



## XXXIX. A geological description of the neighbourhood of Bristol

W.H. Gilby Esq.

To cite this article: W.H. Gilby Esq. (1814) XXXIX. A geological description of the neighbourhood of Bristol , Philosophical Magazine Series 1, 44:198, 241-248, DOI: [10.1080/14786441408637448](https://doi.org/10.1080/14786441408637448)

To link to this article: <http://dx.doi.org/10.1080/14786441408637448>



Published online: 27 Jul 2009.



Submit your article to this journal [↗](#)



Article views: 3



View related articles [↗](#)

XXXIX. *A Geological Description of the Neighbourhood of Bristol.* By W. H. GILBY, Esq.

To Mr. Tilloch.

SIR,—THE paper which I have ventured to transmit to you, contains a geological description of the neighbourhood of Bristol. Some time after I had commenced my inquiries, I saw for the first time Mr. Townsend's very valuable book "*On the Character of Moses established for Veracity as an Historian*," wherein I found interspersed throughout the body of the work much important information respecting the structure of this quarter. Admirable as his descriptions are, it appeared to me that some interesting particulars, having perhaps no immediate relation to his conclusions, remained yet to be detailed. In the paper that I have addressed to you, I have endeavoured to supply those particulars, and to give a more connected account of the formations in this quarter; and should it appear to you to be worthy of a place in your Journal, you will oblige me by inserting it.

I am,

Very respectfully yours,

York Crescent, Clifton, Bristol,  
September 24, 1814.

W. H. GILBY.

The rocks in this quarter may be divided into those that are inclined, and those that lie unconformably in a horizontal position upon the tops of the inclined strata. In the following description I shall first speak of the inclined strata, and begin with the limestone and its accompanying formations, which range round the country somewhat in an elliptical form. I shall then speak of the coal-measures which this ellipsis incloses. The horizontal strata will then be treated of; and I shall, lastly, enumerate those minerals which occur partially, or in veins, in the preceding formations.

The rock which forms the most prominent feature in this quarter, and gives rise to all the bold and picturesque scenery which many parts of this country are remarkable for, is the *gray, compact, mountain limestone*. Mr. Townsend has very accurately described the different localities of this rock. It ranges round Bristol in almost every direction, and forms, in fact, an irregular kind of basin, of which the most northern points are the hills about Thornbury. On the east it is well observed in a continuous range at Wickwar and Sodbury; and in a very bold manner at Week, about half way on the upper road to Bath

Vol. 44. No. 198. Oct. 1814.

Q

from

from Bristol. It is wanting on the south-east, in the distance between Bath and Elm near Mells, where it reappears and constitutes the whole of the Mendip Hills, which run east and west to the south of Bristol. On the west it runs in a wide ridge which commences about three miles to the north-east of Langford, and continues to within about two miles of Bristol. On the north-west it is seen at Clifton and Westbury. Independent of this limestone ellipsis there is a subordinate range which begins from Leigh and Ashton Downs, and runs towards the Channel above Belmont, Wraxal, and Tickengham. The inclination of the limestone wherever seen is always at a considerable angle, being never less than  $35^{\circ}$ . At Week the strata are elevated to an angle of at least  $65^{\circ}$ . At the Mendips near Langford, and on the road near Westbury, the dip is seventy; and in some parts of Blais Castle grounds the strata may be said to be completely vertical. It is very remarkable that the direction of the dip varies as we observe it at different parts of the basin. At the north the inclination is towards the south. On the east, at Sodbury, due west. On the south, at the Mendips, they incline towards the north. This, however, is only to be said of that part of the range which has a northern aspect; for that portion of the south part at Cheddar Cliffs, and the hills above Wells and Axbridge, are observed to incline towards the south. The Langford road passes along the westward ridge, and wherever the dip is seen, it is towards the east; and at Barrow, where there is a large quarry, it is due east. There are some places, however, where we find that the inclination does not conform to this arrangement. If we diverge from the Langford road, and come any where upon the brow of the ridge above Brockley, Backwell, or Bourton, we find the dip completely altered; instead of its being as it is on the Langford road eastwards, we find it almost due north. This part of the range forms, in fact, the southern boundary of the Nailsea coal-field, which lies between it and the opposite range, passing above Wraxal, Belmont and Tickengham, where the dip is always tending towards the south. We therefore find the Nailsea coal-field shut in by two barriers, each dipping towards the other. From Clifton to Westbury the limestone sinks towards the south-east, but about half a mile beyond Westbury the inclination is to the north. If we go from this point westward towards King-weston Hill and Pinfield Point, we find the same dip to prevail. It is probable that this variation in the dip is connected with some coal formation in the plain below. I am confirmed in this idea by having observed at Patishead along the point the micaceous sandstone or Pennant stone, which is always in this country an unerring index of coal.

The

The magnitude of the limestone strata is various; they seldom are less than three feet in thickness, and frequently they are observed to be six or seven feet thick. We sometimes see the beds of a black colour, from a deep impregnation of bituminous matter, in which case they exhale a fœtid smell when rubbed similar to that of sulphuretted hydrogen. It should be remarked, that the beds are sometimes very much traversed by contemporaneous veins of calc spar. It is not uncommon to find these veins of great thickness, they then approach to the character of true veins.

In some places we find a highly indurated sandstone of a grayish and oftentimes of a reddish colour and splintery fracture resting upon and dipping in a conformable direction with the limestone. About Clifton it is rather extensively distributed, forming several hills. Paragon Buildings are built upon it, and it is behind this row that the junction of the sandstone and limestone can very well be traced. York Place also stands upon it, from which spot it continues and forms the whole of Brandon Hill, and much of the space between Brandon Hill and Paragon Buildings is composed of this rock. We likewise trace it through Mr. Tyndal's Park, and on Kingsdown.

In all the above-mentioned places it reposes upon the mountain limestone, as is the case also at Week. It is likewise seen at the foot of Almonsbury Hill, in the cross road leading from the Gloucester to the Old Passage road, and in several places about Olverton. Besides the indurated sandstone, which perhaps according to the Wernerian nomenclature should be called a quartzzy sandstone, and which, as far as I know, is only met with above the limestone, there are two other rocks which occur but partially, and lie below the limestone in a conformably inclined position—a siliceous pudding-stone and a red sandstone.

The relation which these rocks bear to the indurated sandstone and limestone is beautifully displayed by the section which some grand convulsion of nature has made of the rocks below Bristol. If we follow the path on the left side of the river Avon, where the stratification is best observed, we observe these formations occurring in regular succession. The first rock that comes in view after passing the ferry at Rownham, is the indurated sandstone, which at no great distance ceases, and is observed resting upon the limestone. The limestone then commences and continues uninterruptedly for about two miles. Opposite Cock's Folly it terminates, and then succeeds the pudding-stone, the matrix of which is a grayish-white sandstone cementing round pebbles of quartz. In some of the beds the gravel is so abundant that the matrix is hardly to be perceived, and in other strata it is so thinly distributed that the rock better deserves

the name of a sandstone than pudding-stone. From the river side the pudding-stone can be traced crossing the road a little below Leigh. It is then for some distance lost on account of the cultivated state of the country, but in the hills near Bill and St. George's it is very distinctly seen, and can be followed beyond Portbury. In this route the pudding-stone is always seen dipping under the limestone agreeably to its inclination.

We now return to the stratification at the river's side. Beyond the pudding-stone which continues for about 200 yards, we arrive at the red sandstone of a fine friable texture, and containing spangles of mica. We can follow this rock northward from the river, and always see it sinking under the pudding-stone. It is exposed in many places in the space between Leigh and Portbury, and I have remarked this rock underneath the limestone at Mendip Hills in the path leading from Langford to Shipham.

I have been thus particular in describing these formations, as they absolutely exhibit a counter part of those that exist in the south of Herefordshire, along the skirts of Dean Forest. I had lately an opportunity of investigating the geology of the hilly country in the neighbourhood of Ross, and could not but be very much struck with the almost perfect identity of the series I have just now described with that near Ross. The lowest strata of which those hills were composed was the red sandstone I have just been dwelling upon. Then succeeded a siliceous pudding consisting of rounded pebbles of quartz, united by a sandstone cement, and above the pudding-stone lay the mountain limestone.

It is probable that the same stratification obtains in the country about Chepstow, for the mountain limestone is seen to prevail there, and I observed that Tintern Abbey is built of the red sandstone, which I was informed was quarried from the neighbourhood.

Having now fully described the limestone and the relation which the other inclined strata bear to it, I have next to speak of the country which the limestone ellipsis incloses. It is almost entirely an extensive coal formation, in which the coal either occurs in regular basins, or in veins following each other in quick succession, without being arranged in any determinate form. Mr. Townsend has described a very beautiful instance of the first kind of formation on the north-east side of Bristol, the outer range of which will be described by a line beginning at Iron Acton, and drawn through Yate, Wapley, Pucklechurch, Mangotsfield, Hambrook, and Frampton. This basin is about five miles in length and four in breadth, and in every part of its circumference I found the coal and its accompanying strata tending to a common centre. The Nailsea coal-field which is  
inclosed

enclosed by the two ridges of limestone, as described above, is, according to Mr. Townsend, another instance of the basin-shaped formation of coal. In other parts of the country the coal does not occur in any regular form.

Kingwood, from which Bristol has been so long supplied with coal, is a tract to the east of Bristol, about four miles broad. In this space the coal beds are very numerous, and follow each other in very quick succession. I have been informed by several old colliers, that in this district there are upwards of thirty veins of coal. A gentleman of my acquaintance told me, that his estate at Kingwood, in breadth about 1160 yards, contains twelve veins of coal, four of which are six feet in thickness. The beds in general are not of any considerable thickness, and are always inclined seldom less than  $26^{\circ}$  or  $30^{\circ}$ , and the prevailing dip is to the south, as is also the case with the veins worked at Bedminster. It sometimes happens that the veins are much impaired in quality, and sometimes completely intercepted by a loose kind of rubble, but faults of this kind are seldom of any considerable extent. The most remarkable instance in this district of a fault, that I am aware of, is in some collieries belonging to the Duke of Beaufort, about two miles on the Pucklechurch road, where the coal is thrown into a saddle-shaped form. On one side of the saddle a shaft has been sunk which meets with the coal at the depth of 147 fathoms. The strata that accompany the coal consist of micaceous sandstone (Pennant stone), indurated clay, here called duns, and bituminous shale. The micaceous sandstone is met with most extensively, and occurs in beds of great thickness. I know of pits that are sunk upwards of 20 fathoms through it. It is very well exposed in many quarries about Bristol, and is seen to great advantage along the bank of the river at Crew's Hole and Hanham, where it forms high and beautiful cliffs. I shall omit mentioning any particulars respecting the collieries at Stovey and Farrington near the Mendips, as they have been fully described by Mr. Townsend, and by a Mr. Williams, in the xxxth volume of the Philosophical Transactions for 1719.

Having now described the inclined strata, I have next to take notice of a class of rocks which is always seen lying horizontally upon the tops of the elevated strata.

In Farey's Derbyshire and Mr. Townsend's work above alluded to, this series, which is distributed over great part of the south of England, is fully detailed. I shall mention generally the places where in this neighbourhood the different members of this class occur, and the relation they bear to each other. The lowest beds of this arrangement and those which rest immediately upon the inclined rocks are described by Townsend and

others under the name of *red ground*, because they are always covered by red soil, and many of the beds are deeply impregnated with that colour. The rocks of the red ground are represented by Farey as being numerous; in this quarter, however, they may very well be reduced to two—a limestone breccia and a calcareous sandstone. The breccia consists of angular fragments of limestone, hornstone, &c. cemented by a calcareous basis. Wherever it occurs, it is always seen resting immediately upon the inclined formations. It is sometimes wanting, and instead of it we find the calcareous sandstone, which is very well seen at Stapleton, where it rests immediately upon the Pennant stone; it has also been cut through in making the new course of the river. We sometimes meet with the breccia and calcareous sandstone together, as on Clifton Down near the turnpike, and among the Mendip Hills in the path leading from Langford to Shipham. Of the two formations the breccia is always the lowest; the best examples of this bed are about Pill and Portbury, where it is superimposed upon the red sandstone.

Above the beds of the red ground, we have what is provincially termed *lyas*, which is a limestone sometimes of a grayish, but more commonly of a blueish hue and dull compact fracture. It is a peculiarity in this rock to occur in strata of about a foot in thickness, which have generally interposing seams of clay or marl. The lyas has extensive localities in this quarter. It is quarried in many places in the tract between Bristol and Dundry, on the road to Bath, and in many parts of Kingwood; we see it abundantly on the Gloucester road. About Wells it rests upon the red ground, and at Aust Cliff it is situated upon claystone, probably one of the upper beds of the red ground. I could readily multiply these instances, but I believe these will be sufficient to show its general disposition in this quarter.

The next formation is the inferior *oölite*, a variety of the Bath freestone. I have no where viewed this rock *in situ*, except at Dundry Hill, where we have a favourable example of it. In walking from the village of Bedminster to the top of Dundry Hill we can trace most beautifully the relation of the three formations just now described. About Bedminster and at the sides of the new river we have the calcareous sandstone; between Bedminster and the Hill the lyas every where comes into view, and even forms the lower part of the hill. On the top near the church and among the caves the inferior oölite is well displayed. The next member of the series in this district is the Bath freestone, or great oölite, which surrounds Bath in almost every direction. There are also large quarries of it about three miles beyond Sudbury, near the Cross Keys. Of the series which lie next in succession, I have no where seen any examples in the country

country which has been the subject of my examination. I am informed, however, that the chalk which lies above the great oolite begins to appear a short distance beyond Bath.

I have now to treat of those minerals which are found partially or in veins in the several formations I have described above.

*Hornstone or Petrosilex.* This mineral I have found in distinct beds on the top of a hill above Ashton, where it rests upon the indurated sandstone, and is of a red colour from a deep impregnation of iron, and possesses an uneven fracture. At Sodbury this rock is seen upon entering the town, where it lies in distinct strata upon limestone.

*Quartz crystals* of great beauty and rich variety of colour occur in veins of clay ironstone traversing the limestone. The crystal is commonly a six-sided pyramid, which is very frequently double.

*Celestine or sulphat of strontites* is contained in veins in the claystone at Aust Passage, and it is from hence that the finest and best crystallized specimens are obtained. It has been found in other situations massive and radiated.

*Hæmatite.* Good specimens are obtained from veins in limestone and Pennant stone.

*Gypsum*, both massive and fibrous and in the state of selenite, occurs at Aust Cliff, in thin seams in the red claystone lying below the lyas.

*Sulphate of barytes.* I found crystallized specimens of this fossil in masses of limestone that had been quarried near Harptree.

*Calamine and Galena.* These minerals have been found in thin seams in the limestone of Durdham Down, and at Clevedon. The brass works at Bristol are chiefly supplied with calamine from Shipham, a village among the Mendip Hills, where it occurs in beds beneath the limestone breccia.

*Manganese* has been mentioned by Townsend, as being procured from the Mendips.

*Compact felspar.* Upon visiting some time ago the Druidical stones at Staunton Drew, I was very much surprised to find them composed of rocks which I was perfectly unaware had any existence in this vicinity—a siliceous breccia and compact felspar. In returning a short time since from an excursion among the Mendip Hills, I passed through the village of Harptree, and I was very much struck by observing about half a mile on this side Harptree, masses of compact felspar exactly resembling the blocks at Staunton Drew, which had been brought together for the purpose of repairing the highway. All the information I could learn respecting them, was, that they were taken from



the adjoining fields, where I saw large slabs of them lying upon the surface, having been turned up by the plough. The cultivated state of the country prevented further examination: otherwise I have little doubt that the compact felspar would be found *in situ*, for the masses here were in nothing different as to composition from the blocks at Staunton Drew.

*Organic Remains.* After the very elaborate manner in which Mr. Townsend has treated this subject, I should only be repeating his observations were I to attempt to add any thing. There is, however, one curious fact which I believe, he has failed to mention. It is, that although we find the fossilized remains of the *encrinus* so extensively distributed in the mountain limestone, and a prodigious abundance of shells chiefly *anomice* and *pectens*; yet in the indurated sandstone lying upon, and the other formations below the limestone, this sort of petrifications, as far as I can observe, does not appear. I had once or twice seen in cabinets at Bristol, specimens of a fine-grained friable red sandstone abounding in delicate impressions of a spinous anomia, and I was quite at a loss to know where this substance occurred, till I found it under York Place, apparently filling fissures in the indurated sandstone. A friend of mine the other day sent me a specimen of indurated sandstone containing the impression of the bark of a pine, which is the only instance of that kind of stone (as far as I know) containing in its substance any thing like an organic remain.

XL. *On the variable Action of the Electric Column.*

*By Mr. J. A. DELUC.*

*To Mr. Tilloch.*

SIR,—YOUR number for June last contains a paper of Mr. Ronalds's, which could not but interest me, as it relates to the *variable action of the electric column*. This variableness depends on many causes, with respect to one of which we do not agree, and it will be the object of this paper.

I have found in my experiments, that an increase of *moisture* did increase the *action* of the *column*. Mr. Ronalds is of a different opinion; but as he describes the experiments from which he concludes *that moisture has a very little effect on that action*, it will be easy for me to show that this disagreement between us results from a mistake on his part, and that his experiments, though very ingenious, according to his idea of the subject, are quite dissimilar to those whence I had derived my conclusion.

One