ O.S. 1308
Roggan Hall, West-riding, near Bolton Abbey.....	N. 1318
Beamsley Rock, West-riding, near Bolton Abbey.....	N. 1314
Newby Head Pass, between Hawes and Ingleton.....	P. 1300
Beamsley Beacon, West-riding, near Bolton Abbey.....	N. 1286
Nursa Knot, West-riding, five miles west of Pateley Bridge	N. 1274
Wharf Head, West-riding .....	N. 1273
Pinnow Pike, West-riding, four miles south-west of Skipton	N. 1270
Stainmoor Inn, North-riding .....	P. 1262
Bordley Grit Hill, West-riding, east of Malham Tarn....	N. 1252
Cowper Cross, West-riding, part of Rumeleymoore.....	N. 1250
Bradhope, West-riding, near Ilkley .....	N. 1248
Bradfield Point, West-riding, north-west of Sheffield ....	O.S. 1246
Malham Tarn, West-riding .....	N. 1243
Shode Bank Hill, West-riding, east of Skipton.....	N. 1223
Embsay Crag, West-riding, north of Skipton .....	N. 1221
Hell Gill Lund, North-riding, pass into Westmoreland from Wensleydale .....	P. 1210
Hunts Cross Hill, near Ingleton .....	N. 1174
Halton East, West-riding .....	N. 1170
Lartington Moor.....	P. 1165
Sutton Crag, West-riding, near Glusburn.....	N. 1161
Flasby Fell, West-riding, north-west of Skipton .....	N. 1151
Clayton Heights, West-riding, south-west of Bradford ( <i>coal- measures</i> ) .....	F. 1094
High-edge .....	N. 1078

	HEIGHT. Feet.
Draughton Moor, West-riding, south-west of Bolton Abbey	N. 1074
Gearstones Inn, West-riding, between Ingleton and Hawes	N. 1052
Lund's Thorn, North and West ridings, pass from Garsdale into Wensleydale .....	P. 1050
Stankfell, West-riding, near Bolton Abbey .....	N. 1003
Guisecliffe (Pateley Bridge) .....	P. 1000
Brimham Crags, West-riding, near Pateley Bridge .....	N. 990
Jack Hill, West-riding, north of Otley .....	N. 951
The Town of Bowes, North-riding .....	P. 942, P. & G. 968
Reevah Crag, West-riding .....	N. 935
Baldon Common, West-riding, east of Bingley .....	N. 922
Chevin Beacon, West-riding, near Otley .....	N. 921
Dog Park Hill, West-riding, north of Otley .....	N. 893
Boldron Hill, North-riding, near Barnard Castle .....	P. 883
Cow and Calf Rocks, West-riding, near Ilkley .....	N. 860
Richmond Race Ground .....	P. 850
Halton Bank, West-riding, Shooter's Inn .....	N. 849
Little Almes Cliff .....	N. 837
Haw Pike, West-riding, near Bolton Abbey .....	N. 832
Shibden Top, West-riding, near Ilkley .....	N. 831
Todda Hill, West-riding, four miles south-west of Otley ..	N. 809
Billinge, West-riding, near Rawden .....	N. 773
Wiscott Hill .....	N. 721
Wrose Hill, West-riding, three miles north of Bradford ..	N. 747
Great Almes Cliff .....	N. 716
Huddersfield Canal, West-riding, at Marsden .....	646
Adwalton Common .....	641
Cookridge .....	639
Mickle How Hill, West-riding, near Fountains Abbey ( <i>glacial drift on magnesian limestone</i> ) .....	N. 622
Harley Hill, Harrogate .....	N. 596
Bradford Moor, West-riding ( <i>coal-measures</i> ) .....	F. 595
Burntcliff Thorn .....	F. 570
Hartshead Moor, West-riding ( <i>coal-measures</i> ) .....	F. 537
Quarry Gap, West-riding ( <i>coal-measures</i> ) .....	P. 510
Rochdale Canal, summit level near Todmorden .....	421
Clifton Beacon, West-riding, near Rotherham ( <i>magnesian limestone</i> ) .....	O.S. 417
Ledston Beacon, West-riding ( <i>magnesian limestone</i> ) ....	O.S. 278

HEIGHT.  
Feet.*In Teesdale :—*

The Weel .....	P. 1489
High Force .....	P. 1000
Junction of Lune .....	P. 700
River at Barnard Castle .....	P. & G. 454

*In Gretadale :—*

The Source .....	P. 1400
Junction with Tees .....	P. 380

*In Swaledale :—*

Swaledale Head .....	P. 1700
Muker .....	P. 850
Marsk near Richmond .....	P. 545
River at Richmond .....	P. 300
Catterick Inn .....	P. 180

*In Wensleydale :—*

Hellgill Lund .....	P. 1210
Lund's Thorn .....	P. 1050
Hawes Inn .....	P. 820
River at Hawes .....	P. 770
Askrigg Inn .....	P. 760
Bainbridge .....	P. 700
Middleham Cross .....	P. 489
Wensley Bridge .....	P. 400
East Witton Church .....	P. 405
Masham Inn .....	P. 339
River at Masham .....	P. 250

*In Nidderdale :—*

Angram Ford .....	P. 850
Govden Pothole .....	P. 640
Lofthouse Bridge .....	P. 540
Pateley Bridge .....	P. 400
Ripley .....	P. 240

HEIGHT.  
Feet.

*In Wharfedale:—*

The Source, called Wharfehead .....	P. 1264, N. 1273
Deepdale Bridge .....	P. 900
Hubberholm Bridge .....	P. 767
Buckden Bridge .....	P. 732
Kettlewell Bridge .....	P. 669
Kilnsey Inn .....	P. 618
Ilkley Wells .....	N. 689
Linton Bridge .....	P. 538
Bolton Bridge .....	P. 358
Otley .....	P. 223
Harewood Bridge .....	P. 98

*In Airedale:—*

Malham Water .....	P. 1250
Malham Cove foot .....	P. 680
Skipton, about .....	P. 380

*In Ribblesdale:—*

Ribblehead .....	P. 1000
Horton Bridge .....	P. 750
Settle Bridge .....	P. 440

## PART II.

## CONTAINING THE HILLS IN EAST YORKSHIRE.

At the date of the preparation of this list, few of the heights in this district had been determined trigonometrically. The authorities used in the following catalogue are—Col. Mudge, in the Ordnance Survey, marked (O.S.). Barometrical measurements by Professor Phillips, in his *Geology of the Yorkshire Coast* and others not previously published (P.). Barometric measurements added by Mr. Gray (G.).

The hills of this district form three classes.—First Class: The Wolds in the East Riding, ranging from Flamborough Head to Hessle, composed of chalk, marked (A.). Second Class: The Tabular Oolitic Hills, in the North Riding, commencing at Filey Brig, and forming a number of bold escarpments from Oliver's Mount to Hambleton End. These are composed of an oolitic limestone (*coralline oolite*), calcareous sandstone (*calcareous grit*), thick blue clay (*Oxford clay*), and shelly sandstone (*Kelloways Rock*); all which are exhibited in the Cliff at Scarborough Castle. (B.)—Third Class: The moorlands in the North Riding, consisting of a series of sandy and argillaceous rocks, containing thin seams of coal and a bed of impure limestone; these rest upon the upper Lias Shale, which in several places is worked for alum. And after passing below the cliffs of Hambleton, these rocks reappear in the range by Brandsby, Terrington, &c. (C.)

	HEIGHT. Feet.
Burton, or Botton Head, above Ingleby Greenhow, C. . .	O.S. 1485
Cranimoor, C. . . . .	G. 1423
Farndale Head, C. . . . .	G. 1412
Loosehoe Moor, near Rosedale Head, C. . . . .	O.S. 1404
The Two Hows, between Bransdale and Farndale, C. . .	G. 1380
Howdale Head, C. . . . .	G. 1346
Carlton Bank, C. . . . .	G. 1325
Cold Moor, C. . . . .	G. 1314
Wainstones, West of Burton Head, C. . . . .	P. 1300
Hambleton End, B. . . . .	G. 1300
Black Hambleton, above Kepwick, B. . . . .	O.S. 1246
Limekiln House, on Hambleton, B. . . . .	G. 1148
Boltby Scar, B. . . . .	G. 1105

T



	HEIGHT. Feet.
Hambleton Down, Whitestonecliff, B. . . . .	G. 1078
Easterside, B. . . . .	G. 1035
Rosebury Topping, near Stokesley, C. . . . .	O.S. 1022
N.B. There is reason to suppose this hill to be 30 or 40 feet higher.	
Lilhow Cross, near Saltergate Inn, C. . . . .	P. 1000
Danby Beacon, north of Eskdale, C. . . . .	O.S. 966
Oldstead Bank, B. . . . .	G. 954
Wass Bank, B. . . . .	G. 870, P. 900
Boon Hill, B. . . . .	G. 860
Three Hows, north of Cloughton, C. . . . .	P. 820
Wilton Beacon, or Garraby Hill, A. . . . .	O.S. 805
Stow Brow, near Robin Hood's Bay, C. . . . .	P. 800
Barnaby Moor, or Eston Nab, near Guisbrough, C. . . . .	O.S. 784
Acklam Wold, A. . . . .	G. 739
Bason How, near Snainton, B. . . . .	P. 686
Easington Heights, near Boulby Alum-works, C. . . . .	O.S. 681
Rockcliff, C. . . . .	P. 666
Flask Inn, between Whitby and Scarborough, C. . . . .	P. 660
Peak Cliff, Robin Hood's Bay, C. . . . .	P. 605
Burleigh, or Birdley Moor, near Guisbrough, C. . . . .	O.S. 553
Hunsley Beacon, near Cave, A. . . . .	O.S. 531
Highest point of road from York to Gilling, C. . . . .	P. 520
Oliver's Mount, near Scarborough, B. . . . .	P. 510
Brandsby High Wood, C. . . . .	P. 506
Scalby Nab, near Scarborough, B. . . . .	P. 490
Speeton Cliff, near Filey, A. . . . .	P. 450
Craike Hill, C. . . . .	G. 400
Scarborough Castle Cliff, B. . . . .	P. 305
Gristhorpe Cliff, near Scarborough, B. . . . .	P. 295
Flamborough Head, base of Lighthouse, A. . . . .	P. 159
Dimlington ( <i>a clay and gravel hill</i> ), highest ground in Holderness. . . . .	P. 159

*Formation of Stalagmite.*

Mr. J. W. Farrer has fulfilled the expectation which is expressed in reference to the growth of the stalagmite in Ingleborough Cave, by collecting three more examples of the water which falls on the 'Jockey Cap':—

1. On the 7th Jan. 1852, a pint was filled by the drops in twelve minutes. The rain which fell in five weeks previous amounted to 1·50 inch. The solid matter left on evaporation weighed 3 grains.

2. On 7th April, 1852, a pint was filled by the drops in forty-five minutes. The rain which fell in five weeks previous amounted to 0·13 inch. The solid matter left on evaporation weighed 2 grains.

3. On the 3rd July a pint was filled by the drops in twenty-five minutes. The rain which fell in five weeks previous amounted to 4·46 inches. The solid matter left on evaporation weighed 2·2 grains.—*Page 35.*

*Quality of Water.*

The quality of river water in Yorkshire is known only by few published analyses. In a very useful tract published by my friend Mr. Joseph Spence in 1843, the results of his analysis are given for the water of the Ouse at Lendal Tower, York, and for eleven of the springs in and near the city. The contents of the river water are thus stated:—

*Solid contents in one gallon.*

	Grains.
Carbonate of lime .....	3·12
"    of magnesia .....	1·20
"    of iron .....	0·04
Sulphate of lime .....	2·00
"    of magnesia .....	0·70
Muriate of soda .....	0·90
"    of potash .....	0·12
Silica .....	0·02
	<hr style="width: 100%; border: 0; border-top: 1px solid black; margin: 0;"/> 8·10

The gases yielded by one gallon were, in cubic inches, carbonic acid 1·9, oxygen 1·6, nitrogen 6·9.

The springs in York contain from three to fifteen times as great a

proportion of salts, and among them are nitrates of lime, soda, and magnesia. The gaseous contents were from two to three times as great as in the river; the difference being greatest in the quantity of carbonic acid gas.

I am indebted to Mr. W. Chadwick for the following comparative results on three cases in Wharfedale. The examination was conducted by the late Mr. W. West, of Leeds. The results are stated in grains per gallon.

I. The river Wharfe, at Burnsall.

II. Sand Beck which descends from the gritstone of Burnsall Fell.

III. Hebden Beck, taken near its junction with the Wharfe, on a day when the washing of the Grassington lead-mines ran into the beck nearer to its source.

	I.	II.	III.
Carbonate of lime .....	7·90	2·7	3·3
Sulphate of lime .....	...	...	1·5
Chloride of magnesium.....	1·0	1·3	1·7
Carbonate of soda.....	8·1	...	2·0
Organic matter (vegetable) .....	trace.	trace.	3·5
Iron .....	trace.	trace.	...
Total in the gallon .....	12·0	4·0	12·0

—Page 42.

*The Nymph Elaina.*

To adore springs and rivers was a part of the old world's worship. Thus Achilles, fated never to return to his 'beloved native land,' places in the hand of dead Patroclus the lock of hair which Peleus had vowed to cut off at the fountains of Sperchius, in the sacred enclosure, by the sacrificial altars, on the safe return of his son (Il. xxiii. 144); and Æneas, arrived in Latium, invokes the 'genius of the place, Earth, Nymphs, and the yet unknown rivers.'—(Æn. vii. 136.)

The association of altar, spring and grove, appears again in the beautiful sketch of the Grecian assembly at Aulis, when the chiefs took upon them the engagement to conquer Troy (Il. ii. 305).

Ἡμεῖς δ' ἀμφὶ περὶ κρήνην ἱεροῦς κατὰ βωμοῦς  
 Ἐρδομεν ἀθανάτοισι τελέησσας ἑκατόμβας,  
 Καλῇ ὑπὸ πλατανίστῳ, ὅθεν ῥέειν ἀγλαὴν ὕδωρ.—

Such a scene of broad cool shadows over a sparkling rivulet, rushing from its full source among rocky hills, may often delight the wanderer in the North Riding of Yorkshire.—Page 48.

*The Circle of Stones.*

Of a deliberate assembly Homer says, ‘the seniors sate on polished stones; in the sacred circle.’

..... οἱ δὲ γέροντες  
 Εἶτα' ἐπὶ ξεστοῖσι λίθοις, ἱερῶ' ἐνὶ κύκλῳ'  
 IL. Σ. 503.

And of a hurried consultation, before supper, ‘standing the conference was opened, none daring to sit.’

‘Ορθῶν δ' ἐσταότων ἀγορῇ γένετ', οὐδὲ τις ἔτλη  
 Ἔσεσθαι' IL. Σ. 246.

—Page 64.

*The Milliard Stone.*

The Stone bearing this Inscription has been lately figured again by Mr. H. E. Smith, in his valuable work entitled ‘Reliquiæ Isurianæ’ (Pl. xxi. fig. 5). According to that representation, the Inscription appears thus:—

IMP C  
 AESCME  
 S Z I V S  
 Q O E C P  
 T R A P O  
 X L I C I  
 A V G  
 XX C  
 S

and should be read—

Imp. Cæs. C. Messius. Q. Decio, Tra. Pio Felici Aug. XX. C. S. It seems, however, doubtful if the letters in the 4th line can be read Q. Decio, and if the numeral XX be correctly given, the meaning of C. S. remains unsettled. Mr. Smith supposes the stone to have stood twenty miles on the military way from Calcaria to Isurium.—Page 69.

*Brimham Rocks.*

Brimham Rocks, elevated nearly 600 feet above the Nidd, and 990 feet above the sea, stand nearly opposite to the dome of Greenhow Hill, and the precipitous edge of Guisecliff, and offer to the artist a wonderful variety of gigantic crags, cleft by convulsion, and wasted by the atmosphere. Immense solitary pillars—groups of enormous fragments—one huge stone loose and moveable on another—stand out conspicuous on a rugged surface, richly covered with heath, and startle the most incurious eye with innumerable picturesque combinations. For the geologist these vast rocks have the solemn charm with which archæology invests the ruins of human art; these are Nature's ruins, destined from day to day to suffer still greater decay. Man may have somewhat modified their forms; here he may have excavated, and there he may have balanced the loose block into a rocking stone; but for the most part thousands of years of atmospheric vicissitude have been the sculptors of the romantic scenes of Brimham, and under the same agency other forms will appear in later times. And while the summits of our barren hills are slowly wasting away, the materials thus obtained are transported by the rivers and accumulated at some distant point, to constitute new land in a more favourable region. (See Pl. XIV.)—Page 71.

*Roman Villas at York.*

The most fashionable part of the suburbs was on the west side of the river, on the road to Calcaria. In this quarter several pavements in mosaic have been found at different times. One of the most elegant is preserved only by an accurate drawing of Fowler—the object was slowly destroyed in a stable.

And now (1853) other excavations in the same line near the Railway Station have brought to light two adjacent pavements in mosaic: one, 13 ft. by 13 ft. 6 in., contains four angle compartments representing the Four Seasons, the central ornament being Medusa: beneath it were Roman urns and pottery. The other pavement filled a larger apartment (18 ft.), and was formed of larger tesserae, in a different style: its central portion had been removed. Close to these rooms was a bath, not far off a well, formed of coarse gritstone cut to a cylindrical sweep. The fine pavements noticed above are now in the Yorkshire Museum.—Page 76.

*Waterspout of Starbottom.*

“ In 1686, by a tempest, with thunder, the inhabitants of Kettlewell and Starbottom were almost all drowned with a violent flood. These towns are situate under a great hill, from whence the rain descended with such violence for an hour and a half together, the hill on the side opening, and casting up water into the air to the height of an ordinary church-steeple, that it demolished several houses, and carried away the stones entirely; filled them with gravel to the chamber-windows, drove the inhabitants away, filled the meadows with stones and gravel, &c.”—*Whitaker's Craven*. The original notice is in the *Phil. Trans.*, No. 245, p. 306.—*Page 80.*

*St. Helen's Ford.*

Here, on the north side of the river, was a Chapel dedicated to St. Helen, near a spring once believed to have healing qualities. Removed from the river only a few hundred yards to the south, and east of Rudgate, was a small Roman Camp, still preserved to memory by the name of Langbrough, repeated in several of the neighbouring fields. Many Roman coins have been found hereabout.—*Page 83.*

*The River Went.*

This is in truth, as its name implies, a ‘fair’ water, especially where it winds and sparkles along the narrow glen which divides the magnesian limestone between Went Bridge and Smeaton. About Went-bridge are scenes at once bold and beautiful, and toward Smeaton rude precipices stand out from the woods and pastures, and justify the local name of ‘Smeaton Crag’—among which Dr. Lankester, as well as myself, has passed many pleasant hours! Went flows to the Dun through flat marshland, and peaty moors full of buried oak-trees. Antlers of the Red-deer accompany them.—*Page 103.*

*Ravenser.*

The name is supposed by Thompson, the author of ‘*Ocellum Promontorium*,’ to be derived from the Danish Standard *the Raven*; Worsaae regards the name (*Ravens-ora*) as of northern origin, and

mentions a tradition of the Northmen that the shattered remains of the army of Haradrada re-embarked at this port. But may we not conjecture that 'Ar Avon,' the Cymraic *on the river*, lurks in the first part of this word, as in the Ravana of the Chorography, and that 'burg' implying its importance was an Anglian addition, while 'spurne,' the latest determinative, indicated the beacon which was the precursor of the modern lighthouse? The termination 'od' is supposed by Thompson to be the Dutch 'oed,' 'ode,' 'od'—deserted. The combination Ravensrode, rather suggests the idea of a Cross.

This Port had several names, or rather there were perhaps two neighbouring landings, one called Ravenser, Ravensere, and Ald Ravenser—the other, Odd near Ravenser, Ravenserot, Ravenserodd, Ravensroad, Ravensrodd (Ed. III.), Ravenscrosbourne (H. IV.), Ravensrode (Ed. III.). This last place seems to have been an island, thrown up by the sea in the time of Henry III. In 1240 'Odd near Ravenser' was given to the Monks of Meaux—for curing of herrings and other fish—in 1251, the Manor, Market-place and fair of Ravenserot were granted to William De Fortibus, Earl of Albemarle—in 1273 the chapel of Ravenserod was a subject of dispute between Kilnsea (in which Ravenser was situated) and Easington, and was adjudged to belong to the latter. In 1285 the merchants of Ravensroad had confirmed to them the privilege of supplying good bread and good beer, according to the assize then established. In 1289 Ravensrode is called an island.

In 25 Edw. I., 1296, 'Kaiage' was granted to the inhabitants of Ravensere. In 1298 Hull and Ravenser presented petitions to Edw. I. for privileges, the former offering the gift of 100 marks, the latter of 300.

In 1300, K. Edw. I. gave lands in Ravenserodde to the convent of Thornton in Lincolnshire; and other lands in the same place to the Hospital of St. Leonard at York; the Prioress of Swine also paid six marks for leave to enter into possession of property there. In 1300 the magistrates of Ravensere were enjoined to stop the export of bullion. In the 33rd Edw. I. (1305), Ravenser and Hedon sent members to the Parliament; this privilege was continued in the case of Ravenser in the 20th of Edw. II. (1326) and 2 Edw. III.

In 1310 (3 Edw. II.) the men of Ravensere remonstrated against the depredations of the subjects of the Earl of Holland. In the same year Ravensness, with Grimsby and Hull, contributed ships for Edw.

II.'s expedition to Scotland. In 1312, the inhabitants of Ravensere were empowered to raise a tax for defending their sea-walls.

In 1315, the burgesses of Ravenserod agreed to pay the king £50 for the confirmation of their Charters and 'Kaiage' for seven years.

In 1321 (15 Ed. II.), Les Borgees de les Villes de Ravenserod et Grimmesbi, q<sup>e</sup> sont Portz sur la mer, &c. (Rot. Parl. 405 a).

In 1323, Commissions were issued for the Wapentak of Ravensere.

In 1326, the king granted the dues and customs in the Ports of Kingston-upon-Hull and Ravenserod.

In 1330, the citizens of York complain of 'plusurs gentz de Hull q̄ vil est appelle Kyngeston, et de Ravenser, et des autres villes,' who claim exemption from toll. (Rot. Parl. 51 b.)

1332. Baliol embarked at Ravenspurne or Ravenspurgh, 2500 men, for Scotland.

In 1335 and 1336, the war ships of Ravensere are mentioned, but about this time William De la Pole, the great merchant of Ravensrod, removed to Hull, and all the following notices of the once flourishing port and burgh at the Humber mouth speak of decay. In 1341, Ravensere, and in 1344, Ravensrode sent one representative to a sort of naval parliament of Edw. III. In 1344 both Ravensere and Ravensrod were required to send a man well-versed in naval affairs to advise the king. In 1346 Ravenser and York sent one ship each to the siege of Calais, while Hull supplied 16 ships, and Grimsby 11.

In 1361, overwhelming floods drove away the merchants, and in 1390, according to the Book of Meaux, nearly all traces of Ravensrod were lost. See Frost's 'Early Notices of Hull.'—Page 119.

### *Waste of the Coast.*

The waste of land on the coast of Holderness must, unfortunately, be a subject of permanent interest to the residents. The following documents will place in a clear light the importance of this unresisted encroachment of the sea :—

Data for ascertaining the progress of destruction along the Yorkshire coast, viz. from Bridlington to the Spurn, an extent of about forty miles, by careful measurements, taken first by John Tuke, A.D. 1786, and afterwards by the Rev. Jos. Hatfield, A.D. 1832 and 1833.



*Distances from the following Objects to the nearest descents  
in the Cliff.*

A.D.		Yards.
1810.	Wilsthorpe Farm-house near Bridlington. . . . .	221
1833.	Ditto by Mr. Coverly, about . . . . .	180
1786.	Barmston Townend Gate, by Mr. Tuke . . . . .	790
1832.	Site of the above Gate, by Mr. Hatfield . . . . .	745½
1833.	Skipsea Windmill, by ditto . . . . .	1757
1786.	Atwick Cross, by Mr. Tuke, supposed . . . . .	980
1832.	Ditto, measured by Mr. Hatfield and others . . . . .	885
1786.	Chancel of Hornsea Church, by Mr. Tuke . . . . .	1133
1833.	Ditto, by Mr. Hatfield, to the high water-mark . . . . .	1014
1833.	Rowlston Hall, by Mr. Hatfield in September . . . . .	867
1833.	Iron Gate near the Lodge, by ditto. . . . .	556
1832.	Mappleton Church, by ditto . . . . .	507
1764.	Nearest Farm-house to the Sea at Coldon . . . . .	180
1833.	Ditto in September, by Mr. Hatfield . . . . .	90
1786.	Aldbrough Church, by Mr. Tuke . . . . .	2044
1832.	Ditto from the Chancel, by Mr. Hatfield . . . . .	1953
1832.	Beer House near the Sea, by ditto . . . . .	153½
1833.	West end of Ringbrough Farm-house, by ditto . . . . .	305
1833.	House on the site of Grimston old Hall, by ditto. . . . .	325½
1833.	Grimston new Hall, by ditto . . . . .	725
1832.	Tower on Hilston Mount, by ditto . . . . .	1200½
1833.	Middle of the road at Whale Nook, by ditto . . . . .	209
1786.	Tunstal Church, by Mr. Tuke. . . . .	924
1832.	Ditto to Sea, by Mr. Hatfield . . . . .	763
1833.	Middle of the road at Tunstal Nook, by ditto. . . . .	214
1833.	Preventive Watch-house near Sandley Mere, by Mr. Hatfield . . . . .	84
1833.	Main Post of Owthorn Mill, by ditto . . . . .	833
1805.	Steeple of Owthorn Church, 22 yards, A.D. 1814, measured by ditto. . . . .	8
1816.	Owthorne steeple fell A.D. 1833, its site within the cliff	18

A.D.	Yards.
1833. Seathorn Church (now in ruins), by Mr. Hatfield ..	417½
1832. Middle of the road opposite the ruin, by ditto .....	278
1833. Intake Farm-house, west end, by ditto .....	312
1786. Holmpton Church to the cliff, by Mr. Tuke .....	1200
1833. Ditto to the nearest part of the Cliff in Sept., by Mr. H.	1130
1833. Ruins of the old Chapel at Out Newton, by ditto ..	147
1833. Beacon on Dimlington, by ditto .....	48
1833. Chancel of Easington Church, by Mr. H. and Mr. Pears	968
1833. Gate leading out of Kilnsea North Field, by ditto ..	327½
1833. The top of the south end of Kilnsea Sea Bank, by ditto	48
1833. Front wall of the large Farm-house (licensed for di- vine service) .....	58
1833. Old Church-yard Gate to the Edge of the Cliff, Mr. H.	25½
1833. There remained of the ruins of the Steeple in Sept. . .	4
1833. From the said Ruin to the extremity of the Church-yard	25½
1766. The Chancel of Kilnsea Church was about .....	95
1790. Kilnsea Cross, now erected at Headon, was about. . .	50
1833. Its place is supposed to be within the Cliff, about. . .	30
1830. From the middle of the High Light to the extremity .	800
1833. Ditto measured in September by Mr. Hatfield .....	434
1833. From the High Light-house to the Sea eastward . . .	147½
1833. From ditto to the Humber westward, by Mr. Hatfield	114½
1833. Life-boat Inn to the nearest Cliff on the S.E., by ditto	72
1833. From the sea to the Humber, passing the Light-houses	262
1833. The great storm in September swept from the point. .	30
1833. Passing from the High Light towards Kilnsea, the measures of the Long Strand are as follows, viz.—	
At the distance of . . . 990 yards the width is found to be	60½
Ditto at. . . . . 1760 yards .....	51½
Ditto at. . . . . 3124 yards .....	42
Ditto from High Light 3624 yards the breadth is .....	26½
And at the distance . . 3784 yards from High Light about	42
At this distance the two shores greatly diverge.	

N.B. The long sand-bank which separates the sea from the Humber is now more diminished than is remembered by the oldest inhabitants, its average breadth being only 44 yards. In 1817 the extent of ground about the Spurn was found to be 100 acres: in 1833 the quantity remaining was only about 58 acres.

Circumstances indicate that a breach must take place in some part of this barrier within seven years; a breach once opened would rapidly augment, and afford such an increased facility for the ingress of the tides as would greatly alter and improve the navigation of the rivers connected with the Humber.—(Written in 1833.)

“Easington, 5th March, 1831.

“REV. SIR,—In compliance with your request I have carefully surveyed what is called the Ten Chain Field, in Easington, abutting upon the sea, which at the time of the enclosure was set out ten chains from the Cliff; it is better than half a mile long; but I exactly measured off half a mile, and I find 20·77598 acres=20 acres 3 roods 4 perches, which if doubled, you will have 41·55196 acres=41 acres 2 roods 8 perches per mile in 61 years; if divided by 61, you will have ·68118=2 roods 28 perches full, per mile per annum.

“I also find the average distance gained by the sea upon the land, in the above half-mile, to be 127 yards 1·80 foot; and in or during the said 61 years, which, if divided, will leave 6 feet 3 inches and  $\frac{3}{10}$ ths of an inch for each year’s encroachment.

“JOHN FIELD.”

“To the Rev. Christopher Sykes.”

“P.S. I am convinced that the Parish of Kilnsea has lost land in a much greater proportion than Easington; but it is my belief that the Easington loss will be about the general average loss of Holderness all the way to the rocky coast about Bridlington, a distance of 34 or 35 miles from Easington.”

About 1770, in the enclosure of Skipsea, two fields on the Cliff were allotted—

	A.	R.	P.	and	A.	R.	P.
Measurement in 1760..	30	2	30		9	1	38
Measurement in 1827..	23	1	26		6	0	32
Loss by sea. . . .	7	1	4		3	1	6

—Page 122.

WM. GRAY.

The waste of the coast may in future be accurately registered, by comparison with the definite data given by Dr. Bell and Mr. Kemp, in the 'Reports of the British Association' for 1853.

*Temperature.*

The following results of thermometrical observations made at Whitby, by Mr. Belcher, are extracted from manuscripts containing much other information, for the use of which I am indebted to that gentleman.

*Temperature of the air at Whitby, taken daily at 9 A.M., in the four critical months, January, April, July, and October, from 1825 to 1829.*

	1825.	1826.	1827.	1828.	1829.
Jan. ....	35·3	33·0	36·3	35·5	34·6
April ...	47·5	46·0	47·2	46·3	42·2
July .....	60·6	60·8	57·1	58·8	58·0
Oct. ....	51·0	49·0	49·6	48·0	47·0

The general mean of the year seems to be about 47·5.

The month of July 1852, though fine and warm, was not on the average marked by so high a temperature as the same month in 1826. Mr. Cholmeley has recorded at Brandsby the following comparative results (see p. 147) :

	Mean maximum of temperature.		Mean temperature.
June 1826 .....	75·0	....	63·5
July 1826 .....	76·0	....	65·5
August 1826.....	74·5	....	64·0
July 1852 .....	72·5	....	62·75

*Temperature of the Interior of York Minster.*

My information regarding the temperature of the interior of York Minster is mainly due to the ingenuity of the worthy Master Mason of the edifice, who is now laid to his long rest—Mr. Shutt. By his direction a Thermometer, placed 5 feet above the floor against one of the great pillars, was read daily (with some exceptions) from April 8, 1808 to July 31, 1811. The hour of observation was usually 1 or 2 P.M., but we find also readings at 10, 12, 2, 3, 4, 5 and 6, nor does

it appear that any notable differences occurred in consequence of this variation. York Minster is of vast interior extent, almost 100 feet high to the roof. During the period of these observations it was not warmed by artificial means, and only lighted in the choir, by candles.

For comparison I possess a series of contemporaneous observations by the late Mr. Jonathan Gray—taken in the open air about 250 feet from the Minster, at 2½ P.M. The following tables will show the principal results of the comparison.

*Monthly Maxima and Minima of Temperature in York Minster.*

		Max.	Min.	Mean.	Greatest Monthly Range.	Greatest difference from day to day.	
1808.	April ...	46·0	41·5	42·91	4·5	1·5	
	May .....	58·5	44·0	53·23	14·5	2·0	
	June.....	61·0	56·5	58·50	4·5	2·0	
	July .....	67·0	60·0	64·63	7·0	2·0	
	Aug. ....	67·0	63·0	64·82	4·0	1·5	
	Sept.....	63·25	53·0	60·10	9·75	1·75	
	Oct. ....	53·0	45·25	49·33	7·75	1·75	
	Nov.....	47·25	41·5	44·89	5·75	3·5	
	Dec.....	46·00	35·0	39·64	11·00	3·0	
	1809.	Jan. ....	38·00	32·0	35·13	6·0	2·5
		Feb. ....	43·75	36·0	40·37	7·75	1·75
		March ...	47·00	41·25	43·70	5·75	1·75
April ...		45·00	40·75	44·49	4·25	2·00	
May .....		59·00	44·50	54·33	14·5	3·75	
June.....		61·00	53·00	57·20	8·0	2·50	
July .....		63·00	57·25	60·01	5·75	2·50	
Aug.....		63·50	59·00	61·43	4·50	2·00	
Sept. ...		61·75	52·25	58·41	9·50	2·00	
Oct. ....		56·00	48·50	52·22	7·50	1·75	
Nov.....		51·00	40·50	44·89	10·50	2·00	
Dec.....		45·00	38·50	40·78	6·50	2·50	
1810.	Jan. ....	43·50	31·00	37·83	12·50	2·75	
	Feb. ....	41·50	34·25	37·91	7·25	1·75	
	March ...	44·00	39·00	40·55	5·00	2·00	
	April ...	51·00	41·25	44·00	9·75	2·00	
	May .....	53·25	49·5	51·66	3·75	1·25	
	June.....	62·00	54·0	58·13	8·00	2·00	
	July .....	62·00	59·0	61·00	3·00	2·25	
	Aug. ....	63·25	59·0	61·31	4·25	1·50	
	Sept. ...	65·25	57·0	60·96	8·25	2·25	
	Oct. ....	59·00	47·75	55·00	11·25	2·50	
	Nov.....	47·0	42·00	43·43	5·00	1·50	
	Dec.....	42·75	39·0	41·14	3·75	2·00	
1811.	Jan. ....	39·25	34·0	37·10	5·25	1·50	
	Feb. ....	41·25	36·0	38·81	5·25	2·00	
	March ...	48·50	42·0	45·18	6·50	1·00	

*Monthly Maxima and Minima of Temperature at 2½ P.M., York.*

		Max.	Min.	Mean.	Greatest Monthly Range.	Greatest difference from day to day.	
1808.	April ...	59	36	46·00	23·0	15·0	
	May .....	77	50	59·86	27·0	16·0	
	June.....	75	57	62·53	18·0	12·0	
	July .....	84	60	67·97	24·0	11·0	
	Aug.....	75	59	64·75	16·0	6·0	
	Sept. ...	66	46	57·30	20·0	15·0	
	Oct. ....	59	40	44·03	19·0	7·0	
	Nov.....	54	36	41·53	18·0	11·0	
	Dec.....	51	27	33·24	24·0	15·0	
	1809.	Jan. ....	53	30	33·04	23·0	20·0
		Feb. ....	56	33	41·11	23·0	11·0
		March ...	59	40	43·19	19·0	8·0
April ...		62	38	44·30	24·0	10·0	
May .....		75	48	60·59	27·0	10·0	
June.....		82	56	61·00	26·0	18·0	
July .....		78	59	62·36	19·0	11·0	
Aug.....		76	61	64·23	15·0	7·0	
Sept. ...		71	51	56·86	20·0	8·0	
Oct. ....		64	48	51·39	16·0	6·0	
Nov.....		50	32	39·73	18·0	9·0	
Dec.....		51	37	39·05	14·0	11·0	
1810.	Jan. ....	52	48	34·04	34·0	10·0	
	Feb. ....	53	30	37·01	23·0	8·0	
	March ...	55	39	40·64	16·0	9·0	
	April ...	68	42	49·66	26·0	15·0	
	May .....	68	44	52·31	24·0	13·0	
	June.....	74	57	62·03	17·0	12·0	
	July .....	77	58	61·84	19·0	14·0	
	Aug.....	76	55	61·56	21·0	13·0	
	Sept. ...	75	57	57·63	18·0	8·0	
	Oct. ....	64	38	48·00	26·0	9·0	
	Nov.....	53	37	41·16	16·0	8·0	
	Dec.....	50	30	36·99	20·0	9·0	
1811.	Jan. ....	46	29	33·82	17·0	9·0	
	Feb.....	50	36	38·11	14·0	8·0	
	March ...	57	41	43·90	16·0	14·0	

The Mean of the Temperatures observed in York Minster, occurred May... 5·25 and Oct. 22·2  
 And in the open air at York . . . . . April . 13·60 and Oct. 15·3

Difference in the Spring . . . 21·55 Autumn 6·9

Mean difference of Epoch of Mean Temperature between York  
 Minster and open air at York  $\frac{21·55 + 6·90}{2}$  14·22 days.

Greatest variation of Temperature in the Year.

Air at York from  $82^{\circ}$  to  $18^{\circ}=64^{\circ}$ .

Minster . . . . .  $67^{\circ}$  to  $31^{\circ}=36^{\circ}$ .

Greatest variation of Temperature in one Month.

York. . . .  $34^{\circ}\cdot 00$ .      The Minster. . . .  $14^{\circ}\cdot 50$ .

Greatest variation of Temperature from day to day.

York. . . .  $20^{\circ}\cdot 00$ .      The Minster. . . .  $3^{\circ}\cdot 75$ .

Mean variation from day to day.

York. . . .  $11^{\circ}\cdot 00$       The Minster. . . .  $2^{\circ}\cdot 06$ .

—Page 146.

#### *Temperature of York.*

The coldest night ever known at York was that of Jan. 2–3, 1854, when, in my garden, within trellis work, the reading was  $-5^{\circ}$ . To this a correction was applied by an excellent Kew Standard (No. 41), of  $+1\cdot 6$ , thus making the correct record  $-3^{\circ}\cdot 4$ . At the same time, similarly corrected, Mr. J. Ford's Thermometer gave for his locality in Bootham, York,  $-3^{\circ}\cdot 5$ . At 10 A.M. Jan. 3, the Kew Thermometer (No. 41), sunk 6 inches in the snow which covered my Telescope stand, was  $+3^{\circ}$ ,  $+2^{\circ}$ ,  $+1^{\circ}\cdot 25$ , and finally  $+0^{\circ}\cdot 5$ .—Page 148.

#### *Temperature of the Sea.*

In the former edition of this work the attention of my meteorological friends was directed to the want of information on this subject; I have now the pleasure, through the exertions of the officers of the Scarborough Philosophical and Archæological Society, to refer to a valuable series of observations on the Temperature of the Sea, 6 feet below the surface, at the entrance of the harbour at Scarborough. The Report of the Society for 1853 contains the register of 87 observations, between April 22 and Dec. 30, 1853. Mr. Cooke, the Secretary, has had the goodness to communicate further observations, extending the series to March 17, 1854; so that 139 results for the twelve months may now be placed in tabular order. I hope the observations will be continued for a few years, and that other Institutions, stimulated by this example, may furnish contemporaneous data on other parts of the British coast.

Placing in parallel columns the Mean Temperatures of the Sea as given by these observations, to the nearest decimal, and the Mean Temperatures of the Air at Scarborough and York, we find the following suggestive results :—

	Sea.	Scarborough Air.	York Air.	Difference of Sea Temperature from that of the under-mentioned places.	
				Scarborough.	York.
April ...	42 <sup>o</sup> ·2	45 <sup>o</sup> ·4	47 <sup>o</sup> ·6	3 <sup>o</sup> ·2	5 <sup>o</sup> ·4
May ...	50·0	51·2	54·5	1·2	4·5
June ...	53·2	57·4	59·2	4·2	6·0
July ...	55·9	61·6	62·0	5·7	6·1
Aug. ...	56·7	59·8	61·1	3·1	4·4
Sept. ...	55·1	57·2	55·7	2·1	0·6
Oct. ...	52·0	50·4	48·2	1·6	3·8
Nov. ...	48·0	45·6	40·9	2·4	7·1
Dec. ...	43·5	42·2	36·0	1·3	7·5
Jan. ...	40·5	39·4	34·8	1·1	5·7
Feb. ...	41·3	40·6	37·3	0·7	4·0
March...	42·8	41·2	40·7	1·6	2·1

During the period of observation, the Temperature of the Sea varied from 59° to 38°,—a range of only 21 degrees; the Temperature of York from 73° to -3°·5,—a range of 76·5 degrees. The general mean of the Sea Temperature is 48°·43, a little above that of York, but somewhat below that of Scarborough. Some years must pass, however, before a conclusion of this kind can be safely adopted. The average range of Sea Temperature in a month is 5°·0; that of Scarborough in 1853, 17°·5; of York, 19°·8.

The climate of Scarborough is further illustrated by the subjoined Tables, for which, as well as much other information, the author is indebted to Mr. Cooke.

*Mean Temperature of Months at Scarborough.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
1849	40	42	42	43	51	54	60	57	57	48	47	42	1848
1850	36	42	43	46	48	59	60	61	57	49	46	43	1849
1851	41	42	42	48	55	57	60	62	57	52	42	41	1849
1852	38	41	41	45	52	57	65	55	58	50	47	47	1849
1853	42	36	38	43	50	60	63	64	57	53	46	38	1848
Average of 5 years.	39·4	40·6	41·2	45·4	51·2	57·4	61·6	59·8	57·2	50·4	45·6	42·2	

49°·3 Fahr. Mean Annual Temperature (?).

U



## Cycle of 10 years from 1832 to 1841.

## Thermometric Results.

	Fahr.
Mean Annual Temperature . . . . .	48°·82
Greatest ditto (1834) . . . . .	52°·76
Least ditto (1838) . . . . .	46°·06
Range for 10 years of Mean Annual Temperature..	6°·70
Average daily range for 10 years . . . . .	9°·37
	in.
Average fall of rain of 10 years . . . . .	22·89
Average fall of rain of 19 years . . . . .	23·95
Greatest quantity of rain fell in 1849. . . . .	32·19
Least quantity in 1832 . . . . .	15°·29

## Mean Monthly Temperature of Sea at Scarborough.

	Temperature of Sea.	Mean Temperature of Air for the Month.	General Mean of Monthly Temperature of Air.	Difference of Sea and General Mean Monthly Temperature of Air.	No. of Observations.
1853.					
April . . . . .	42°·25	43°	45°·40	-3°·15	4
May . . . . .	50·00	50	51·20	-1·2	14
June . . . . .	53·18	60	57·40	-4·22	11
July . . . . .	55·85	63	61·60	-5·75	7
August . . . . .	56·75	64	59·80	-3·05	8
September . . . . .	55·14	57	57·20	-2·06	7
October . . . . .	52	53	50·40	+1·60	9
November . . . . .	48	46	45·60	+2·40	6
December . . . . .	43·50	38	42·30	+1·30	8
1854.					
January . . . . .	40·52	37·82	39·40	+1·12	25
February . . . . .	41·21	39·17	40·60	+·61	23
March . . . . .	42·76	45·80	41·20	+1·56	15
Whole Year	48·43	40·73	49·30		137

N.B. The Mean Temperature of the Sea is deduced from observations chiefly taken at 9 A.M. throughout the year 1853; those of 1854 were taken in the afternoon, about 4 o'clock.

A comparison of the Temperature of the Month with the general mean, will show the mean difference of the month with the observed temperature of the sea; for instance, the month of March of the present year is in excess above the average, and makes it appear that the observed temperature of the sea is less than the mean temperature of the air, which is not the case in an average of years.

The Thermometer generally showed a higher temperature on a

flowing tide than on the ebb, and from the results recorded in the 'Phil. Mag.,' vol. lxxvii. p. 339, it appears that sea-water becomes colder on nearing the land, deep water being the warmest at the surface.

*Temperature.*

On the 24th of July, 1826, and on the 3rd of August, 1852, corn was first cut in Yorkshire.—*Page 151.*

Mr. Sorby finds the Mean Temperature of a spring on the high ground west of Sheffield, about 1000 feet above the sea, to be  $44\frac{1}{2}^{\circ}$  F.—*Page 152.*

*Rain.*

I am indebted to Mr. D. Ferguson for monthly registers of rain kept at Redcar by Mr. C. C. Oxley, between May 1845 and May 1852.

The average results appear to be—

Jan. ....	1·50	July .....	1·79
Feb. ....	0·87	Aug. ....	1·88
March .....	1·31	Sept. ....	1·55
April .....	1·87	Oct. ....	2·68
May .....	1·68	Nov. ....	1·87
June .....	2·33	Dec. ....	1·43

The greatest quantity falls in October, the least in February.—*Page 155.*

*Velocity of the Wind.*

Among the valuable meteorological results of the Liverpool Observatory reported by Mr. Hartnup, we find, from twelve months' registration with Osler's new Integrating Anemometer, the mean velocities of winds blowing from the under-mentioned directions, the average being 13 miles in an hour.

Direction from	Miles in an hour.	Direction from	Miles in an hour.
N.N.E.	5·8	S.S.W.	13·7
N.E.	6·3	S.W.	18·7
E.N.E.	8·7	W.S.W.	16·7
E.	11·0	W.	16·8
E.S.E.	9·8	W.N.W.	19·1
S.E.	11·5	N.W.	16·4
S.S.E.	12·0	N.N.W.	13·8
S.	11·5	N.	7·9

The mean velocity of wind steadily augments from a point of time a little after midnight to a little after noon, when it is greatest, and then again steadily diminishes to a little after midnight, when it is least.

*Site of Delgovitia.*

Mr. Still, in the course of careful researches on the lines of old roads from Eburacum toward the east and south-east, has found portions of these roads directed toward Warter (Wartre is the older spelling). In the aspect and history of this place are other indications of its early importance. Roman coins, bronze keys and fibulæ, silver rings, amber and glass beads have been found at and near Warter, and there are earthworks of such a kind as to lead to the supposition that it may have been a Roman station. If this were Delgovitia, the Antonine Itinerary would run thus:—From York (Eburacum) to Stamford Bridge (Derventio) seven miles. From Stamford Bridge, *viâ* Garraby Street, eastward, and from a point in that street southward to Warter (Delgovitia), thirteen miles. (*See p. 241.*)

Another site of an old, perhaps British settlement, has been pointed out by Mr. Davies, in the vicinity to which so many partial inferences have conducted independent inquirers for Delgovitia—the vicinity of Givendale, Millington, Londesborough and Goodmanham. At Grimthorp near the first-named of these places, on an outrunning ridge of the wold, close to a fine spring, the ground shows unmistakable traces of ancient but unascertainable occupation. The situation is conspicuous, and near to the line of the Old Wold road (British or Romano-British) leading from Malton, across Garraby Street by Givendale to Millington and the Humber.

*The Battle of Cattraeth.*

The passage in the 'Gododin' referred to, page 221, is supposed by the Rev. John Williams ab Ithel to describe a British chief, the son of Ysgyran.

In the most recent edition of the 'Gododin,' by Mr. Williams ab Ithel, the poem is assumed to relate to a contest between the Kymri and the Anglians, aided by the natives of Deira and Bernicia; and Cattraeth is supposed to be on the line of the Catrail, or 'war fence' between the British and Anglian territories.—*Page 252.*

## EXPLANATION OF PLATES.

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### PLATE I. Frontispiece.

Map of Yorkshire, showing the elevation of the ground, above the sea, by shades of different intensity.

### PLATE II. P. 6.

Plans and Sections to illustrate the form of the surface. Fig. 1. Section from west to east, showing the elevations and depressions:  $x'$  is the place of the Penine Fault.

Fig. 2, p. 7. Diagram to show the effect of elevation of the strata on an axis marked by  $x$ , and the arrow;  $w$ . the level of the sea, towards which the strata are rising, so as to come within the action of the waves, and above which they finally stand. G. Gritstone, S. Shale, and L. Limestone.

Fig. 3, p. 7. Plan showing the effect of the sea in wasting the strata as they rose, in the direction A. A, so as to leave islands  $b. w. i$ .

Fig. 4, p. 8. Plan showing the further effect of the elevation of the strata and the wasting action of the sea, by which the valleys began to be marked out, between the elevated parts of the land.

### PLATE III. Pp. 9-11.

Outlines to show the forms which particular kinds of rock assume, in consequence of the waste which they have experienced.

Fig. 1. Contours in Craven:  $g$ . the rugged hills of millstone grit,  $s$ . the rounded hills of shale.

Fig. 2. Ingleborough from the north, to show the prominent edges of  $m$ . millstone grit,  $l$ . limestone,  $s$ . sandstone, near the summit.

Fig. 3. Contours of the oolitic hills  $n$ , and the chalk-hills  $w$ .

## PLATE IV. Fig. 1, p. 11.

Sketch of Yorkshire Mountains, from the Buttertubs Pass between Muker and Hawes; Whernside, Ingleborough, Great Whernside, Little Whernside are seen in succession.

Fig. 2, p. 36. Penyghent as seen from the west side of Ribblesdale below Horton.

## PLATE V. Fig. 1. Camp on Ingleborough.

The wall has three openings; within it are nineteen foundations of huts. The plan of the wall is shown in fig. 1 *b*, and the elevation in fig. 1 *c*; the drawing is so made that the interval between *b* and *c* is in proportion (about 50 feet), p. 27.

Fig. 2. The Cairn called Obtrush Roque north of Kirkby Moorside, p. 210.

Fig. 3. An 'erratic block,' perched on the bare limestone hill above Settle, about 1160 feet above the sea. It illustrates what may be called a natural 'rocking-stone,' p. 112.

## PLATE VI. Weathercote Cave between Ingleborough and Whernside, p. 29.

The appearance of this magnificent Cave varies with the hour of day, condition of sky, and quantity of water. The author hopes the general effect of the scene is not wholly lost in this drawing.

## PLATE VII.

Plan and Section of Ingleborough Cave, as presented by Mr. Farrer to the Geological Society in 1848 (p. 30). The prevalent fissures are added, their general direction being to the N.W. If the Stalactites of this Cave could be drawn by the aid of Photography, very beautiful effects would be produced.

## PLATE VIII. The High Force in Teesdale, p. 46.

The crowning rock is prismatic greenstone; below it, indurated and prismatized shale. The lower beds are limestone, not prismatized; but jointed in the usual manner.

## PLATE IX. Barnard Castle, p. 47.

If the reader should visit Teesdale after long-continued dry weather, he will think lightly of the impediment offered to the escape of Bertram, who might easily ford 'streams more deep than Tees.' But let him see it in a flood.

**PLATE X. Hardraw Force near Hawes, 99 feet, p. 58.**

The aspect of this waterfall varies in a wonderful degree, according to the hour of day, season of year, and quantity of water. The drawing here given was taken after much rain, when the 'beck' was more than usually violent. I have other sketches which show a mere 'spout' of water, but it is always an impressive scene. Cotter Force, on the same side of the valley, should be visited.

**PLATE XI. Gale Force near Hawes, p. 58.**

The shale, which forms the lower part of these rocks, is remarkably full of delicate corals (*Fenestella*) and small shells of *Brachiopoda*.

**PLATE XII. Millgill Force near Askrigg, 69 feet, p. 60.**

Above this, which is the principal fall, the active pedestrian may ascend to another of different character, but very pleasing, which may be called Upper Millgill Force. It is a cascade over gritstone 42 feet.

**PLATE XIII. Aysgarth Force, p. 60.**

The river is seen in a time of 'fresh.' After long drought the rocks are merely relieved by thin sheets and many little jets of water, making a pretty combination.

**PLATE XIV. Brimham Rocks, p. 71, and Appendix, p. 278.**

It is probable that no great part of the singular appearances presented by these fantastic rocks is due to art. Atmospheric agency is certainly the principal power which has been employed in shaping and grooving the huge masses of millstone grit. How far the perforations and balancings of the rocks may have been aided by the human hand, may be matter of opinion. Nature is constantly performing similar work.

**PLATE XV. Kilnsey Crag, p. 79.**

No valley in Yorkshire is so full of bold cliffs as Wharfedale. In this respect it emulates the Craven district, the scars in both cases being formed by the same limestone.

PLATE XVI. Cow and Calf Rocks, Ilkley, p. 80.

The fine effect of these huge masses of millstone grit is enhanced by their position at a prominent part of the Moors, which overhangs Benrhyding. Great and Little Alms Cliff, and many of the hills to the north are edged by grand masses of the same rock. It forms magnificent Craggs on the south-western border of the county.

PLATE XVII. Ancient Crosses, Ilkley, p. 81.

The style of all these reliques is characteristically Anglo-Saxon; but there is much inequality in the work. In the central figure one side is occupied by the usual 'runic' design, another by very rude skeletons. The front pillar has the involved pattern on one face, and on another some elegantly designed complications of animal forms, arranged in compartments, the angles being marked by the slender spirally fluted pillar, which appears in some late Roman sculptures.

PLATE XVIII. Rosebury Topping, p. 87.

The crown of this hill is a gritstone capping: the upper lias shale forms a concave slope beneath, and then the marlstone series runs out in a narrow terrace. *Above* this terrace is the band of ironstone, and a little higher is the range of pits presumed to be the bases of British huts (p. 203).

PLATE XIX. Malham Cove, p. 93.

The subterranean channel through which the Aire arrives at the base of Malham Cove may be compared to the Cave of Ingleborough (Plate VII.). Before the fissures were enlarged to their present degree of openness, the overflow of water at the top of Malham Cove may have been a common occurrence. In modern times it can only happen when the subterranean channel is incapable of discharging the streams which gather to it. It is a general rule in the Scar limestone country, that the streams find lower and lower openings, and thus desert and leave dry the upper parts of their channels.

PLATE XX. Gordale, p. 94.

The reader will remark in the rocks here portrayed, a prismatic structure of certain thick beds, indicated by the prevalence of vertical lines. It is a character which may be recognized again in Malham Cove, Kilnsey Crag, and many other high limestone cliffs, and it appears in the vicinity of many of the Caves.

## PLATE XXI. Wharnccliffe Lodge, p. 100.

The view from Wharnccliffe Lodge was highly praised by Lady Mary Wortley Montague. The word 'Wantley' in the legend of the Dragon, connected with this place, should, no doubt, be read Wharnccliffe. Wharn, Whern, Quern, and Quorn, are Teutonic names for the old hand-mill, which was often cut from the 'millstone' grit.

## PLATE XXII. Thornton Force, p. 116.

This place will please the geologist quite as much as the artist. In ascending from the Force, by Yorda's Cave, to the summit of Whernside, the whole series of the Mountain Limestone is crossed, and on the top of the mountain is the millstone grit.

## PLATE XXIII. The Matron, p. 127.

The detached pinnacles of chalk at Flamborough are the last remains of the land which has been wasted; the caverns in the cliff are the first great step toward further decay. For these caves are enlarged upwards continually by the falling in of the roof, till at length the outer walls stand detached, and appear as insulated rocks. Through how many long periods of years has the waste of the Flamborough cliffs been continued!

## PLATE XXIV. The King and Queen, p. 128.

These rocks probably formed part of the outer wall of a cave worked long ages since into the solid chalk. An interesting gift to posterity would be a photographic picture of the detached rocks of Flamborough, taken from given points which could be readily found again, so that comparative pictures could be made after the lapse of years, and the exact rate of decay be ascertained.

## PLATE XXV. Filey Brig, p. 130.

This low ridge of rock constitutes a breakwater for Filey Bay. In some earlier period—for example, in the Roman period—we must admit that it extended further to the east, and (the dip of the beds being southerly) that *it stood higher*. It would then not be covered by the tide, and may have been a real natural pier.



**PLATE XXVI.** Scarborough from the South, p. 132.

The visitor of the sea-side who merely walks on the sands, or rides on the roads, will have but a slight notion of the many picturesque combinations of land and sea, which reward those who tread the margin of the cliffs. I affirm that half the beauty and grandeur of our coast is lost to those who follow merely the beaten tracks. The sketch is from a part of Gristhorp Cliff.

**PLATE XXVII.** Runswick Bay, west of Whitby, p. 141.

This has always appeared to me one of the prettiest examples of a Wick, Wyke, or Vik—the Norwegian name for small bay—which can be found on the Yorkshire coast.

**PLATE XXVII. a.** The Peak and Robin Hood's Bay, p. 136.

Rather distant from Scarborough and Whitby, between which no coach runs, the fine cliffs at the 'Old Peak' are seldom explored by strangers. Robin Hood's Bay furnishes accommodation for man and horse, and is a picturesque fishing village.

**PLATE XXVIII.** Staithes, p. 141.

At some time, perhaps, the quiet of this romantic place will be disturbed by mining, and its hardy fishermen—athletic Norwegian forms—will be set to more tedious work in ironstone pits. (This has now happened, 1854.) Staithes is unrivalled in the variety of organic remains, which may be collected from the cliffs of lias, marlstone, and ironstone, at a small distance.

**PLATE XXIX.** Rockcliff, or Boulby Cliff, p. 142.

The Lias series in this great cliff is complete, except as to the base, which indeed is nowhere clearly seen on the Yorkshire coast. Among other curious appearances at the base of the cliff are shales so wasted below masses of harder material, that these look like mushrooms on pedicles.

**PLATE XXX.** Geological Map, p. 168.

On this Map the principal masses of strata which appear at or near the surface in Yorkshire are marked by colours, with as much fulness of detail as

the small size of the drawing would allow\*. The palæozoic strata occupy about half the area of the county; they include a small and singular district of Silurian slates, and a very large and varied series of Mountain Limestone, Millstone Grit, Coal, and Magnesian Limestone. By mineral associations and conformity of positions, this last rock passes into the New Red Sandstone group, which commences the Mesozoic series. This series is of unusual character in Yorkshire—the lower Oolites being almost lost in thick masses of Gritstone and Shale, with Ironstone and Coal. Above all is a small patch of Tertiary strata at Bridlington, and a great extent of clay, gravel, and sand, with large boulders scattered here and there, which were till lately termed diluvial deposits.

Three coloured Sections accompany this Map. One running from north-west to south-east, shows the relative positions and elevations of the rocks from the extreme north-west angle of Yorkshire, near Mickle Fell, to Bridlington. Along this line no true coal-measures appear; the Magnesian Limestone resting 'unconformably' against the Millstone Grit and Mountain Limestone. Another passing from S.S.W. to N.N.E., gives the general character of the north-western district. In this line the Mountain Limestone scarcely appears—the upper division (Yoredale rocks) is represented by thick shales below the Millstone Grit. A third section crosses the anticlinal between Lancashire and Yorkshire, and the rich coal-field of the West Riding; and shows below the Chalk near Cave, the incomplete development of the Oolites, which a little farther north do not appear at all, the Chalk resting on the Lias.

**PLATE XXXI.** Sections to illustrate the Craven Fault, p. 176.

- Fig. 1. Section from W. to E. across the ridge of Dufton Pike to Teesdale. S. Slate ridge; S.L. Scar Limestone; T. Whinsill; Y.S. Yoredale series; N.R. New Red Sandstone.
- Fig. 2. Section from W. to E. across the Lune at Kirkby Lonsdale. S. Slaty rocks; O.R. Old Red Sandstone; S.L. Y.S. as in fig. 1; M.G. Millstone Grit.
- Fig. 3. Section from S. to N. from the Coal at Burton to Ingleborough. S. S.L. Y.S. M.G. and N.R. as before. The Coal dips to the north under New Red.

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\* The author has prepared a larger map for separate publication. It may be had on application to Mr. Monkhouse, Lithographer, or any of the booksellers in York.

**PLATE XXXII.** Map of the Brigantian Territory, p. 192.

Ptolemy expressly assigns to the Brigantes the lands from sea to sea. Their towns are mentioned p. 231; the sea-coast and rivers p. 229; the roads p. 239. The situations of Prætorium, Delgovitia, and Derventio, east of Eburacum, are undetermined. Morbium, Arbeia, Dictis, Concangium, Glanoventa, Galacum, Galava, Alione, all probably in this territory, are in equal uncertainty.

**PLATE XXXIII.** British, Roman, and Anglian Pottery,  
pp. 220, 257.

The variety of Roman pottery is so great that a volume might be filled with designs from the Yorkshire Museum alone. Much of it was made on the spot. The specimen figured is supposed to be exclusively Eburacensian. It seems to have been made by moulding thin laminae of clay on a previously formed vase.

The ornaments of the British vases are made sometimes with a plain edge or point pressed into the clay, sometimes with a serrated edge, as in each of the examples before us. This increases the resemblance of the urn to a small basket, p. 220.

Anglo-Saxon urns are stamped with various ornaments, probably cut in metal, bone, or horn. As a contribution toward a collection of these stamps, I have sketched such as occur on our specimens, which are all from the Anglian settlement in Deira, p. 257.

**PLATE XXXIV.** Relative Magnitudes and Situations of Camps  
north of York.

None of these camps is to be compared in magnitude with the great temporary circumvallations constructed by Agricola in his Caledonian wars (see Roy's Military Antiquities).

The stations at York and Isurium might hold a full legion with the auxiliaries (12,000 to 13,000 men). For Rey Cross camp, see p. 19; Lavatræ, p. 48; Greta Bridge, p. 50; Cataractonium, p. 54; Isurium, p. 67; Eburacum, p. 75; Cawthorne, p. 88; Malton, p. 236.

**PLATE XXXV. Earth-works on Acklam Wold, p. 216.**

These are but a small though prominent part of the system of earth-works in the north-western part of the Wolds. The entrenchments run on to the eastward by Sledmere for about 15 miles.

**Various Earth-works in different localities of Yorkshire.**

These being all drawn to one scale, and all included in a parallelogram which, on the same scale, represents Eburacum, the superior size of the greater Roman camps becomes very conspicuous. The sections across each will explain the relative elevation of the banks and depth of the fossæ. The several works are numbered as under.

1. Circular works near Thornborough and Nosterfield, p. 63.
2. Semicircular work on Eston Nab, p. 219. (This sketch is not given as exact.)
3. Circular work near Penistone, p. 220.
4. High mound and enclosure of Barwick in Elmet, p. 213.
5. Polygonal rather than circular work at Yarlesber, near Ingleton, p. 27.
6. Imperfectly circular work called Studforth Ring, near Ampleforth, p. 215.
7. Old Camp at Langton, p. 214.
8. Old Camp at Hutton Ambo, called Gateskeugh, p. 213.
9. Ground Plans of cairns, tumuli and houses. The uppermost is Obtrush Roque. Below it the base of a hut on Ingleborough, followed by two tumuli.
10. The Circle of Arbelow in Derbyshire, with a series of stones on the edge of the flat inner enclosure, p. 219.



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Roman and Greek Names of Nations, Tribes and Places, in SMALL CAPITALS.  
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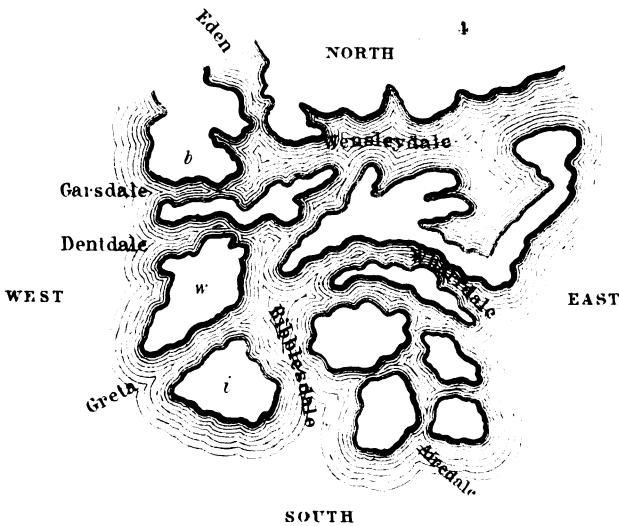
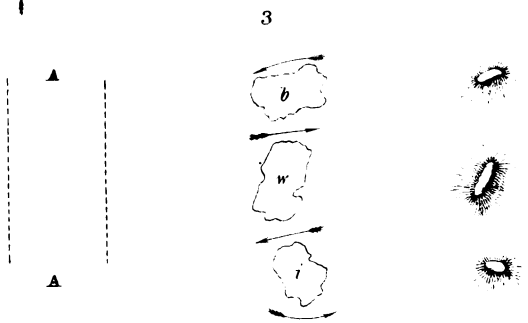
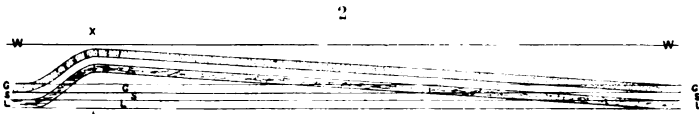
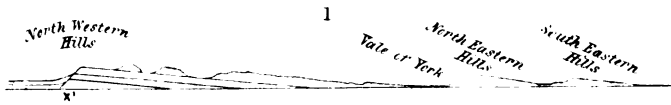
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THE END.

FORM OF THE SURFACE

PLATE 3



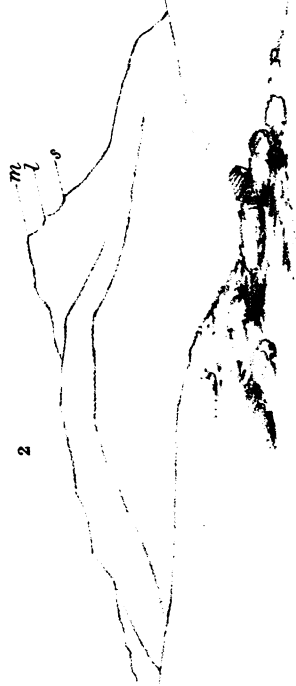
W. Mason's map. 1. 1/2 in. scale.



1



2



3

w

n

- 1. Near Skipton.
- 2. Ingleborough.
- 3. } The Wolds. (w)
- } The Wolds. (n)

CONTRASTED OUTLINES OF HILLS.

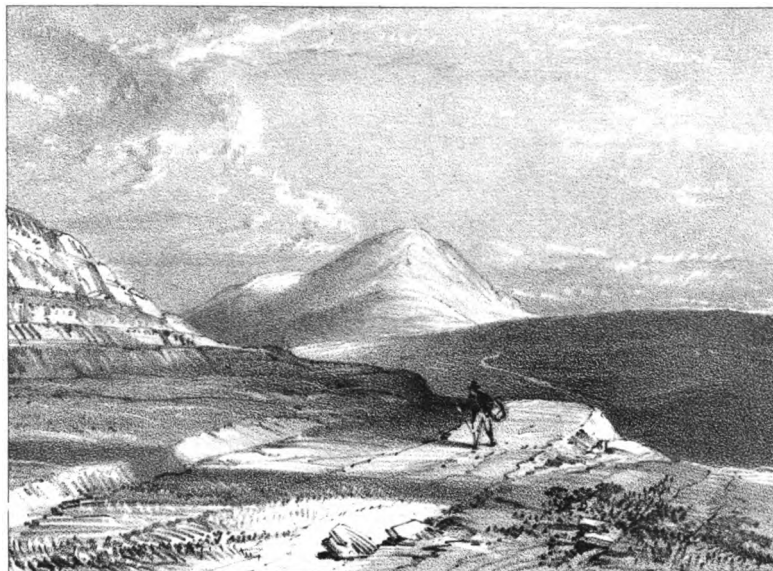




*The Dunes by W. Benson. From a Sketch by J. Phillips.*

*W. Merrickman Lith. York.*

## BUTTERTUBS PASS



*The Dunes by W. Benson. From a Sketch by J. Phillips.*

*W. Merrickman Lith. York.*

PENYGENT.

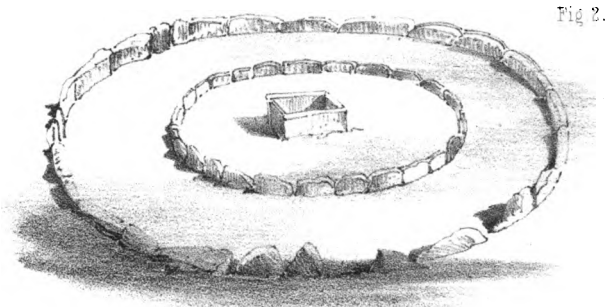
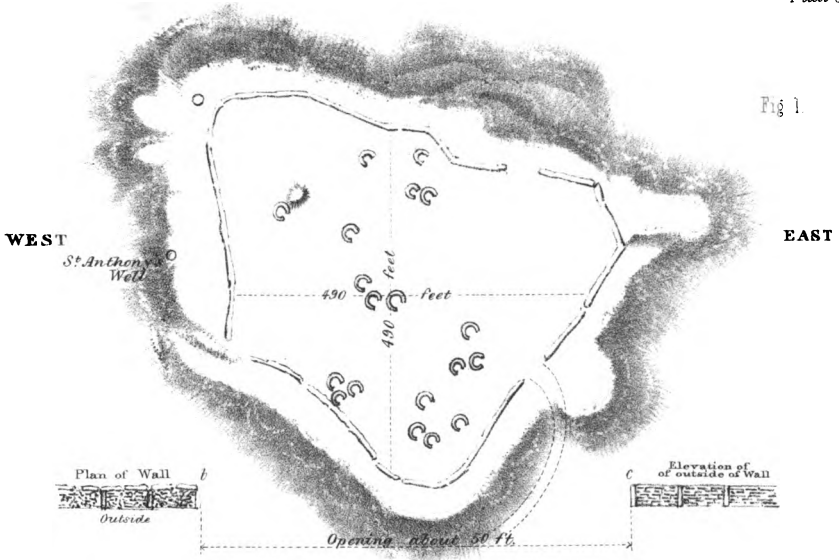




CAMP AND HUTS ON INGLEBOROUGH.

Scale 4 Chains to one Inch.

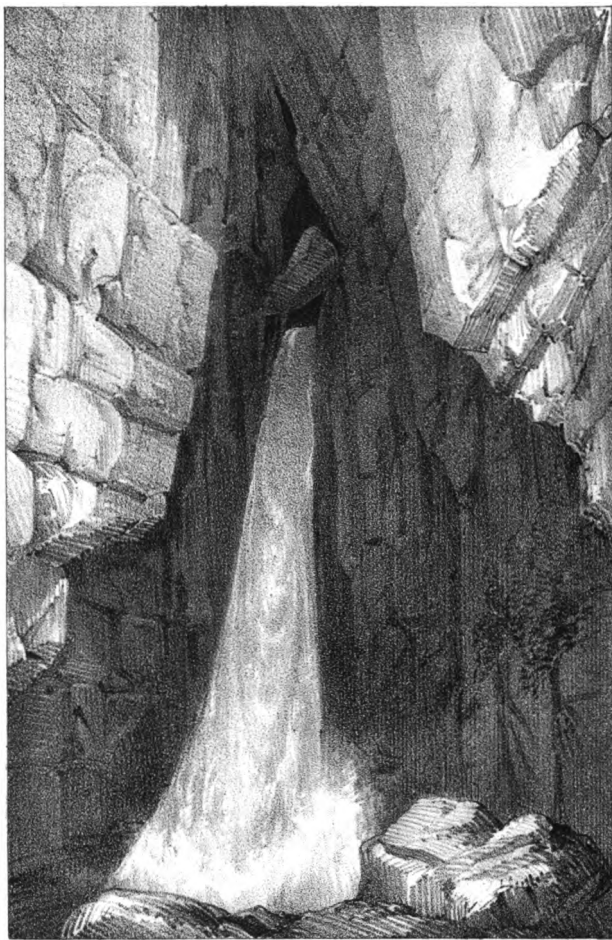
Plate 5.



OBTRUSH ROQUE.







*The Stone by H. Brown from a sketch by J. Phillips*

*H. M. Brown, 1866, York*

WEATHERCOTE CAVE.

*Plate v*

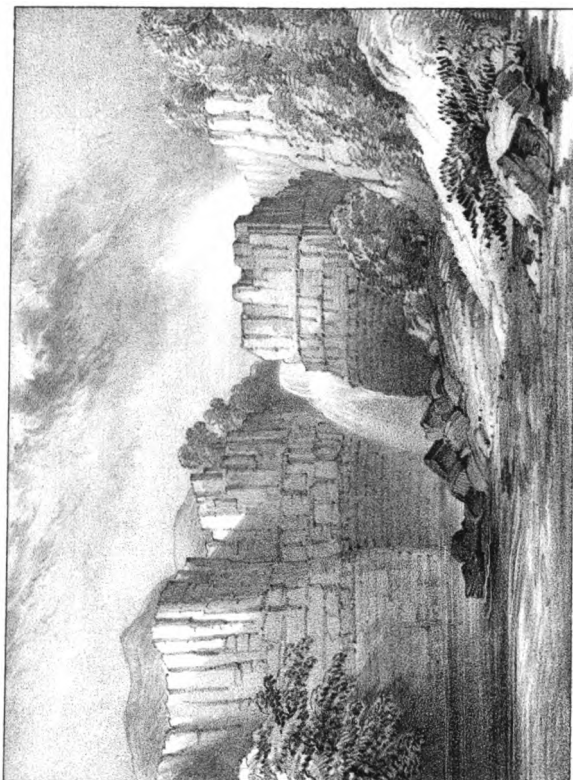


PLAN AND SECTION OF INGLEBOROUGH CAVE.



A. Cave mouth, B. Bridge, C. Cave, A a. Old Cave, a. Curtain b. Pillar Hall, c. Pillar and Abyss f. Long Gallery g. g. Cross arches, h. Giant's Hall.





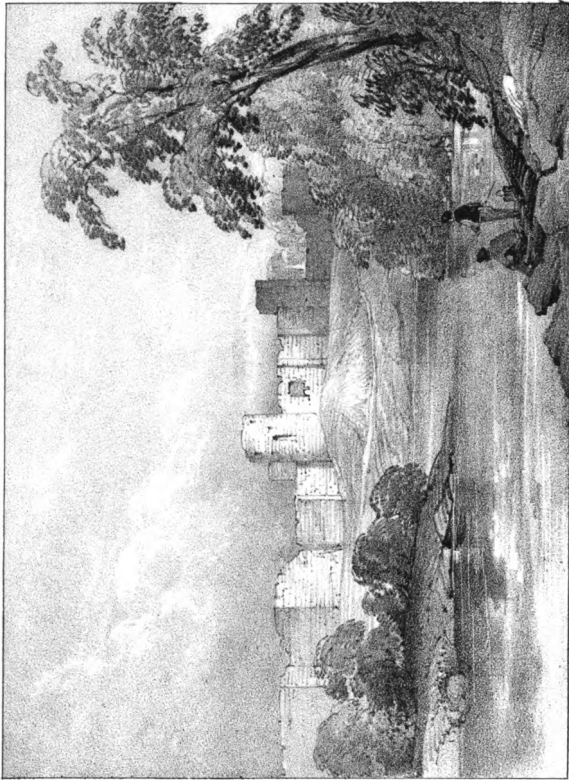
*At the base of the falls, 1870.*

*The Falls of the St. Lawrence River, as they appear in 1870.*

# HIGH FORCE





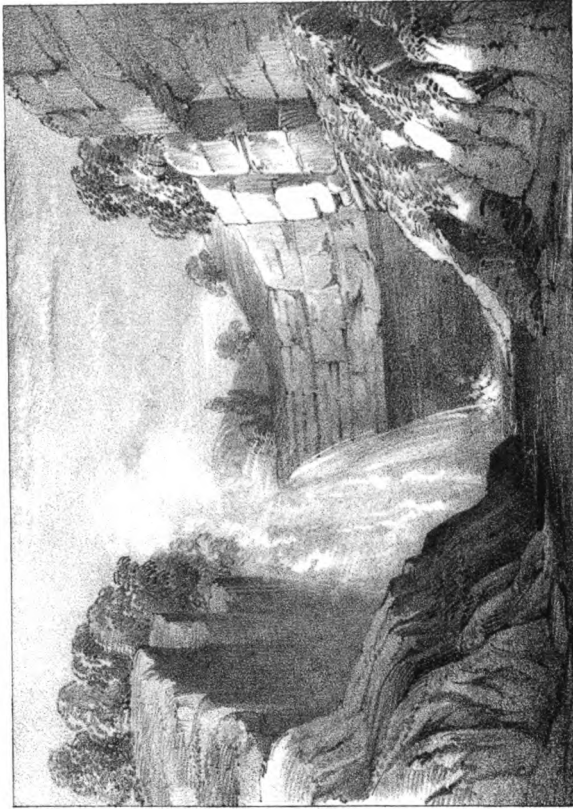


of the ...

of the ...

**BARNARD CASTLE**



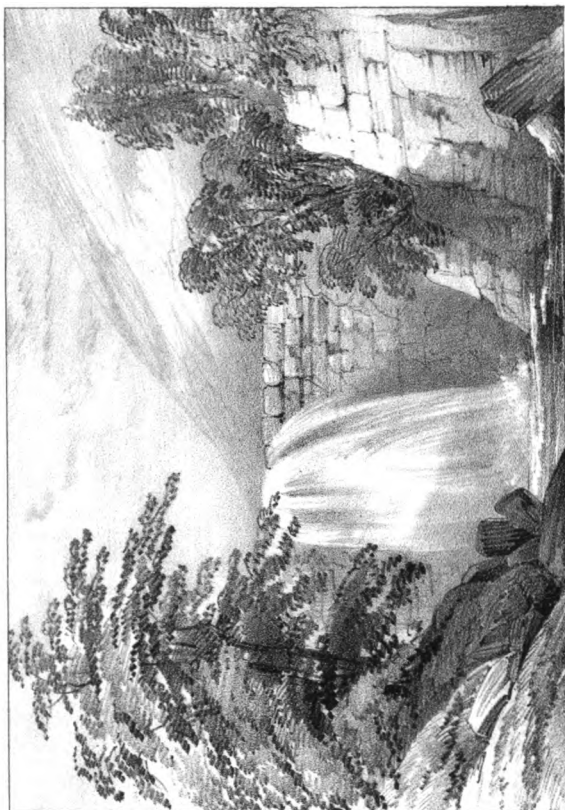


*Dr. Wm. Brewster del. & sculp.*

*Published by J. P. Putnam & Co., New York.*

# HARDRAW FORCE



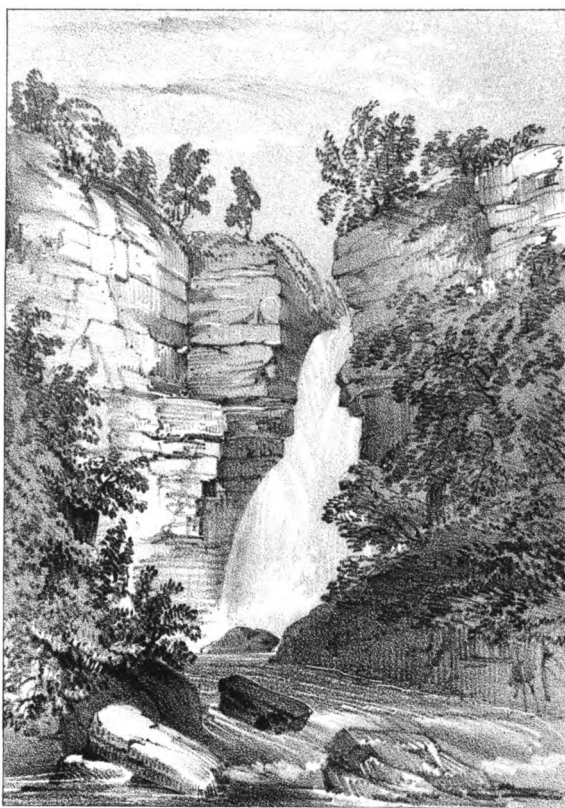


*The Mountain House, 1866, by J. M. W. Turner.*

*The Valley of the Rhine, from a sketch by C. Phillips.*

G A I E F O R E





*The Stone by W. Brown. Trees, & Rocks by J. Phillips.*

*W. M. Lockhart. Lith. F. & S.*

MILL GILL FORCE.

*Plate 12*







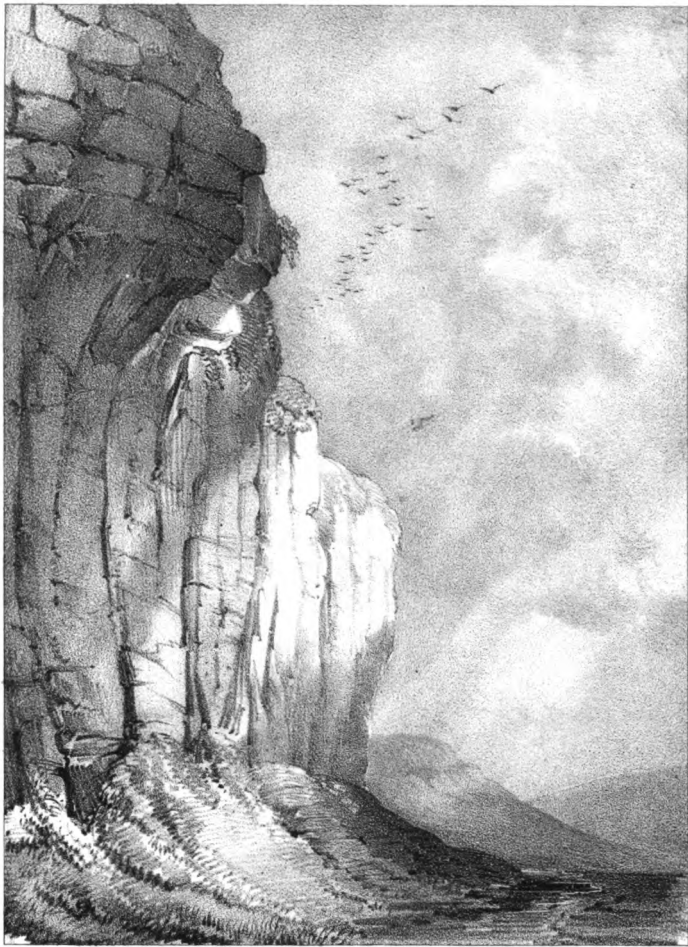
AYSGARTH FORCE.





BRIMHAM ROCKS.





W. M. M. 1881

W. M. M. 1881

KILSNEY CRAG.





W. Marshallman, Lith. York.

The View by W. Forrest. As seen at a distance by C. Phillips.

**COW & CALF ROCKS ILLKLEY**

*Plate 16*

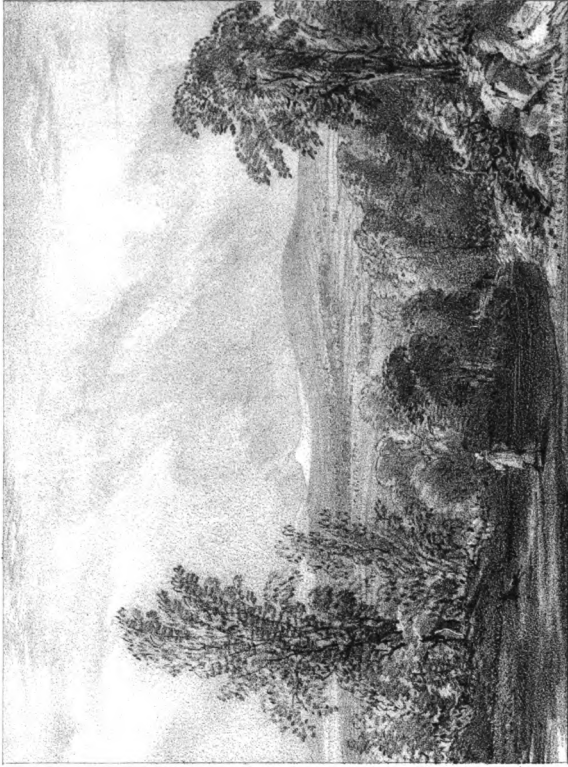






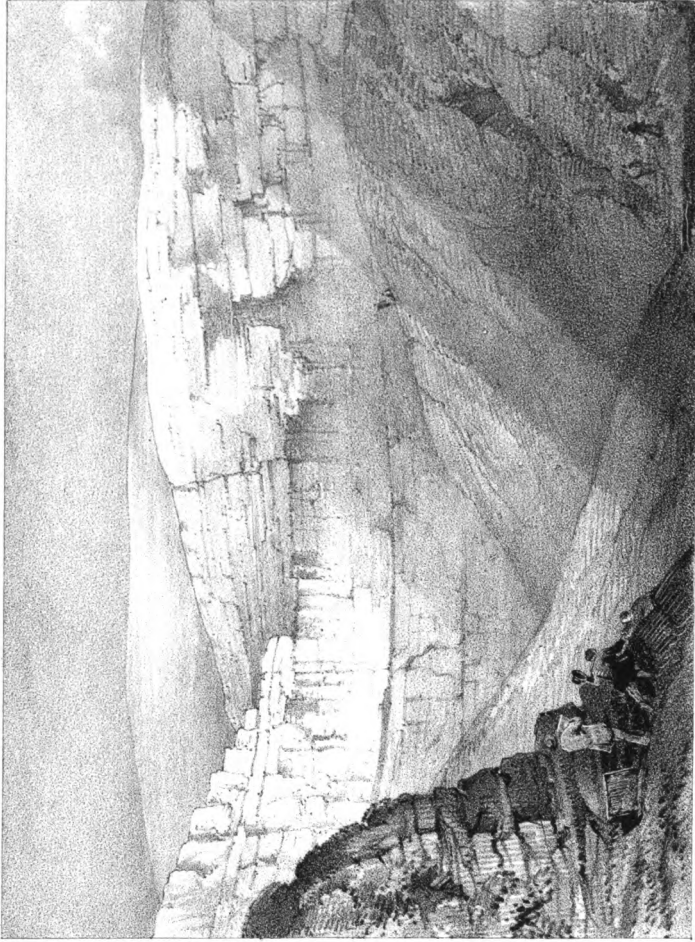
ANCIENT CROSSES, ILKLEY.





ROSEBURY TOPPING.

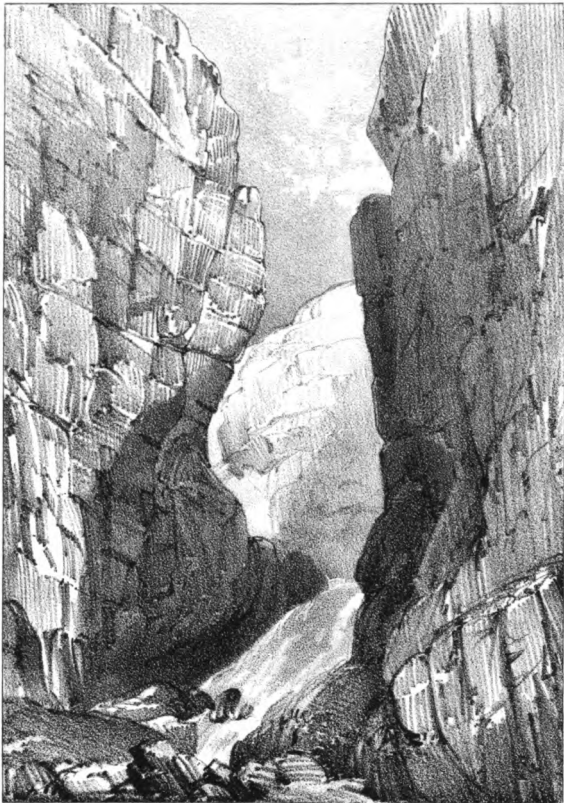




St. Michael's Light Reef

MAIHAM COVE





*See Notes by W. L. Estlin, *Notes on Scotland*, p. 2, Plate 2.*

*W. M. Woodhouse, *Edin. 1846*.*

GORDALE SCAR.

*Plate 20*

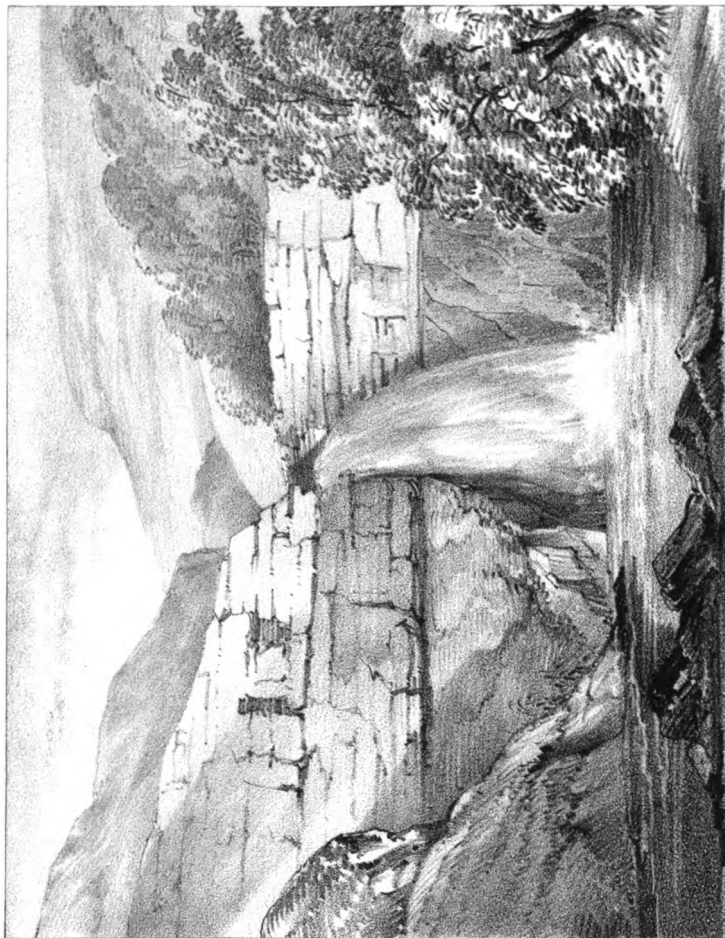






FROM WHARNCLIFFE LODGE



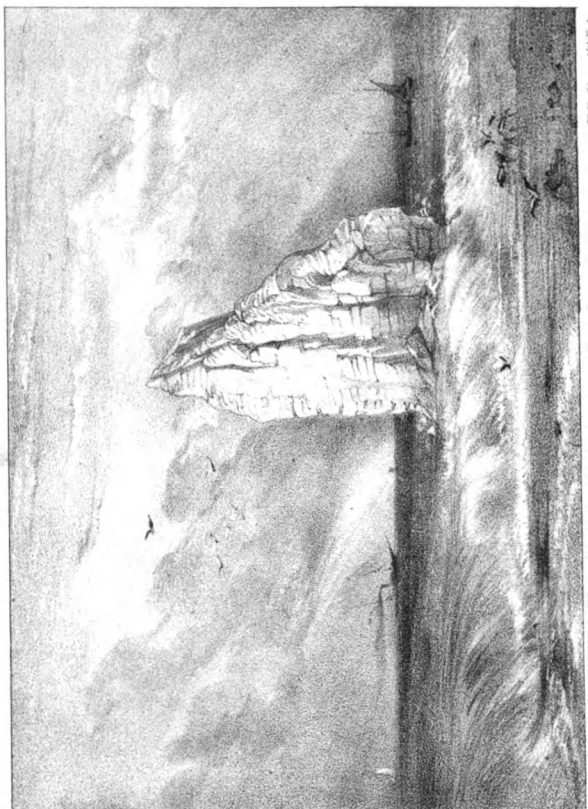


W. H. W. 1842. 1843. 1844.

By George H. Payne from a sketch by W. H. W.

THORNTON FORCE.





THE MATRON, PLAMBOROUGH





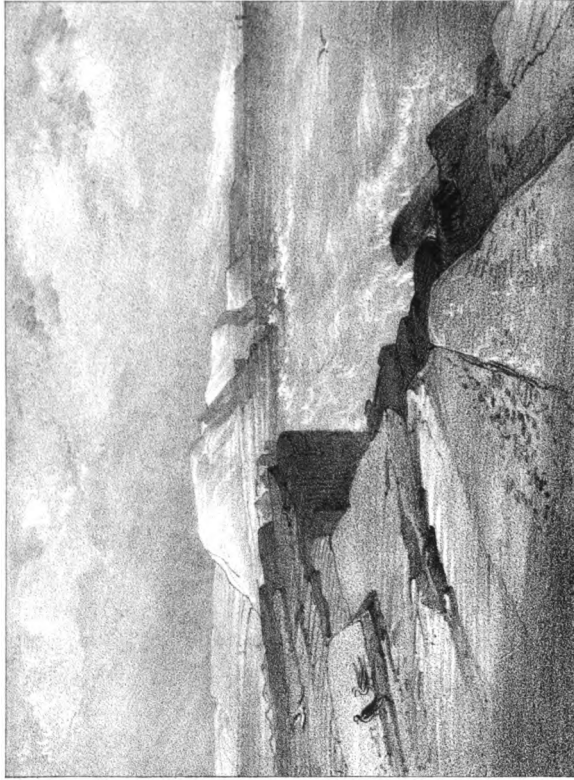
From the North

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THE KING & QUEEN, FLAMBOROUGH





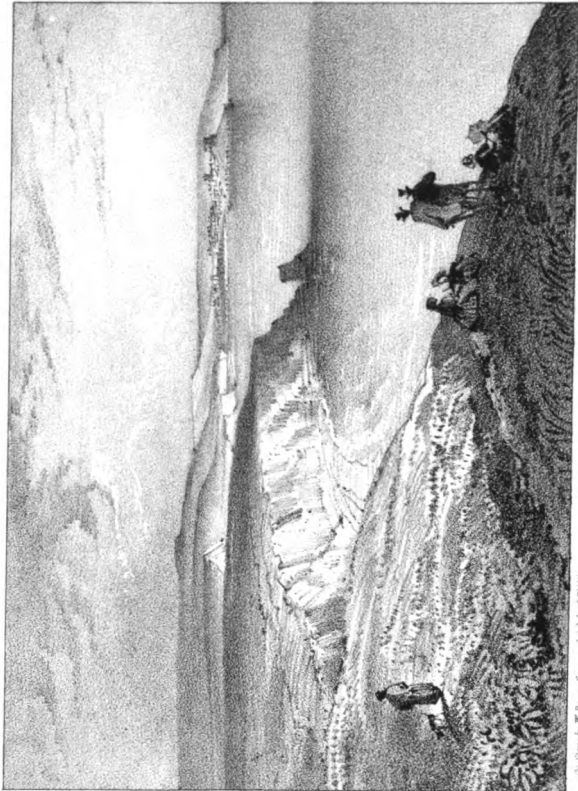


*The Filey Brig from the North*

*The Filey Brig from the South*

## FILEY BRIG



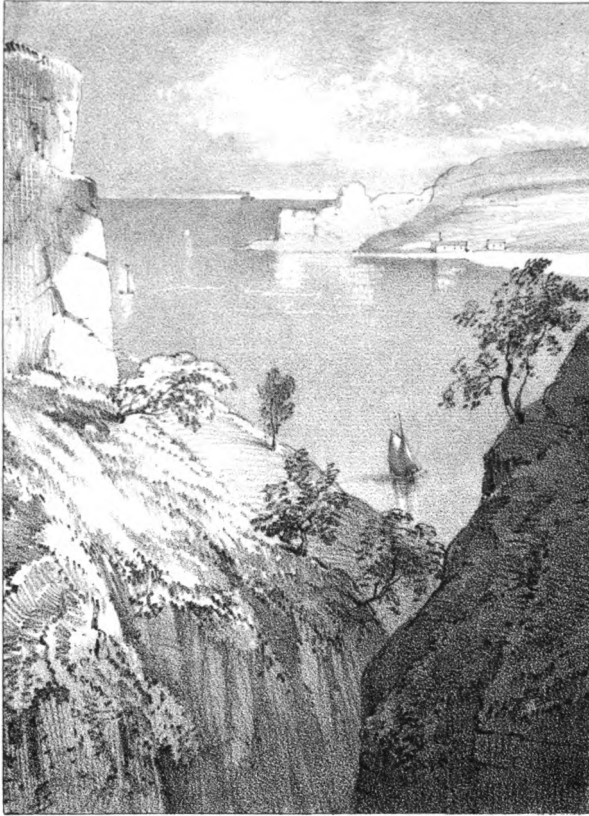


184. View of Scarborough from a point by the lighthouse.

R. M. Robinson, 1888, 1890.

SCARBOROUGH FROM THE SOUTH.





*the Stone by W. Brown from a sketch by J. Phillips.*

*W. M. Woodhouse Lith. York.*

RUNSWICK BAY.

*Plate 27.*

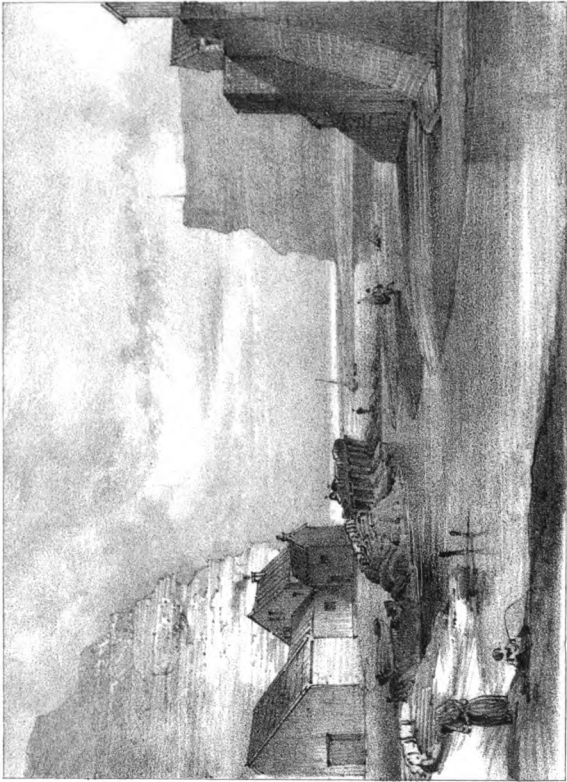




THE PEAK AND ROBIN HOODS BAY







*The View of St. John, from a Boat, by C. Phillips.*

**STAIRS.**





W. H. H. 1860.

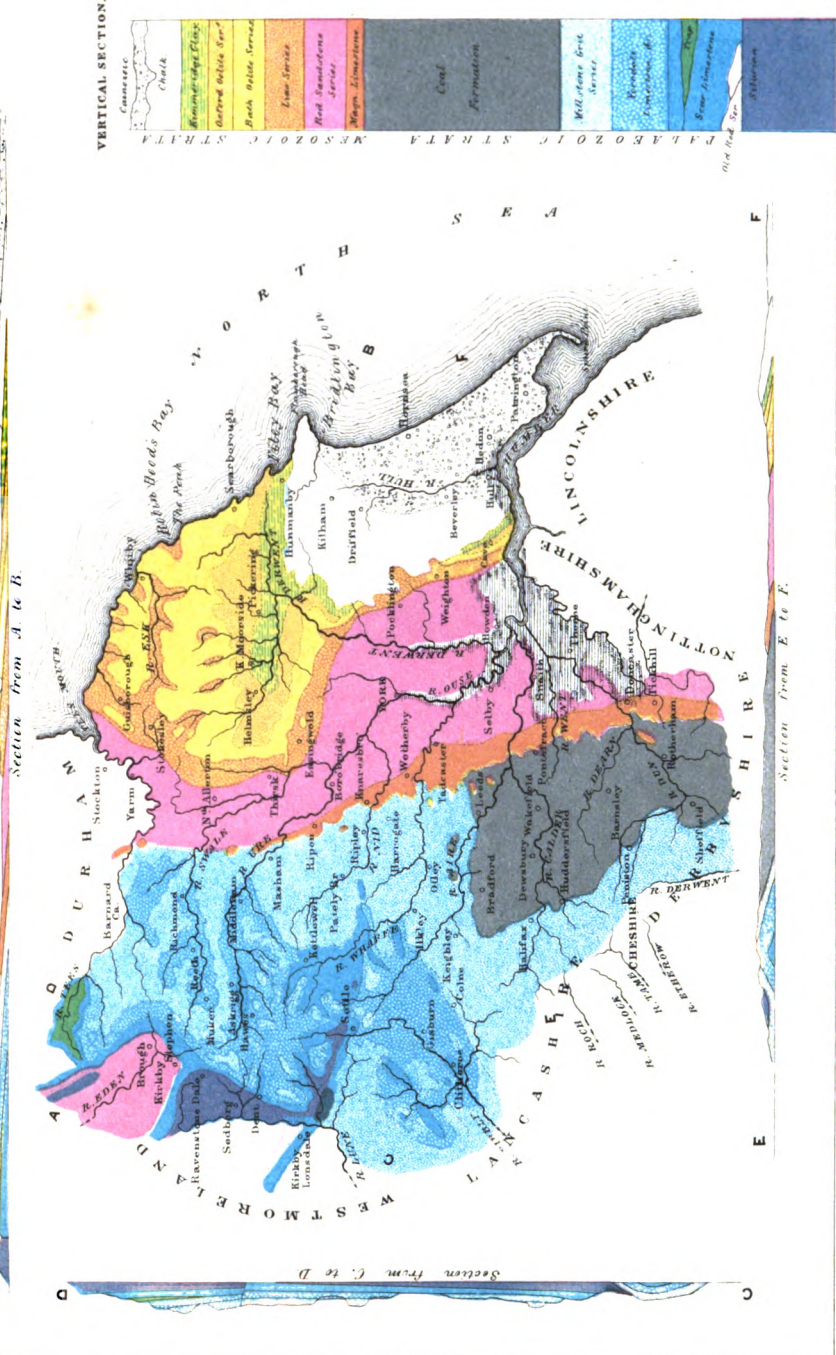
A. Stone, by W. H. H. 1860.

ROCKCLIFF.



GEOLOGY OF YORKSHIRE.

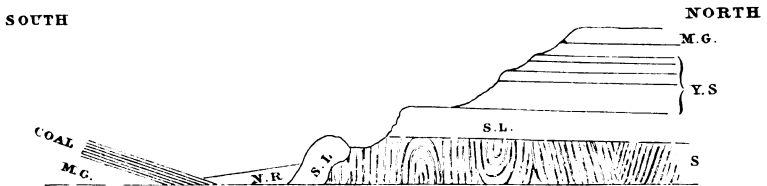
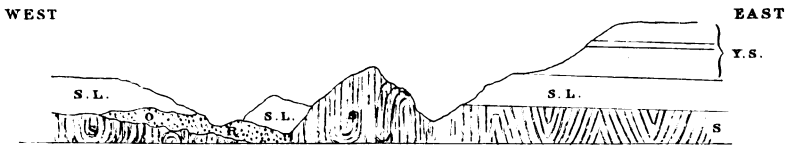
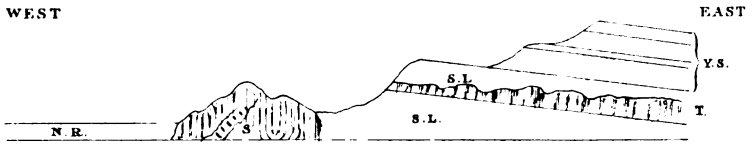
B



W. Monkhouse, Ltd. York



SECTIONS TO ILLUSTRATE THE CRAVEN FAULT



W. M. Malhouse 1895











ANGLO SAXON, (DEIRA)



ROMAN, (EBURACUM)

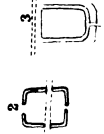
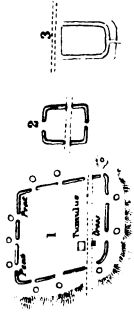


BRITISH, (BRIGANTES)



RELATIVE MAGNITUDES & SITUATIONS OF ROMAN CAMPS NORTH OF YORK.

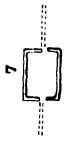
Scale of 0 1000 2000 3000 4000 5000 Feet.



2



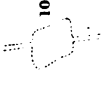
3



7



4



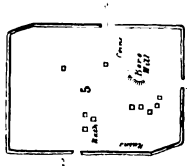
10



9

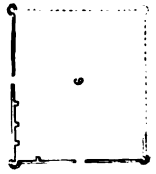


8



5

11

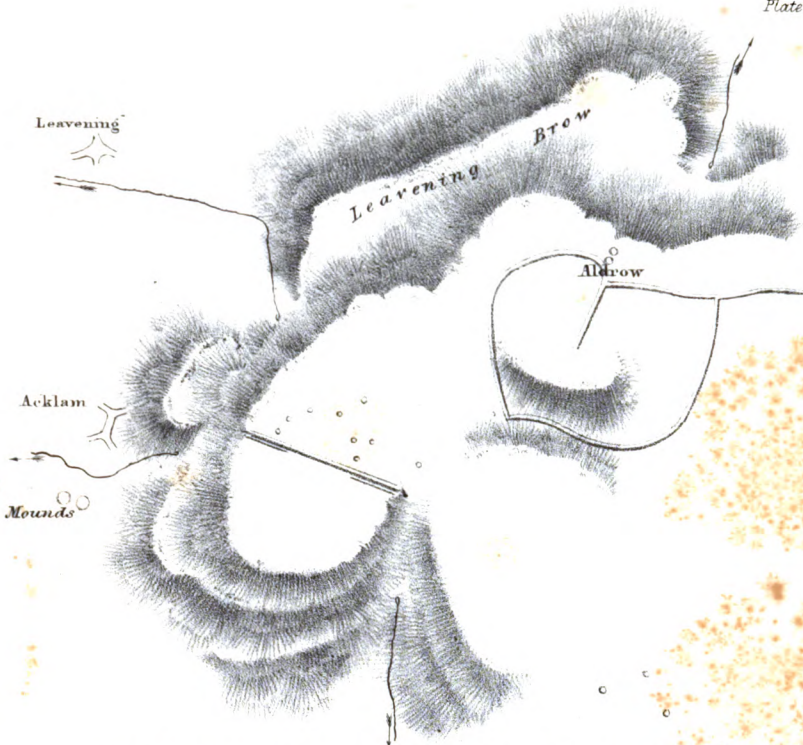


6

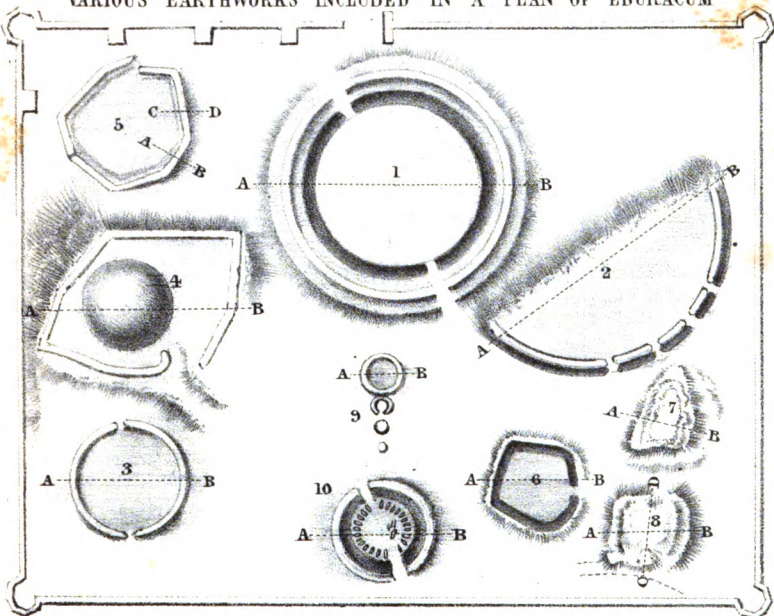
12

- 1 Reycross (Stanniser)
- 2 Lavale (Hewes)
- 3 Gairragobium (Galleric bridge)
- 4 Gaurium (Abercrombie)
- 5 Breachium (Abercrombie)
- 6 Malton
- 7 Leaswater
- 8 Leaswater
- 9 Leaswater
- 10 Gairragobium
- 11 Langton
- 12 Langton





VARIOUS EARTHWORKS INCLUDED IN A PLAN OF EBURACUM



SECTIONS.

- |         |   |       |   |       |   |       |   |        |    |       |       |   |
|---------|---|-------|---|-------|---|-------|---|--------|----|-------|-------|---|
| FIG. 1. | A | ----- | B | FIG 5 | A | ----- | B | FIG. 8 | A  | ----- | B     |   |
| " 2.    | A | ----- | B | " "   | C | ----- | D | " "    | C  | ----- | D     |   |
| " 3.    | A | ----- | B | " "   | G | ----- | A | " "    | A  | ----- | B     |   |
| " 4.    | A | ----- | B | " "   | A | ----- | B | " "    | 10 | A     | ----- | B |







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