SCIENTIFIC RAMBLES

ROUND MACCLESFIELD.

To Samuel Cheek Esq.
with the Authors comps. and kind regard

1

re

Pepper Street
Street Fields
Bramhall Station
Street Lane
Siddal Houses
Coal Line
Lower Permian
Upper Permian
Disley Station
New Mills Station
River Goyt
Lyme Cage
382
Lyme Hall
Ravel Dean
Roman Road
Poynton Station
River Bollin
Wilmslow Station
Street Lane
Knights Low
Bow Stones 1250
Whaley Bridge Station
Roos Dyche or Rhedagua
Horridge End
Shrigley Hall
Tumulus
Adlington Station
Winter Fold
Pott Shrigley
Bakestonedale
Churls Head
Jaxal
Alderley Station
FAULT
Holy Well
Copper Works
Beacon 650
Alderley Edge
Prestbury
Tumulus
Butley
River Dean
Bollington
Billinge Head
Northern Roman Road
Bollington Station
Patch
Windgather Rocks
Pym Chair
Jenkin Chapel
Roman Road
Lower Street
Old Gate
Combs Moss
1670
Camp
Upton
Tumulus
Monks' Heath
Birtles
Broken Cross
Asylum
Pepper Street
HURDSFIELD
MACCLESFIELD
Tumulus
Capesthorne Hall
Tumulus
Thursbach
Cats Tor
Goyts Bridge
Goyts Lane
Roman Road
Shining Tor
1837 feet
Buxton
Burbage
Grin Lime Kilns.
Eddisbury Hill
1000
Tegg Nose
1300
Forrest Chapel
Toot Hill
Tor Gate
Cat and Fiddle Inn
1750
Dane Moss
Langley
Ridge Gate
Reservoir
Gawsworth
Source of the Goyt
Dane Head
Thatch Marsh Colliery
1810
Well
Shutlings Low
1661
Axe Edge
Marton
Bosley
Allgreave Tollbar
Flash
North Rode Junction
Wincle Church
River Dane
Lud Church
Hanging Stone
Swithamley Hall
Clough Head
Hulme Walfield Roman Camp
Minn
Bosley Station
1580
The Roaches
Gib Tor
Hug Bridge
Royal Cottage
Turners Pool
CONGLETON
Cloud Hill
1190
Camp
Bridestones
Dial Lane
Rushton
Lower Permian
New Red Sandstone
Dolmen
Doxy Pool
Rock Hall
Hob Church
Dolmen
Stone Circle
Black Moor or Moor
Gun Hill
stone Pits
1210
Meerbrook
1210
Hall
Astbury Lime Kilns
Congleton Edge
Biddulph
Biddulph Moor
1001
Mowcop
New Red Sandstone
Churnet
River
LEEK
Mixon Coppermine
Wickenstone
Tumuli
Dolmens
Millstone Grit
Stone Circles
Cairns
New Red Sandstone
Lower Permian
Upper Permian
Middle Coal Measures.
Lower Coal Measures.
Yoredale Rocks
Mountain Limestone

To Samuel Chick Esq
With the Authors compts and Kind regards

THE JOTTINGS

OF SOME

ological, Archæological, Botanical, Ornithological, and Zoological

RAMBLES

ROUND MACCLESFIELD.

BY

J. D. SAINTER, F.G.S.

WITH ILLUSTRATIONS.

MACCLESFIELD:
SWINNERTON AND BROWN, PRINTERS.
1878.

TO MY KIND AND CONGENIAL FRIEND,

PROFESSOR GREEN, M.A., F.G.S.,

AND FORMERLY ON THE

STAFF OF HER MAJESTY'S GEOLOGICAL ORDNANCE SURVEY,

I Dedicate

THIS LITTLE WORK,

IN REMEMBRANCE OF THE MANY HAPPY HOURS WE HAVE SPENT

TOGETHER, WHEN TRACING THE GEOLOGICAL STRUCTURE

OF THE COUNTRY ROUND MACCLESFIELD.

J. D. SAINTER, F.G.S.

PREFACE.

In publishing this work, the Author has been actuated chiefly by the motive that it may be the means, more or less, of stimulating in others, especially the rising generation of this neighbourhood, a greater taste than has hitherto been manifested for the study of the Natural Sciences and other kindred subjects. With respect to the Geology of this district, merely an outline has been given from the "Memoirs of the Geological Survey of Great Britain," which is the only reliable authority upon the subject; and, in its production in 1866, the Author was somewhat instrumental, his services therein being duly acknowledged and appreciated by the authorities. To incipient students in this science, recourse must be had to the latest elementary works upon Geology, either before commencing or along with the study of the before-mentioned publication. The Archæology of the country around Macclesfield, so far as it relates to Celtic, Romano-British, or Anglo-Saxon times, is rather rich, and as the subject has been hitherto scarcely touched upon by former writers, the present exposition will no doubt be acceptable to antiquarians. The Botany of the neighbourhood of Macclesfield is replete; but its specimens cannot vie with some of the

very beautiful and rare wild flowers that are to be met with in the adjacent county of Derby, with its luxuriant Mountain Limestone valleys. As to the Ornithology and Zoology of this part of Cheshire, there is nothing uncommon, which, with few exceptions, may not be found in the surrounding counties. In the midst of an active medical practice, conducted by the author in the town of Macclesfield and its vicinity for many years, it has been his custom and pleasure (on desultory occasions, or whenever opportunities offered,) to obtain, more or less, a practical knowledge of some of the various branches of the Natural History of this part of the country. The study of the science of Geology is rather a dry subject for beginners, and the author has combined with it the Archæology of the neighbourhood; he flatters himself that this step may prove both agreeable and useful to students who possess a taste in that direction, for, when tracing the strata of a district, it is generally in desolate or out-of-the-way places, where Archæological remains are found to be existing, and the same remark will equally apply to the discovery of the rarer plants.

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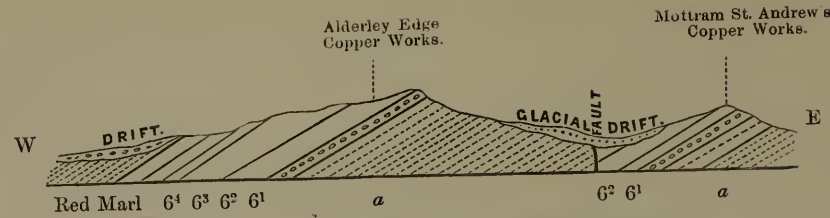
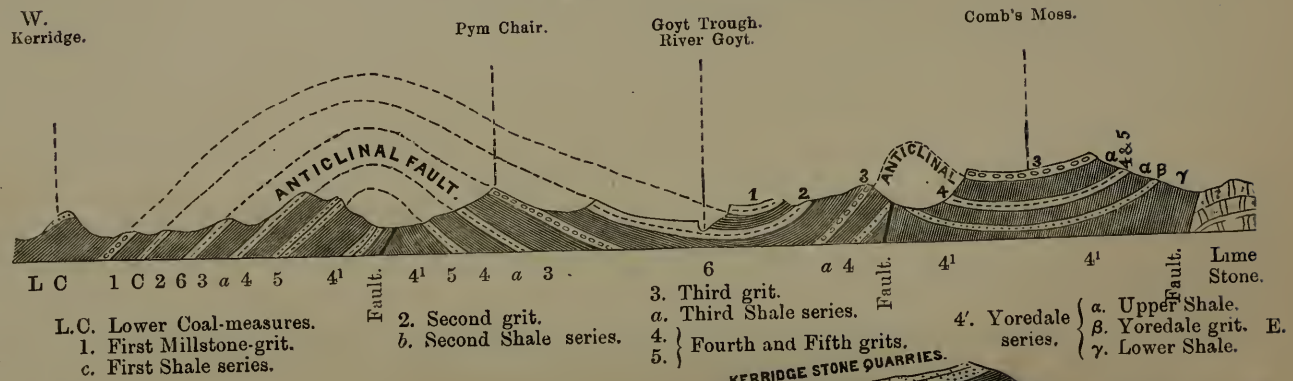
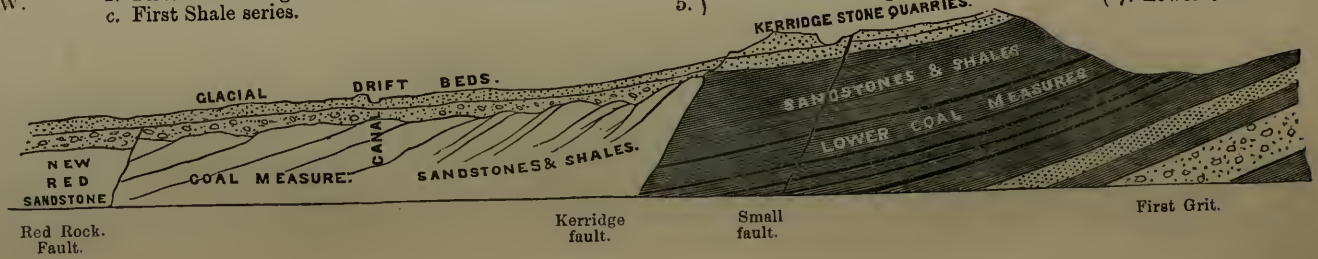


Section across the District South of Whaley Bridge.





Section of the New Red Sandstone series from Alderley Edge to Mottram St. Andrew.

[*Vide Plate.*]

The escarpment of Alderley Edge rises gradually from the eastern aspect of the Cheshire plain with a steep and abrupt ridge towards the north. This ridge has been upheaved along the line of a large fault, bearing east and west, and throwing down the Red Marl at its base; while, on the other side, is brought up the upper red, yellow, and mottled sandstone of the Bunter series, which are capped by a mural cliff of the Lower Keuper Conglomerate Sandstone.

Succession of Beds in descending order.

First.—Red Marl or Upper Keuper Sandstone, with red and grey laminated marls.

6^4.—Waterstones or brownish flagstones and marls.

6^3.—Building stone, white and brown freestone.

6^2.—Copper-bearing sandstone.

6^1.—Hard conglomerate sandstone, with quartz pebbles thickly embedded in it; and this forms the base of the Lower Keuper series, which will amount to about 500 feet in thickness.

a.—Upper red and mottled sandstone. Bunter.

At Mottram St. Andrew, cobalt and copper are extracted from the conglomerate at the base of the Keuper. Its position there, which is down in the plain, is due to the large downward fault which ranges east and west through Chorley.

*** *Substitute figures 6 by the letter b.*

Jottings.

IN the geological description of the country about Macclesfield, within a compass of eight or ten miles, the following formations, in descending order, are represented—viz., Valley Gravels and River Terraces; Glacial Drift Deposits, New Red Sandstone or Trias, Permian, Middle Coal-measures, Lower Coal-measures, Millstone Grit, Yoredale Rocks, and Carboniferous or Mountain Limestone. Macclesfield is 500 feet above the level of the sea, it is built upon the drift, which in some parts of the town is from 80 to 170 feet in thickness, and, rests upon the pebble beds or second bunter sandstone of the trias. On the eastern side of the town, a line of fracture, known as the Red Rock fault, runs north and south in almost a direct line, and plays a very leading part in the geology of the district. This fault commences a little to the north of Stockport, cuts right across East Cheshire, and terminates near Talk-o'-th'-Hill, Staffordshire, a distance of 30 miles. Beyond the eastern margin of the fault, we have the carboniferous deposits, which extend to the neighbourhood of Buxton, where they abut against the mountain limestone of Derbyshire; while immediately west of the fault, covered for the most part by the drift deposits, lie the new red sandstone formations, which constitute the great triassic

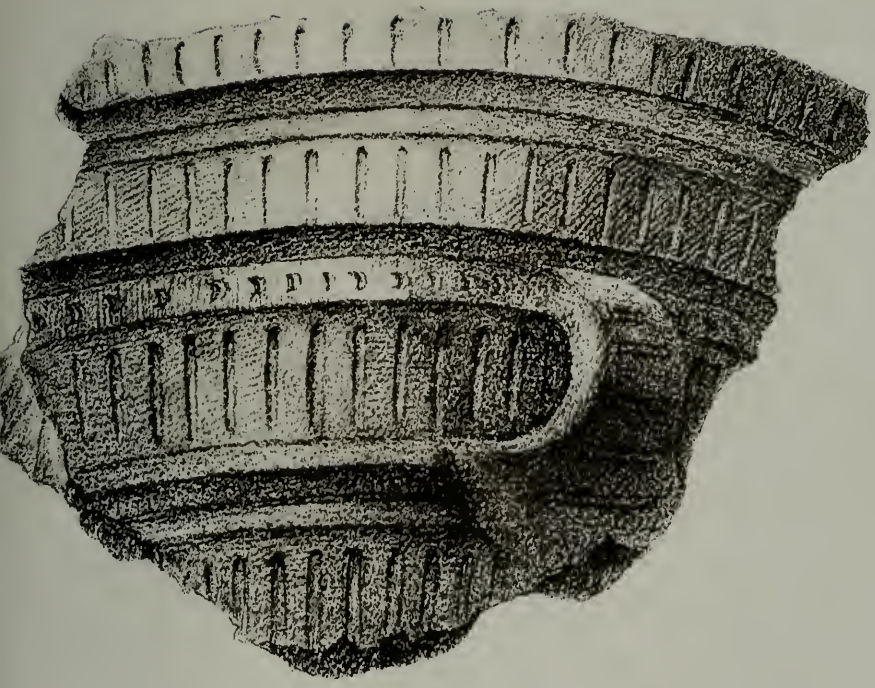
plain of Cheshire, at an average elevation of 250 feet above the sea-level. The physical features of the country, extending east of this fault, contrast very strongly with its western aspect. In the former we have lofty hills with bleak and barren moorland, diversified at intervals by long and broad ridges, bold escarpments and sharp cliffs, which are varied by deep dells and long broad or basin-like, valleys ; while on the contrary, west of the great fault where the soft rocks of the Trias have been planed down by denudation almost to a level surface, the country is well wooded and highly cultivated ; and with the exception of Alderley Edge, which forms a conspicuous object in the foreground, there is no obstruction to the view from the heights near Macclesfield, along the course of the river Mersey as far as the Irish Sea, a distance of fifty miles. Again, with reference to the subject of the great elevation of this part of Cheshire ; there is another point of view in connection with it that may be named. This track forms the component part of that central ridge which stretches 200 miles from Derbyshire northwards, to the borders of Scotland, generally known as the Pennine chain or back-bone of England. It marks the position of a grand anti-clinal axis, which on its western side has been thrown off the coal-measures of Lancashire, Cheshire, and North Staffordshire, and on the eastern side, those of Yorkshire, Derbyshire, and Nottinghamshire. This upheaval has attained its greatest development in North Derbyshire, where the large central arch of mountain limestone, 5,000 feet in thickness, has been brought to the surface, with an altitude of 1,500 feet above the level of the sea.

The lower division of the carboniferous rocks, with the exception of the coal deposits, are fairly represented in the vicinity of Macclesfield. These are confined to the lower coal-measures, which are much broken up by small faults, and consist of four or five poor thin seams, of

which the third is mainly used for domestic purposes. The best general section of them is given on Kerridge, which is 930 feet above the sea level, where they have been largely worked. [From Cerrig (Celtic), a ridge, or Hrigg (Anglo-Saxon), a back.] An important down-throw fault runs along the western flank of this ridge, named the "Kerridge fault," ranging from Bollington southwards, and may be traced into the North Staffordshire coalfield. It is seen crossing the brook below the One House, and through Teggsnose farm, where it brings about a change in the beds; then along the east side of Bosley Minn, producing great disturbance of the strata [from bos, (Anglo-Saxon), a woodland district; ley, (Anglo-Saxon), with pasture land; and Minn or Maen (Celtic), rocky heights]; and a little to the east of Hug Bridge, near Rushton, it crosses the river Dane, where the beds are much broken up. The millstone grits ranging from an anticlinal fault running north and south along the Saltersford valley, (see section), dip under Kerridge; and all the carboniferous strata are ultimately cut off about half a mile to the west of it by the great red rock fault of East Cheshire.

The middle coal-measures, which are a continuation of some of the Lancashire beds, are worked at Poynton, and they extend no further south than Styperson Park near Shrigley, where at Winter Fold, Bakestonedale, &c., the lower coal-measures come into operation. Westward, at Poynton, the coal-measures are skirted by the new red sandstone and permian strata, which are the equivalents of the red rock fault in that locality. About one mile directly south of Styperson, evidence of this fault is to be seen in the bank of the small river Dean, behind the Waterhouse Mill, Bollington, where an outlier of the pebble beds, or second bunter sandstone of the trias forms a good cliff, which shows the fault to be near at hand that determines the boundary line of the lower coal deposits at Bollington.

A like exposition has been proved at the Roe Wood Colliery, Hurdsfield ; also near the Navigation Inn, Macclesfield Common, and in a well at the Sutton Brewery. At Butley, near Bollington Cross, or about two miles on the Manchester road from Macclesfield, Ormerod, in his "History of Cheshire," mentions the discovery of what he names "an ancient cemetery, supposed to have been connected with a religious establishment at Prestbury," which is very unlikely. The following is a summary of his description of it, with further remarks : A cinerary urn was found containing burnt bones, but nothing is said as to its type or style of ornamentation. It was covered by a flat stone, with three or four boulders placed around it and set near the edge or circumference of a cairn, and by its side there had been deposited a collection of human bones. Some of the stones occupying the upper part of the above cairn were split, and black with smoke, having been exposed to a great heat ; and scattered among them, towards the top, there was picked out some fragments of calcined human bones. This cairn had been built up from an excavation that had been made into the surface soil, and it was surrounded by other cairns (how many not named), which had been formed on the surface, and a circle of large stones enclosed the whole. No other interments are mentioned. Some of these cairns were four feet high and two-and-a-half in diameter, and this rather unusual assemblage of ancient forms of burial was overlaid by a covering of earth one yard in thickness, which represented a tumulus on rather a large scale. The urn would probably contain the ashes of some person of note ; and the deposit of bones lying outside of it, was possibly the remains of a wife, servant, captive, or slave, whom from the most remote periods it had been the custom to immolate upon the death of a chieftain or the head of a family ; and this act was occasionally a voluntary one on the



FOOD VESSEL. CELTIC.

part of the victim. The same remark may be applicable to those fragments of calcined bones observed to be scattered among the blackened stones on the upper part of the central cairn ; and it is not unlikely, that if the floor of this cairn had been examined, there would have been exposed another burial deposited in a rude stone cist, or otherwise, accompanied by flint or bone instruments, and this would have been the original or primary interment of Celtic date. The latest interment was that of the urn burial, and probably it contained the incinerated remains of a distinguished Saxon ; and the other cairns, with the surrounding stone circle, may have been erected in honour to his memory ; unless they represented an interment by inhumation or cremation close to each. It is customary to find in barrows, which contain besides the Celtic burial, those of a later period which lie nearer to the top or sides of the mound, and these will refer to Romano-British, and Anglo-Saxon times.

About one mile east from Macclesfield the ground has had a sharp rise, forming Eddisbury Hill, which is 1,000 feet above the sea. Towards the top of it, on its northern slope, owing to an upcast fault, some of the Kerridge coal seams have cropped out on the surface, and in crossing the country upon the turnpike road from this point to near Buxton, it is found to be occupied by the millstone grits and Yoredale rocks, but chiefly by the former.

The millstone grit series consist of a group of thick-bedded, coarse, massive gritstones and conglomerates ; between which lie shales, flagstones, and finer sandstones. The beds of grit, five in number, can be traced over the whole of this district, as their outcrops form nearly all the more striking hills and ridges, while the flanks of the ranges and the valleys are made up of shales. The first bed of grit, technically called " Rough Rock," forms the

upper boundary of the millstone grits, and is about 100 feet in thickness at Macclesfield, the second bed 150, third 200, fourth 100, and the fifth 60; and by allowing 400 feet for their intervening bands of shale, there will be a total thickness of 1,000 feet. The first bed of grit is a coarse and massive sandstone, and it often contains quartz-pebbles forming a conglomerate. It crumbles in some places when exposed to the air, owing to the decomposition of its felspar. A seam of coal from four to six feet thick, lying on the top of this grit, is worked on Eddisbury Hill, which is chiefly used for lime burning and brick making. This represents the lowest bed of coal in the true coal measures. The second bed of grit is generally a fine-grained, flaggy brown or yellow sandstone, and sometimes either coarse or massive. The grit coal lying at the base of the shales between the second and third grits is one of the most persistent beds of the series. Its average thickness is about one foot, but it swells out to four feet six inches at Thatch Marsh, near Buxton, and it is found four feet thick on Congleton Edge, also on Teggs Nose, &c. The third bed of grit is generally coarse and massive, often a conglomerate, and mostly red. It is named the "escarpment grit," being the finest in the country, often running for miles in an unbroken wall of rock. The coal on the top of this grit is found here and there over the whole district. The fourth grit is for the most part a very coarse gritstone and conglomerate; it lies in two or three beds separated by shales. A little coal has been worked on the top of this grit on Axe Edge. The fifth or lowest bed of grit is somewhat changeable in its character, but occurs chiefly as a fine grained sandstone, not very thickly bedded, with shale partings.

The millstone grit beds of the Chinley hills, north-east of Whaley Bridge, attain a thickness of 3,000 feet. All of them proceeding southwards, gradually thin out, so that at

Macclesfield, as above stated, the thickness is reduced to 1,000 feet. At Mow Cop, on the North Staffordshire border only the first and third beds remain, with a thickness of 300 feet, the second bed having died out near Rock Hall, on the Roaches. The fourth bed of grit, which near Glossop is 1,000 feet in thickness, terminates its career on Biddulph Moor, and the fifth bed ends at Rushton. The first bed, after having kept pretty much the same thickness throughout its course, begins to thin away beyond Wetley, in Staffordshire.

Between the lowest bed of the millstone grit and mountain limestone there lies a group of shales and sandstones with thin limestones at the bottom. These are known by the name of Yoredale rocks by English geologists, from a district where they prevail in Yorkshire. The beds in this part of Cheshire admit of three divisions, viz.—first, shales with a thick bed of sandstones, and now and then a few thin limestones; second, sandstones, for the most part thin-bedded and close grained, with black shales; third, black shales with thin, black, and earthy limestones. The first or uppermost division, is named the Yoredale grit, which is but feebly represented about Macclesfield; it will be about 150 feet in thickness, and a quarry in it may be inspected half a mile beyond Walker Barn, east, on the old Buxton road. It shows a massive sandstone of finer grain than the millstone grits. Quarries in the second division have been worked on a large scale in Hollin Lane and Ratcliffe Wood, near Fool's Nook. On Congleton Edge, flanking north, the second division of the Yoredale rocks exhibits a thickness of 2,000 feet, and on Bosley Minn they range 1,200 feet above the sea level. The third division is sparingly seen in this part of Cheshire, nevertheless, in Staffordshire it has a thickness of 2,000 feet.

Connected with the general arrangement and disposition of all the carboniferous deposits at a distance of about

four miles east of Macclesfield, there is a great break that has traversed the country north and south for a long distance, and which from its saddle-like configuration is named the Great Anticlinal Fault. In the Yoredale series of the Saltersford valley, near Jenkin Chapel, this line of disturbance of the strata is very conspicuous, it having assumed during the upheaval, a vertical dip, accompanied here and there by violent contortions from extreme pressure, and the same circumstance is observable near the Forest Chapel, and also in a brook on the west side of Shutlingslow. About two miles east beyond the anticlinal fault, on the Macclesfield Forest, and running almost parallel with it for many miles, a broad cynclinal axis occurs, named the Goyt Trough. This hollow throughout its whole length is bounded for the most part, by ridges or the out-croppings of the different beds of millstone grit which have been broken up by branch faults into several subordinate basins containing coal deposits. From the Cat and Fiddle Inn, extending east across this trough to within two miles from Buxton, an out-crop of the fourth bed of grit takes place that forms a long ridge called Axe Edge—its highest point being 1,809 feet above the level of the sea—[from hax (Scandinavian) a hill; or hoch (German) high, or a height; and ecg (Anglo Saxon) the edge, or sharp ridge of a mountain ;] and between this elevation and the above Inn, which is 1,750 feet above the sea, we have one of the most perfect lesser coal-basins into which the trough of the river Goyt is broken up. "Around a little outlier of the Lower Coal Measures, in the middle of it, the five beds of grit crop out in turn on all sides, and from a series of concentric rings, although broken through and shifted here and there, keep upon the whole the most perfect regularity around three sides at least of this basin." The river Goyt has its rise near to, which is about 1,500 feet above the sea, and

ENTRANCE TO ANCIENT BRITISH FORTRESS,
COMBS MOSS.

flows in a deep channel to Whaley Bridge, New Mills, &c., with a general N.N.W. direction, nearly along the axis of the trough to which it has given a name, and joins the river Mersey near Stockport. The boundary of the Mountain Limestone, which forms the lowest group of the carboniferous rocks, runs along a line of fault on the eastern flank of Axe Edge. Its lithological character consists of a mass of pure pale grey thick bedded limestone. There are thin partings in it, here and there, of shale and clay, also nodules and layers of chert, and two or more contemporaneous beds of igneous rock called "Amygdyloid or Toadstone."

"The upper part of the river Goyt, though little visited by tourists, is of great beauty, specially the part above Goyts Bridge. On either side, the beds of sandstone rise from the middle of the trough in sheets of heathery moorland, broken off abruptly along their upper edges. Beyond them are other expanses of moor, terminated in like manner by steep descents; till a series of escarpments with sharp and gracefully curved sides is formed with broad and gently rolling sweeps of moor between. Each ridge is formed by the outcrop of a sandstone bed, while the steep-sided valley below is hollowed out in shale; and each of these bands of grit and shale has its own place in the series, and can be traced and identified over the whole of the district."

About three miles north-east from Goyt Bridge, or one mile and a half south-west of the Chapel-en-le-Frith station on the Buxton line of railway, there is noticeable the northern termination of Comb's Moss, at an elevation of 1,670 feet above the level of the sea. From "cum," (Celtic) as applied to a curved piece of ground, which is the case in this instance. The upper portion of the Moss consists of the third bed of Millstone Grit, followed in succession by the fourth and fifth beds, with shales between

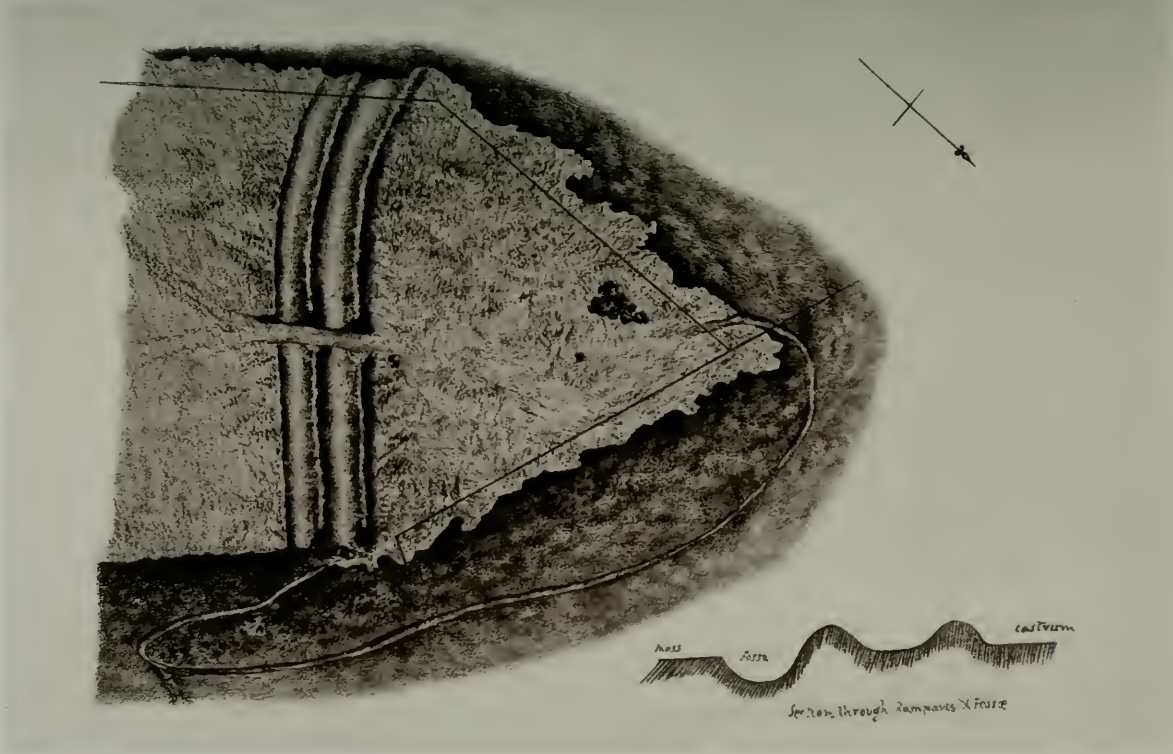
each, and below them are the Yoredale rocks. From a distance this part of the Moss presents a bold and prominent feature in the surrounding scenery, and it consists of nearly a flat and angular platform, that ends on both flanks with precipitous escarpments about 400 or 500 feet in height, which in some parts are inaccessible ; whilst the upper surface or southern boundary of this ancient British camp is occupied by entrenchments, which in those days must have proved to have been of a very formidable character. There is a good spring of water in about the centre of the area, and a stone wall is built on the outer edges of it to prevent cattle from falling over the cliffs. Likewise at the northern angle there are some excavations or pits, either the remains of cairns, or stone huts that were used by sentries in rough weather.

ANCIENT BRITISH FORTIFICATION AND CAMP ON COMBS MOSS, CHAPEL-EN-LE-FRITH.

Length of Fosse and Ramparts	547 feet.
Width of outer Fosse at top of cutting	30 ,,
Depth of do. from level of ground	10 ,,
Height of first or outer Rampart from bottom of outer Fosse	20 ,,
Width of inner Fosse at top of Ramparts . . .	50 to 65 ,,
Depth of ditto from top of ditto	10 ,,
Height of inner Rampart	10 ,,
Length of West side of Camp	450 ,,
Length of North North East side of ditto . . .	466 ,,
Length of Entrance to Camp, including the path . .	366 ,,

Scale of Plan—¼ in. to 10 yards.
,, of Section—¼ of in. to 10 feet.

Upon crossing the river Goyt at the Whaley Bridge station, and taking the way up a lane to the left, for about half a mile, there will come into view on the left, with its fine avenue of trees, what goes by the name of the Rhedagua, or the ancient Roman chariot racecourse ; and it is not improbable that it may have been used also for similar purposes by their successors, when it went by the name of the Roosdyche, from "rise," (Anglo-Saxon), or "raise," (Scandinavian), a high wood, with "dic," (Anglo-Saxon),

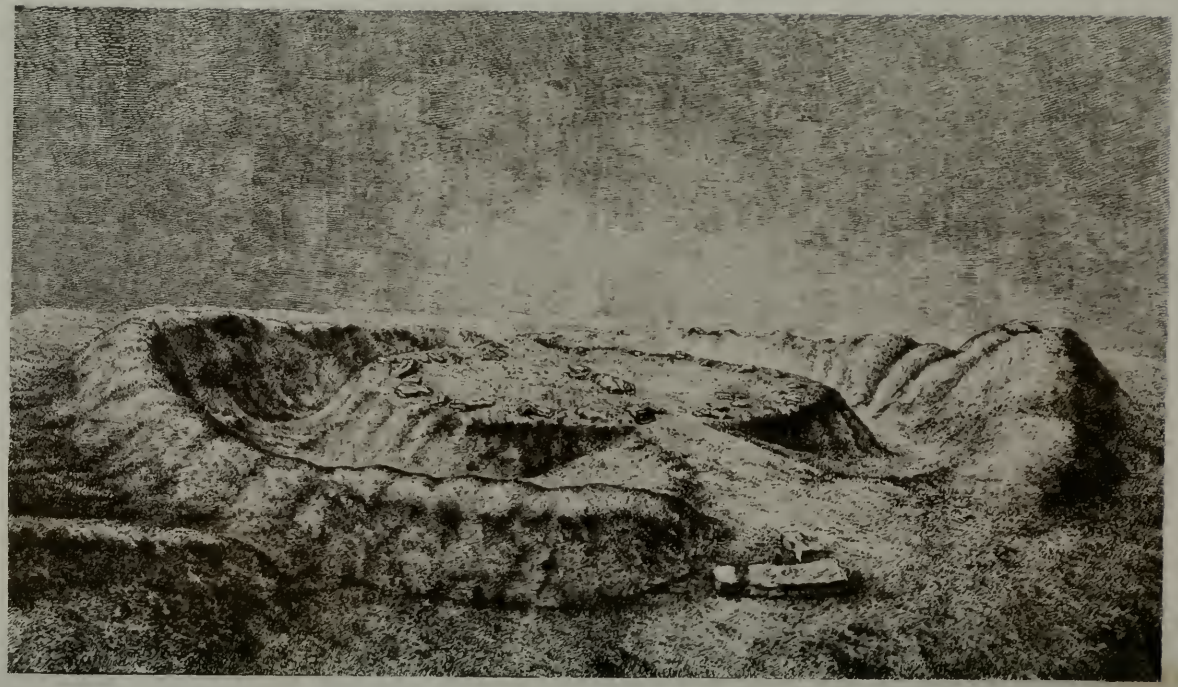


ANCIENT BRITISH FORTRESS.

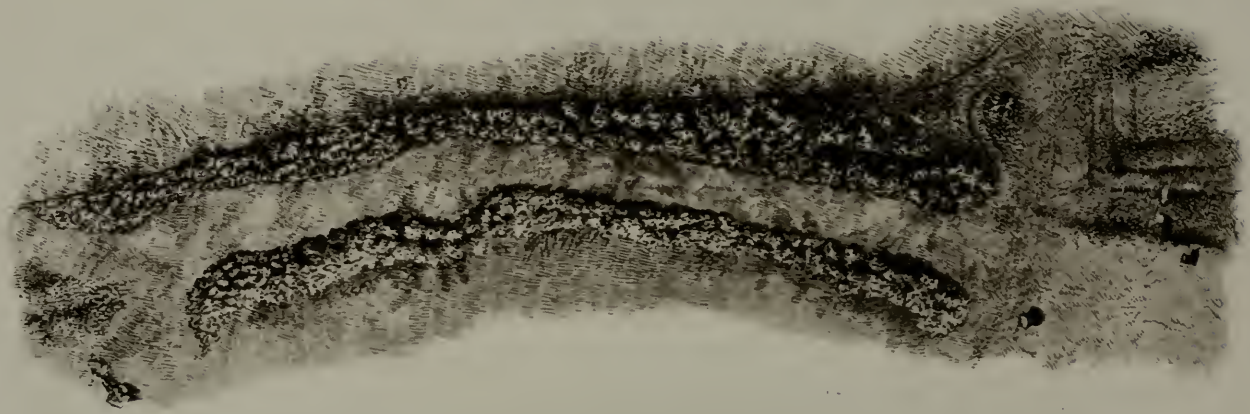
COMBS MOSS.

ENTRANCE AVENUE TO ROMAN RACE COURSE.

ANCIENT BRITISH CAMP, MAM TOR, NEAR CASTLETON, DERBYSHIRE.



ARBOR LOWE.



ROMAN CHARIOT RACECOURSE,
NEAR WHALEY BRIDGE STATION.

a ditch or furrow running through it. Originally this furrow or groove may have been the result of a huge landslip, or has been caused by the passage of an iceberg; or it may be a portion of the bed of an ancient river or watercourse, that had been formed during the occurrence of one of these oscillations of level between land and sea in the Glacial Drift period. Although so many centuries have passed since the Rhedagua was in use, it still remains in a wonderful state of preservation, and with little trouble and expense it might be made available once more for a similar purpose, with other sports and pastimes.

Roos Dyche.

Length of Race Ground	694 yards
Width near the extremity	30 ,,
Ditto ,, middle	20 ,,
Ditto various places	20 yds. 2 ft.

The above length does not contain that portion of ground where are the Terraces for spectators.

Mam Tor, five miles and a half from Whaley Bridge, is a celebrated eminence near Castleton, Derbyshire, probably derived from "mon," "maen" or "mannin," (Celtic) rock, and "tor," (Anglo-Saxon) a height, or a rocky height. It stands at an elevation of 1,300 feet above the town, and is 1,709 feet above the level of the sea. Geologically the upper part of it, for about 250 feet in thickness, is composed of sandstones belonging to the middle division of the Yoredale rocks; below them the cliff consists of beds of black shales, with thin earthy limestones, that abut against the lower massive white limestone which crops out on the road lower down the hill, near the Blue John mine. Mam Tor is called the "Shivering Mountain," on account of the middle and lower portion of it, facing south-east, being of a crumbling character. This arises for the most part from the continual percolation or oozing of water through its shaly structure, combined with other disintegrating agencies—as winds, rains, frosts, &c.; and likewise

from chemical action ; the consequence is, that the upper division of the hill, which consists of solid rock-strata, becomes now and then undermined, and large breadths of it along with other detrital matters at a lower level, are detached and precipitated down the slope into the valley below, where for some distance there has been accumulated a vast amount of debris. The following account of Mam Tor is given in Davies' View of Derbyshire, 1811. "On the summit of Mam Tor, are the remains of an ancient British encampment. The camp is surrounded by a double trench which is still in good preservation, except on the side facing Castleton, where it has been destroyed by the frequent shivering of the earth or shale. It extended from north east to south west along the ridges of the eminence, and occupied something more than fourteen acres of ground, the circumference being about 1,200 yards. The principal entrance was from the west. At the north east corner is a perennial spring ; and near the south west side are two barrows, one of which was opened a few years ago, and a brass celt with some fragments of an unbaked urn were found in it. The mountain on every side is very steep."

There is no doubt, that in a military point of view, the possession of the above site, had always been an object of importance in bygone times, both to the Celt, Roman and Saxon.

The heathen temple of Arbor Lowe, or Arbe Low, may now be referred to, as it is one of the most striking monuments of antiquity that is to be met with in Derbyshire, or almost in this country ; it lies about nine miles south east of Buxton on the Ashbourne road. Probably from "Arbhar," (Celtic), which means a locality or an institution suitably adapted for an assemblage of people, either for civil, military, or religious purposes; and "Lowe," (Anglo-Saxon) a burial mound, barrow, or tumulus. This ancient relic consists of

a circular (though somewhat elliptical) area or platform, that will measure from east to west about 50 yards across it. It is accompanied by a ditch fifteen feet broad at the bottom ; and up to a level with the area, it is about 18 feet in breadth. During its excavation, the earth was used in the construction of an outer vallum or rampart, from 18 to 24 feet in height, and 810 feet in circumference at the top. To the north and south there is a path 12 yards in width that leads across the ditch on to the platform ; and on the east side of the southern entrance, there are the remains of a barrow which was opened in 1845 by Mr. T. Bateman, the contents of which proved beyond doubt the extremely remote age of this burial. In addition to the earthworks, there is also to be noticed a circle of stones about 30 in number, that have been prostrated, and most of them lie close to the inner margin of the ditch, along with here and there the remains of others that have been mutilated, displaced, or broken up. The uninjured specimens consist of rough and unhewn slabs of limestone, very much weathered, and ranging from five to eight or ten feet in length, three or four in breadth at the widest part, one in thickness, and they generally point with their narrower ends towards the centre of the circle, where there are likewise some larger and thicker stones, that have evidently formed part of a dolmen.

The site of Arbor Lowe is not quite so elevated as some districts in the county, yet it commands a most extensive prospect, and the feelings on visiting the place upon a fine summer's day, when there is no sound to disturb the solitude except the singing of the lark, and now and then the cry of the plover, (which here abound), are most pleasing ; still, this is accompanied by a certain amount of reverential awe and amazement, especially on a first visit, when contemplating this hoary ruin along with its eventful history.

The temples of the primeval Britons are invariably circular and constructed of large masses of unhewn stone enclosed by a vallum of earth. Some few of them exist in other parts of England, but none are more perfect than the circle of Arbor Lowe. Clusters of tumuli are frequently found near to these temples, raised doubtless, under the influence of the same feelings which prompt us at the present day to inter our dead in consecrated ground. There is every reason to believe, that amongst the earlier Britons, the sun was the principal, if not the only embodiment of Deity generally worshipped. These circles were unquestionably the scenes of their civil meetings as well as of their religious ceremonies. The priests, it is universally known, were called Druids ; they had, previous to Cæsar's invasion, obscured their once simple religion with a mass of dire superstitions, and monopolised most of the power of government. About 50 yards from the south entrance to the right, there is barely visible the outline of a small barrow which has been explored, but no account of its contents has been made known. And at a distance of about a quarter of a mile west of Arbor Lowe, there is observable a large tumulus called Gib Hill, which was opened by the late Mr. T. Bateman, in 1848. A stone chest was disclosed containing an urn, and likewise some other ancient relics, as well as those of a more modern date. This mound is connected in a serpentine form with Arbor Lowe by a small embankment of earth ; and short lengths of it are here and there noticeable, commencing a little to the left of the southern entrance, and outside the great rampart.

In following the road up the hill to the left of Goyt Bridge towards Pym Chair and near the Old Gate, (which is a most remarkable and interesting remnant of the old Roman Road, named Lower Street, that led from Manchester to Buxton), the third bed of Millstone

Grit is crossed at the summit, and presents a striking feature in this locality. Its lithology is a coarse and massive red sandstone, extending from the Windgather Rocks, a distance of four miles from north to south, accompanied almost throughout by a series of escarpments, especially those named "The Tors," that display some of the boldest and wildest moorland scenery in this part of Cheshire, the highest point near "Shining Tor," being 1,837 feet above the level of the sea, which is not equalled either in Derbyshire or Staffordshire. The title, "Pym Chair" has arisen from there having been depicted the natural resemblance of a chair in a part of the rocks, with the back, arms, and seat fairly represented. It is now all but obliterated. Probably from the Celtic word pim, pin or pen, a height or lofty position.

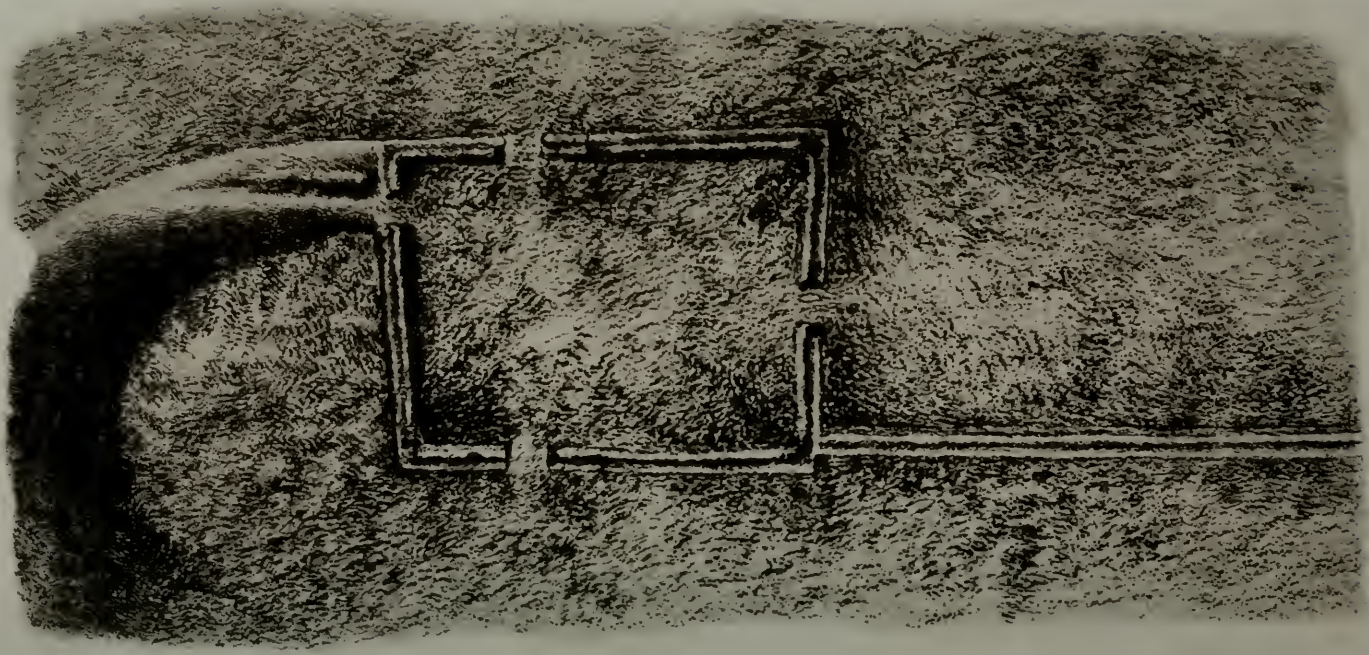
Whilst giving some of the striking peculiarities,—physical, archæological, and geological, of this neighbourhood, I might as well refer to an antiquarian locality close by. On walking southwards along The Tors from the Old Gate, we arrive at what is named Cat's Tor, which is simply some rocks jutting out near the edge of a precipice, 80 or 90 feet in height. The word "cat" or "cath," (Celtic), means either a place of battle or the site of graves, sometimes marked by monoliths, and there is not much doubt that the above circumstance denotes the locality of a fierce struggle between the Ancient British, Romans, or Saxons, after the first-named had been driven to the hills and had to fight for their lives. Nestling at the foot of Cat's Tor, is the pretty and secluded little farmstead Thursbach, so named from bach (Saxon), the rivulet that runs close to it, and which in Teutonic or heathen times was dedicated to the god Thor or Thur. About two miles west of this point, which includes the re-crossing of the great Anticlinal axis of the Saltersford valley, and consequently a reversed dip of the strata, the line of

Roman Road called Ewrin or Ermin Lane, is distinctly observed winding up towards the summit of Pike Low, which is 1,200 feet above the level of the sea. Pike or Peak (Scandinavian), a point, and low or hlœw (Anglo-Saxon), a small hill or barrow covering it which contained a burial, but no indication of it remains; and to the left, near this, three tumuli may be observed at some distance from each other southwards, viz.:—a conical one in a field opposite the Blue Boar farm, which has been more or less disturbed; the others are truncated, that near the Yanslow farm was investigated some years ago, when some Roman coins, glass beads, and bones were found in it. The tumulus named "Brock Low," lies further south, and in a field to the right of the Lamin Load farm, from "Brock" (Anglo-Saxon) a badger, or the resort of the badger, which would have no difficulty in penetrating it, as it appears to be chiefly composed of drift sand, gravel and small pebbles. It is the largest specimen in this part of the country, and has not been properly explored. The following are the dimensions of it:—

Brock Low Tumulus.

Circumference across top	160 feet.
Circumference at base	465 ,,
Height	24 ,,

Most of the Roman tumuli are observed to lie near their lines of road, and the latter were generally made use of by the Anglo-Saxons after the departure of the Romans, to some of which they gave the name of streets—as Watling Street, Ermin Street, or Ermoen Street, &c.—terms no doubt which had referenc to persons or things in their own mystic traditions. British trackways or the old British roads were likewise used by the Romans when found convenient for their purposes; and new Roman roads often ran parallel with these trackways.

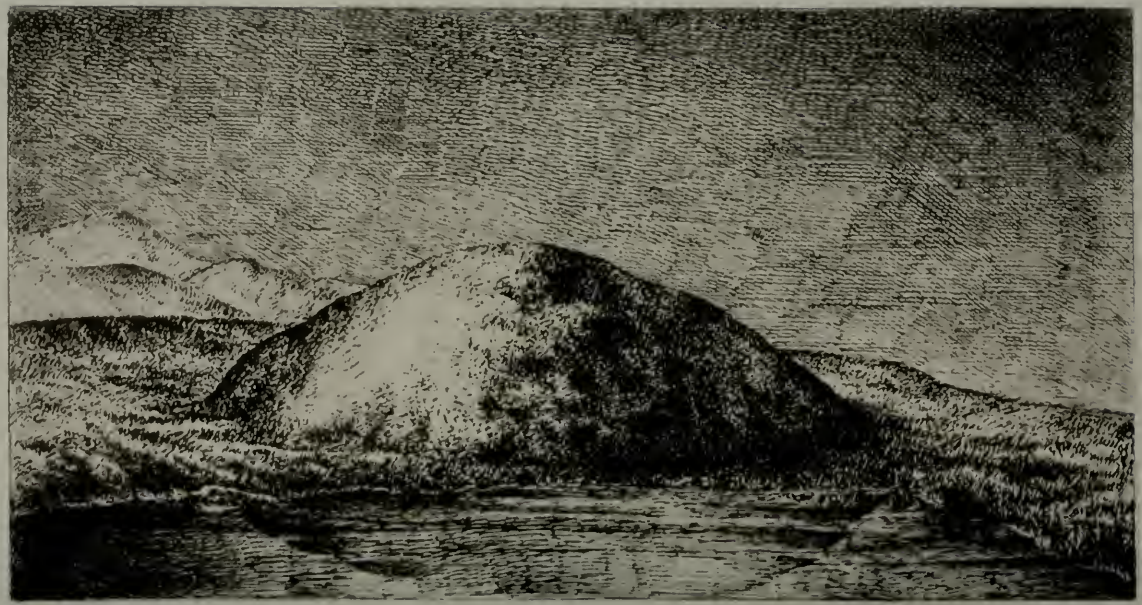


ROMAN CAMP, NEAR FOREST CHAPEL.

Antiquarians make out a line of Roman Road that led from Manchester to Buxton by way of Stockport and Bramhall, where, at the latter place, near the railway station, it would be joined by another one called "Street Lane," from the direction of Cheadle. Near the Siddall Houses, south of the above station, the Roman Road is still visible, pointing towards Hope Green, (here named Street Lane,) and Pott Shrigley. It then becomes apparent along the Billinge Head road, and cresting the summit of Pike Low, it passes down Ewrin or Ermin Lane in the direction of Saltersford Hall, when, crossing the rivulet, it winds up the hill towards the Old Gate, until at length, about two miles beyond this, down Lower Street, it appears to have crossed the river Goyt by the present site of Goyt Bridge, and onwards up Goyt Lane in the direction of Buxton. Another Roman Road has been made out from the position of an entrenched camp or station named Kinderton, near Middlewich, to Buxton, by way of Twemlow, Old Withington, Chelford, Capesthorne, Birtles, Prestbury, Butley, Bollington and Rainow, where close by the Patch Inn, at the foot of Pike Low, it would seem to have joined the line of road above named from Manchester, Stockport, and Buxton. Roman remains have been met with along the whole of this route.

Again near the Forest Chapel, called Toothill, where on the top of it, in addition to the enjoyment of some very beautiful scenery, especially upon a fine clear summer evening, there is still traceable a fair outline of a Roman castellum or camp. Toot, teut, tew, or tyr, are Gothic terms for the god Mercury, who was a messenger of the gods, and presided over the safety of the highways. In form, the camp is an unequal parallelogram, measuring from the bottom of each trench about 190 feet in length from north to south, and 150 from east to west. The accompanying ramparts of earth may have been three feet

in height with about the same depth for the trenches, and a breadth of six feet across both at the top. The area of the enclosure is flat, with two main openings or gates leading out of it, north and south, into the trenches ; and another one outside, at the south-western angle, leading also into the trenches. A postern, likewise, near this angle, leads out of the area across the southern trench on to a semicircular plateau, which will measure about 25 feet across it ; and from this platform there is a steep descent, south east for about 200 feet into a public road, where there is a fine spring of water gushing out at the base. Another supply of water lies a little westward of the camp, and on a level with it. The ancient Britons, and afterwards both the Romans and Saxons, generally chose in hilly districts the most unassailable positions for defence on two or three sides at least; and preferred more especially those places where there occurred precipitous heights, near a river, a morass, lake, or spring of water, which would supply the camp or settlement with that necessary element. An outwork or outer vallum and trench are continued in a straight line directly north with the one that forms the eastern margin of the area, for a distance of 253 feet, which had been considered requisite, since this hill-fortress seems to have been more liable to be attacked at this point than on any other ; and further, in order to prevent a surprise or advance by the enemy, four outposts or gates were established in connection with the camp, whose names (chiefly Saxon), are still retained in the vicinity, viz.—Tor Gate, Lache Gate, Dirty Gate, and Ridge Gate. Tor Gate, which led up to the Tors or rocks named above ; Lach Gate, from lache, (Anglo-Saxon), water or lake ; and Gata, (Scandinavian), a gate which skirted what is now a neighbouring morass. Dirty Gate (a local term), has always been a very dirty road, owing to the oozing of mud from the Yoredale shales.



TUMULUS ABOVE ROMAN ENCAMPMENT.

Probably the word dur (German), for deer, may be applied to this gate or road that led down to the haunts of the deer in the Forest, as well as to the camp. With reference to the word dur, in like manner Her Lane, which is situate in another part of the Forest, may have derived its name from ever or efer (Anglo-Saxon), the wild boar. From the above deductions it may be presumed that these Teutonic people occupied this camp after the Roman period. What is now called Ridge Gate farm is near the road that led up to the camp from the Langley valley.

This ancient fortification would seem to be well adapted for strategic purposes, and appears to have been constructed for the object of keeping open a shorter and easier line of communication between this part of Cheshire and Derbyshire. The sanitary properties of the Buxton waters appear to have been appreciated by the Romans, as the foundations of some of their baths were brought to light a few years ago.

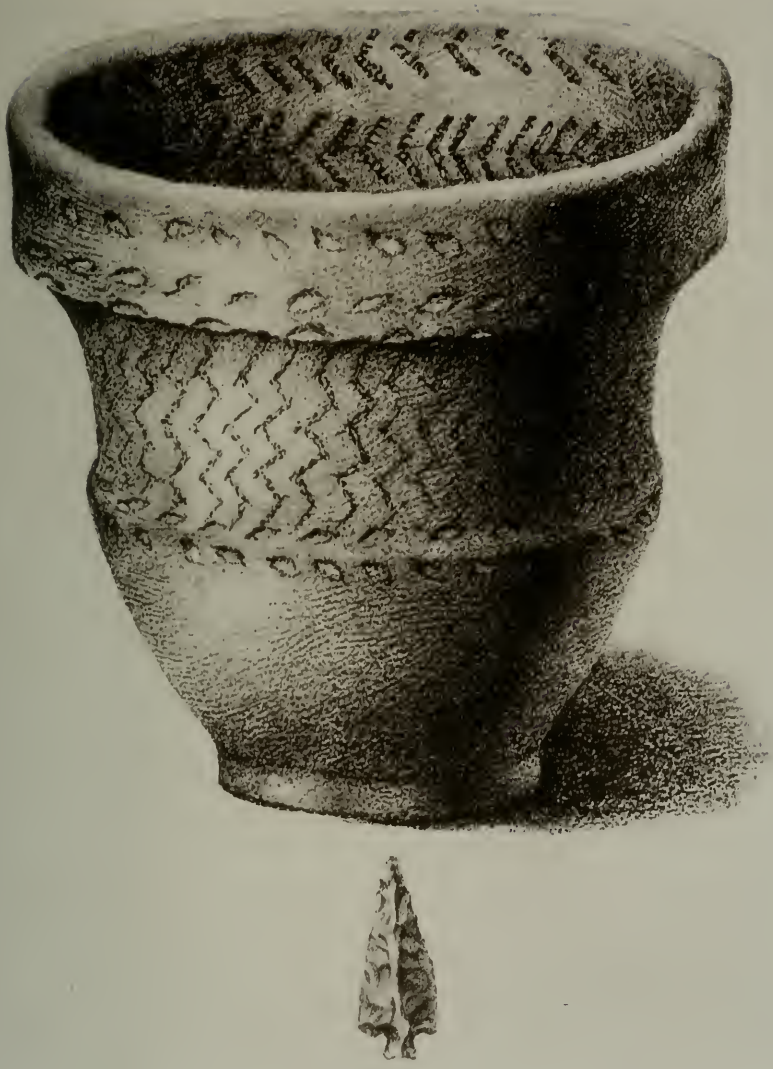
When ascending Dirty Gate for a short distance above the camp, in a field to the left, there is to be noticed a tumulus which is twelve yards in circumference and two in height. On its northern aspect, close by, there is a pool twenty yards in width and two in depth. This has had its origin from an excavation having been made into the surface soil, and the earth was then used for constructing the mound. The pool is fed from the Yoredale shales at a higher level, and is almost always full. This mound has not been disturbed.

Contiguous to this military station, the rising ground begins that assists in forming the base of Shutlingslow Hill, which is 1,661 feet above the sea level. It is the only example among its compeers of like altitude in this district, where the five beds of Millstone Grit remain intact, and succeed each other in regular descending order; for although the anticlinal fault runs north and south

across its western flank, bringing up about 1,400 feet of the middle division of the Yoredale Rocks to the surface, and leaving a breadth of 1,500 between them and the apex of the hill, still the beds of grit remain as originally deposited, lying nearly flat, which is a remarkable circumstance, since this is not the case with the grits on the opposite or western side of the fault; here all the strata have been upheaved 500 feet, but the first and second beds of grit with their shales are absent, having been removed by denudation. The panoramic view from the summit of Shutlingslow, where there is a small spring, is most interesting and striking, as well as rather novel; partly on account of its superior height compared to other eminences around it; and the eye having become accustomed to observe the latter at lower levels, there is consequently a little hesitation in recognising the peculiar characteristics of some of them. Likewise, upon reflecting that you are standing upon a mere speck of the first bed of Millstone Grit, which is all that has been spared from the disintegrating processes of former geological periods; and that before the elevation of this part of Cheshire took place, it had been the component part of a coal basin, formed at a much greater depth below the sea level than it is now above it. The names of families as well as individuals enter largely into the composition of local names. Thus there is in the neighbourhood of Rainow a high hill named Billinge Head, from Billingas, a Saxon family, who had formerly a settlement in that district as well as in other counties. In like manner Shutlingslow is said to be traced in the Scythingas, who gave their name to Shutlington in Warwickshire and Shuttlestone in Derbyshire, &c. Other patronymics as well as the above, are recognisable in various parts of this country. Likewise tumuli are connected with these tribes. Most probably a low or barrow had enclosed the remains of a Scything on Shutlingslow

Hill, of which not a vestige remains. Similar observations will apply also to Gun Hill near Leek, which was formerly occupied by settlers of that name, of Scandinavian origin. Some names of places in other parts of England go by the name of Gun-by, from by (Scandinavian) a town; Gunner-by, a town occupied by the Gunner people; Gun-thwaite, (Scandinavian) a village, &c. In approaching nearer to Macclesfield, the most noticeable object is that fine escarpment of Teggsnose, which is 1,300 feet above the level of the sea. [From skegness, naze, or noes (Scandinavian) a promontory and skeg (Scandinavian) with a declivity.] It is composed of the third, fourth, and fifth beds of the Millstone Grit, the first and second are wanting, having been cleared off in former ages. In ascending the hill from the Langley village, the middle group of the Yoredale series are seen cropping out from beneath it in the brook, overlain by the fifth bed of grit which can be inspected in a quarry to the right, and the remaining beds are observed to succeed each other in regular order when ascending further up the lane leading to Rulow Knob on the old Buxton road. In the quarry here there is a very good section of the first grit, which is a conglomerate, while on the opposite side of the road, in the deep valley, a section of the second grit may be noticed. The best section of the latter may be investigated in a plantation opposite the One House gate. On Windyway Head there is a quarry in the fourth grit, and it contains some very large nodular concretions. The extensive quarries worked on Teggsnose in the third grit, which has a thickness of 200 feet, deserves a special inspection both on account of its lithological characteristics and the great extent of landscape scenery which the promontory opens out. Upon a still, clear, and sunny day, in the far distance the Wrekin in Shropshire is plainly visible. To the right of this, the Welsh mountains are

distinctly recognisable, and a canopy of grey smoke betrays the whereabouts of Chester. Cloud Hill, Mow Cop, the Peckforton range of new Red Sandstone, and Beeston Castle, stand out in bold relief, and Shutlingslow to the left, displays the colossal proportions of its base; while immediately under foot, there is a bird's eye view of the Langley valley, its village, rivulet called the Bollin, and every minute particular of hill, dale, farmstead, and last but not least, the clear and placid lakes which supply Macclesfield with some of the finest water in the kingdom. From the toll bar below Windyway Head, the Millstone grit is traceable southwards resting upon the Yoredale Rocks as far as Leather's Smithy, when the beds bend quickly round due west, with the fifth bed forming the base of Teggsnose as stated above. At this point a few months ago, as some labourers were engaged in repairing a reservoir, upon arriving at about three feet below the surface, one of them struck his pickaxe into something which he took to be a drain-pipe, but it proved to be a sepulchral urn of the genuine Celtic type, containing a quantity of burnt human bones, apparently those of a young person, and a finely polished flint arrow-head of the leaf pattern, likewise some fragments of a barbed arrow head that had been partially calcined. The whole had been deposited upon the bare soil, and formed into a heap, with the urn inverted over it, and its dimensions had been about 8 inches in height, 7½ in breadth, gradually tapering down to 4 inches at the bottom. Upon an examination of the natural surface of the ground where the interment had taken place, there was nothing unusual to be seen indicative of its site; around the urn, however, at the bottom of the trench, the soil had been deeply tinged with carbonaceous matter, bits of charcoal and blackened stones. In former ages it was the custom to erect menhirs or tall stones, cairns, tumuli of earth,



CINERARY URN WITH
FLINT ARROW HEAD,
LANGLEY.

dolmens or cromlechs, accompanied occasionally by stone circles, near to or over the remains of departed friends, warriors, &c., and perhaps one of the above had been used in this instance, but it has shared the fate of many others which have been either removed or destroyed in this country. Near the head of the above reservoir at Langley, may be noticed a large conical mound which has the appearance of a tumulus; and a little further on the road towards Leather's Smithy, close to a farm house on the left, there is another tumulus which has evidently been investigated.

From the base of Teggsnose the Yoredale Rocks keep to the line of road towards Macclesfield, with the grits close by to the right, when at length both are cut off by the Red Rock fault near the railway bridge in Sutton. At this juncture some remarkable results occur. The fault lies here 80 feet below the surface, covered by the Drift; and within a very short distance from this bridge, up Gunco Lane, the New Red Sandstone, Lower Coal Measures, Millstone Grits, and the middle division of the Yoredale Rocks, lie altogether in close apposition and in regular order of succession. Likewise this is the southern limit of the Cheshire coalfield, after having been parted from the Millstone Grit by a small branch fault; and the Yoredale division, after an extensive eastern and southern range, terminates its long connection with the red rock fault at this spot.

Between the railway bridge in Sutton, named above, and the Mow Cop station, a length of ten miles, the Red Rock fault is bounded east by the Yoredale Rocks, and west by the Red Marl or upper Keuper Sandstone of the Trias; and some very interesting sections of the fault may be noticed in the following localities, viz.—in the Sutton reservoir, when laid dry in summer; at the west-end of Ratcliffe Wood; in a brook by the high road below Wood House; in the bed of the river Dane, close by the North

Rode viaduct ; at the limeworks, Newbold Astbury ; and in a lane on the south-west side of Grotto Wood, about one mile south of the limeworks ; and it is seen crossing the road a little above the station leading up to Mow Cop.

The following rock formations enter into the structure of Mow Cop and its vicinity, viz.—the upper part of the hill consists of the first and third beds of the Millstone Grit, which assume the form of a saddle on its western aspect, so that lower down the hill the Biddulph coal measures rest upon it. About two miles north-east from Mow Cop station, and close by the Astbury Lime Kiln Farm, we come to that singular incident—the upheaval of a small patch of carboniferous limestone, which according to Messrs. Hull and Green, the eminent geological surveyors, has a throw or upcast fault of 8,000 feet. It is dome-shaped, and lies in a saddle, displacing the Lower Keuper Sandstone to the west, and the Lower and Middle Group of the Yoredale Rocks eastward. As I have mentioned before, there are 2,000 feet in thickness of the latter strata striking south up the hill, which assist in the structure of Congleton Edge ; and the lower group, for some distance from the boss of limestone, has a vertical dip, occasioned by the excessive squeezing they have undergone during the upheaval and disruption through the superincumbent strata. Towards the summit of the Edge which forms the limit between the two counties, the Yoredale Rocks are overlaid by the first and third beds of the Millstone Grit, which along with them, dip at a very acute angle to the south-east, and form the coal basin of the Biddulph valley. The thickness of the two grits will be near 300 feet. The second bed is absent. Both the Middle and Lower Coal Measures are worked in this Trough, and the distance across it to the outcrops of the two beds of grit and the Yoredale Rocks on the opposite side on Biddulph Moor, will be three miles. " Here about

DOLMEN,
KNYPERSLEY PARK.
TWO VIEWS.

Wickenstone, the Rough Rock or first bed of grit makes a very marked feature in the landscape; huge tables of it slope up from the valley at an angle of 45°, and rise bare of any covering boldly into the air; while the edges of the beds are broken off sharply, and show a steep cliff on the east. A little farther to the north, the escarpment of the third grit becomes the more marked of the two; it is not here, as is often the case, bounded at the top by nearly a straight line, but is crowned at intervals by sharp conical peaks which rise like towers along a rampart."

About one mile south of Wickenstone, and near the reservoir, Knypersley Park, there may be noticed a fine spring of water flowing into two elongated stone cisterns, along with a smaller one that is circular; and some years ago this spring was much resorted to by the sick and lame, on account of its reputed medicinal properties. A little up the valley to the right, there comes into view that huge, singularly shaped and poised block of sandstone, named the "gawton," gorton, or gawstone; from the German "gau," a spring in a hollow or furrow, and "stan," a stone, *i.e.* the spring near to or not far from this celebrated stone. It will weigh about 60 tons, and forms the capstone of a large sepulchral cell or dolmen that has undergone rough and degrading usage. This form of burial is of an early Scandinavian type that had been adopted in this country. The word wicken, or whychen, (Anglo-Saxon) refers to springs by rocks and stones.

THE BRIDESTONES, ON BIDDULPH COMMON, NEAR CONGLETON.

About half way between the Congleton and Rushton stations, and on that part of the Leek road named Dial Lane, there is to be seen in the corner of a field adjoining the residence of the late Mr. Weir, the megalithic

remains of what goes by the name of the "Bridestones," together with some other mementos of bygone ages.

The following is an account of them as they appeared in 1766. "There are six or eight upright stones, from three to six feet broad, of various heights and shapes, fixed about six feet from each other in a semicircular form, and two stones within where the earth is very black from being mixed with ashes of oak-charcoal. It is apprehended that the circle was originally complete and 27 feet in diameter, for there is the appearance of holes where stones have been; and also of two single stones, one standing east of the circle at about five or six yards distance, and the other at the same distance from that. A little west of the above stones are two rough, square tapering stones 4ft. 3in. broad and 2ft. thick, standing at the north and south angles of a kind of artificial stone cave or chest. This is paved with broken pieces of stones about 2½ inches thick, overlaying some pounded whitestone about six inches deep; two inches of the upper part of which are tinged with black, supposed from ashes falling through the pavement which was covered with them and oak-charcoal about two inches thick, along with several pieces of burnt bones. The sides of the cave, if I may so call it, were composed of two unhewn stones about 18 feet in length, six in height and fourteen inches thick at a medium. Each of them is now broken into two.

There is a particular stone in the middle of the cave standing eight feet across it, about 5½ feet high and six inches thick. A circular hole is cut through this stone about 19½ inches in diameter. The whole was covered with large unhewn freestone slabs, since taken away. The height of the cave from the pavement to the covering is five feet ten inches. The entrance was filled up with stones and earth, supposed to be dust blown by the wind from year to year in dry weather.

BRIDESTONES.

There remains another place of the same construction but smaller and without any inward partition, about 55 yards distance from this. It is 2½ yards long, 2½ feet broad and 3ft. 2in. high. There is also part of another.

There was a large heap of stones that covered the whole, 120 yards long and 12 yards broad. These stones have been taken away from time to time by masons and other people for various purposes. And in the year 1764 several hundred loads were carried away for making a turnpike road about 60 yards from this place, which laid it open for examination.

In another short account published in 1820, the writer says:—"The Bridestones consist of eight upright freestones, two of which stand within a semicircle formed by the other six. The outside stones are six feet from each other. Near them is the pavement of an old artificial cave composed of fragments of stone about 2½ inches thick. Two large unhewn freestones about 10ft. long and six high formed the sides of the cave."

In another account published in 1854 the author says:—"The present appearance of the monument shows the cave, cell or chest open at the top and the lower portion of the division or holed stone standing only a few inches above ground. The number of stones composing the chest is five, two at one end, one at the other, and one to each side. The sidestones have been fractured, the one into two pieces the other with three, the centre piece having fallen down upon the ground. This cell is a perfect parallelogram inside, and is 14ft. 6in. in length, 4ft. 10in. broad, and 4ft. 8in. in height. The length of the sidestone that has been fractured into three pieces was originally about 18ft. and the opposite stone 12ft. 5in. The floor is grown over with turf. At the south east angle of the cell, an upright stone stands with a sloping top, whose height is 8ft. 10in. greatest breadth 4ft., greatest width 1½ft. A smaller and

broken stone stands within a yard or two of this ; and there is another unbroken stone about 5ft. high, standing six or eight yards distant in the young fir plantation in which the monument is found ; and six yards apart from and parallel with this another similar stone thrown down." This writer " regards the Bridestones as a cistaven or stone chest, orignally it was covered by a barrow or vast pile of stones called a cairn, in an oblong mound, and this barrow covered two or three similar stone chests and was of the class called the " long barrow." " It is clear that only one part of the monument under notice remains tolerably perfect; of the semicircle of six stones standing immediately east of the cistoven none remain ; but one is thrown down. The two now standing at the south eastern angle of the stone chest are much as they were a century ago—one its full height and the other broken off, and these afford a clue to the original ground plan of the barrow which must have run east and west." " First of all, and at the eastern extremity, a circle is described, 27ft. in diameter, and containing in its centre two stones, where the earth is very black and mixed with oak charcoal. As only one half of the stones of the circle were standing in 1766, it is quite possible that the two centre stones were also fewer than orignally placed there. If so, the reading would appear to be, there having been a free standing dolmen or cromlech of three upright stones supporting a capstone, and the whole enclosed in a circle of 12 upright stones ; or that there may have been originally only two stones as now with a burial by cremation at the foot of each, which was not an unusual practice. What the two stones standing six yards further east from this circle, and six yards apart, were intended to represent is for the present a mystery, whilst it is uncertain for what purpose the two stones placed near to the present cistaven at its south eastern angle served. Two cistavens now follow facing east and west, and these

BRIDESTONES, BIDDULPH MOOR.

with the pile of stones heaped up over all, complete what we know of the barrow." The two slabs which still close the ends of the structure are not named in the above accounts. That placed at the end of it eastward, is 6ft. 6in. long, 2ft. 6in. in width, and 4ft. high ; while the other at the western extremity is 4ft. 6in. long, one foot in width, and 6ft. 9in. high, bluntly tapering off to a point above the edges of the cist.

In summarising upon the above elaborate description of the Bridestones, in the first place I would remark, that on a recent inspection of the cistaven and its adjuncts, they remain in about the same condition as described in 1854. .It would appear that the two sidestones of the cist, formerly slabs about 18ft. in length, had been split into five parts, (making two on one side and three on the other) before the year 1766 ; and that the holed stone which had been placed across the centre of the cist, seems to have been unmolested at that period. This stone, is not named in the account published in 1820, but in 1854 it was found to have been destroyed as far down as within a few inches above the floor. This is not correct, the broken off part was found and replaced in 1877 ; and the split side slab, which for many years has been lying prostrate by the side of the cist, is now depicted in its original position westward. East of this sepulchral cell or monument, there stood six or eight upright stones or monoliths, from 8 to 10 feet in height and six feet apart, which formed a circle 27 feet in diameter ; and two other stones stood north by south within this circle, which may have been the remains of a cromlech or dolmen that had contained a burial by the process of cremation, since the soil is reported to have been stained black with charcoal ashes. Another stone stood six yards east from this circle, succeeded by one six yards beyond it, which may likewise denote there having been a burial at the

foot of each. Further east, two or more cistavens are said to have been erected of smaller dimensions than the one first named ; and altogether in a direct line from east to west, this complicated and extended arrangement of ancient modes of burial had been heaped over by a pile of boulders which formed a long barrow or cairn, 120 yards in length, 12 in breadth, and about 12 or 14 feet in height. For what purpose the two monoliths were intended, which stood originally at the north and south east corners of the cistaven, it is not easy to define, unless figuratively speaking, they represented sentinel stones, which it was the custom of the Scandinavians to erect close by the entrance into similar structures in their own country.

With respect to the use of holed stones, which the above people dedicated to their god Woden or Odin ; when the moon was in a certain quarter, weakly children and young people were drawn through them as an antidote for the rickets and other disorders. Occasionally the hole was made of larger size, so that an ordinary person might be able to creep through it, but not without some difficulty ; a penance that had to be performed three times, in the presence of a number of people, before the guilt that had been incurred was considered to have been expiated. Even persons joining hands through the ring-stone, was considered to be binding and equal to any Pagan oath. In the remote districts of Scotland and Ireland where holed stones are still extant, similar observances were practised up to within the last few years. In some parts of India too, at the present day, the inhabitants believe that they are purified from all sin by creeping through the apertures of the dolmens ; and similar customs prevail in other countries. A remarkable circumstance connected with the holed stone in question is, that it was fixed inside and across the middle of the

cistaven, giving an idea that the incinerated remains of one body had been deposited in each compartment, either with or without an urn, and that there may have been two inhumations as well, in a contracted form or sitting posture, which had been despoiled or removed. Very few examples are known where holed stones have been placed inside and across the middle of a cist. At the commencement of this subject, I mentioned that the site of this ancient cemetery lies in the corner of a field adjoining Dial Lane on Biddulph Common. The word "dial" may probably be a contraction of the word "deiseal," from deas, (Celtic) the right hand, and sul, (Armorican) the sun; which refers to a very ancient ceremony that was practised by some of the inhabitants of this country, probably before, or at all events after, the Roman period. In all ages and nations the postures of the body have been associated with religious worship, and likewise used as signs of civil respect to superiors. Martin in his account of the Western Islands of Scotland, mentions the practice of going three times round a person with the right hand towards him as a mark of respect. Borlase, in his Antiquities of Cornwall, tells us, that in the Scottish Isles, the vulgar never pass the ancient cairns, but they walk three times round them from east to west, according to the course of the sun. This sanctified tour, or round by the south, is called Deiseal, the right hand being always held pointing towards the heap of stones or cairn. In the Island of Barry the inhabitants still observe the anniversary of St. Barr, on the 27th of September, by a procession on horseback three times round St. Barr's Church. Wells, famous for their medicinal qualities, were also subject to the same ceremonial on foot. Hence the words "dial or deisal" lane may refer to the road or track leading up to the immense cairn, which was an object of regard and

veneration by the Anglo-Saxons, it having been most likely erected by that people upon this lofty ridge after a severe contest with the ancient Britons for the possession of the district. History gives no account of this battle, although some of the principal chiefs and other notabilities would have fallen in it, and who thus became highly honoured by the rude and fascinating grandeur of their tomb.

It was during the close of the sixth century, that the Saxons in England embraced Christianity, and consequently they soon began to discontinue their Pagan rites; among which barrow-burial held a prominent position, which they were unwillingly induced finally to give up.

On proceeding directly northwards from the Bridestones towards the summit of Cloud Hill, the remains of a British hill fort, with its usual rampart and fosse may be noticed. What is left of this portion of the entrenchments extends in an oblique curve 790 feet in length, bearing due west to south east. How far the fosse may have extended in this direction there is nothing to show, but part of another entrenchment, 180 feet in length is observable, which denotes that the fortress has consisted of two divisions. At the north western angle, there is part of another entrenchment, which extends due south for a distance of 285 feet, accompanied by a gradual curve of 36 feet, bearing south east; and this appears to have been the greatest breadth of the camp in this direction, although it will have become narrower when carried any further.

At Hulme Walfield, near Congleton, from holm, (Scandinavian) low land lying along the course of a river, and wall, (Scandinavian) is a large mound or fortification. Its apex forms a quadrilateral with an area of 26 yards by 40. A Roman weapon of war was found near it.

Upon referring again to Mow Cop, which is 1,000 feet above the level of the sea, the outcrops of the two beds of grit (first and third), extending from thence along Congleton Edge, keep up a regular course for about five miles north east to Cloud Hill. At this point they quickly diverge southwards, running on towards Biddulph Moor, and assist in forming the eastern rim of the coal basin just named. With respect to the lithological structure of Mow Cop, from "mau," and "cop or copt," (Anglo-Saxon) a lofty summit, which forms the floor of the coal measures in the Biddulph trough, it is found to be identical with the strata that crop out from below the Flintshire coal measures in North Wales, the whole having formed a synclinal axis across the Cheshire plain, which is overlain by the new red sandstone series and glacial drift deposits; and at a future day, it is announced, that these strata will have to be sunk through, in order to reach the coal deposits, which are estimated to lie at a depth of 4,000 feet below the surface, in North Staffordshire, Cheshire, &c.

The Royal Commissioners of 1870 consider that the limit which will stop our further progress in coal-getting will be the depth of the seams; and the maximum beneficial depth they fix at 4,000 feet. Within this depth, they consider that we still have 146,480,000 tons unworked, which at our present rate of consumption would last 1,200 years. The consumption is however increasing in a geometrical ratio. This rate of increase however, will be checked by the increased cost. At a depth of 4,000 feet the temperature will be 116·3 Fahr., but this would be reduced by efficient ventilation.

Cloud Hill from "clud," rock, (Anglo-Saxon) and "hyl," a mountain, (Anglo-Saxon) marks the termination of the North Staffordshire coalfield, which is six miles north from the tail-end of the Cheshire coal deposits at

Macclesfield, the interval between them being entirely occupied by the second division of the Yoredale rocks. The above hill, which is 1,190 feet above the sea level, when viewed from the plain below, presents a very striking and prominent object in the landscape. The cliff seen at the top is formed by the third grit, the flanks by the fourth grit, with shales between them; at the foot of this slope runs the Red Rock fault throwing down the Upper Keuper Marls, and the river Dane winds through the flatter country occupied by these beds, its course being marked by a series of interesting little cliffs, above which are river-terraces covered by old alluvium. In following the course of the river Dane south from the Bosley Station to Rushton for about one mile there lies a small patch of permian strata interposed between the Yoredale beds and the pebble beds of the second bunter sandstone of the trias—the whole being from 70 to 80 feet in thickness. These outliers are bounded on the north by a cross fault, which intersects the Kerridge fault as it crosses the river Dane a little above Hug Bridge. The Dane rises in the Goyt Trough near the source of the river Goyt on the western flank of Axedge, and flows over the grits, &c., in a south-westerly direction to behind Swythamley Park, past Dane Bridge to Hug Bridge, when it gradually takes a north-westerly course over the permian and triassic strata, just named, towards Congleton, and joins the river Weaver at Northwich, which enters the Mersey at Runcorn. The Dane forms the boundary line between East Cheshire and North Staffordshire, nearly from its origin to a little beyond Hug Bridge, from hug, (Gothic) a boundary, after having run over in succession, with here and there great disturbance of the strata owing to numerous minor faults, the lower coal-measures, millstone grits, and Yoredale rocks. The anticlinal fault,

TUMULUS, CLULOW CROSS.

STONE CIRCLE NEAR CLULOW CROSS.

last noticed northward, on Shutlingslow, crosses the Dane one quarter of a mile south west of Dane Bridge into Staffordshire, where for the space of one mile, a perfectly straight line of vertical strata can be traced, some being often violently contorted; and further south in the Gun stonepits, besides huge slabs of bare rock being marked by slicken sides, the Yoredale rocks, near the anticlinal fault, roll over two feet from the surface, and form a complete symmetrical arch.

At Clulow Cross, near Wincle, from clu, clud, or cloud (Anglo-Saxon), a rocky district; low (Anglo-Saxon), a rounded hill or barrow; and Wincle from winch (Scandinavian), an angular piece of ground. A short time ago, in a field close to the Cross, an ancient burial was investigated by myself and others. The interment proved to be that of a child or young person, and it was similar to that which had been found near Langley. The urn, which was also of Celtic type, had been inverted, and among the burnt bones there was found a calcined flint knife and a flint arrow head. The circumstances connected with this burial were rather peculiar. It lay about three feet below the surface, and was surrounded by a stone circle twenty feet in diameter, with apparently a headstone, more or less mutilated, four feet in height and the same in breadth, placed, not in the centre of the circle, but between two and three feet on one side of it, northwards. Directly opposite the headstone, the circle was entered northward by a short avenue of stones; a line of stones also ran up to the circle in an oblique curve from each corner stone at the entrance to the avenue, leaving a semi-triangular space on both sides of sufficient dimensions to accommodate four or five persons standing upright in each. For what purpose the latter had been intended it is difficult to say, unless as a fanciful addition

to the avenue, or for a religious purpose ; at all events, upon a trial being made with a spade no burial was found in either of them. These remains, with the upright stone, may have been enclosed in a tumulus ten or twelve feet in height, with the circle of stones placed round its base ; and the small avenue of stones leading up to the circle might have been for the purpose of pointing out in what part of the mound the urn had been deposited, as it was close to the headstone, with a southern aspect ; or this stone may be the sole relic of a free-standing dolmen, or cromlech, *i.e.*, it never had a covering of earth or stones. Other views of the matter may be suggested ; this upright stone may be the portion of a menhir, with its upper part having been broken off, or, upon a micro-lithic scale, it may be the component part of a small cistaven, or stone chest, which had been enclosed in a tumulus of earth, or a cairn, with the stone circle, &c., placed round its base. This burial will probably date from soon after the Romanised British period, and it exemplifies, what may be named as a transitional example. The style of the urn in its general character is purely Celtic, and most likely it refers to the time when a few of that race still lingered on those lonely and barren hills ; and in burying this child, by way of external adornment they adopted the Saxon custom of forming a circle of stones, &c., round its solitary grave.

In the adjoining field southwards there is to be seen the remains of some small stone circles and square enclosures, six feet in diameter, of which, when dug into, the surface soil was black for 18 inches in depth, succeeded by red soil containing a few rough pieces of gritstone ; and, at a short distance north-east, in a hollow, there is traceable a stone circle, 30 feet in diameter. Likewise, in a plantation across the lane opposite, there is observable that well-known object, Clulow Cross. This

FLINT ARROW HEAD AND KNIFE FROM STONE CIRCLE,
CLULOW CROSS.

wayside cross, once so common, is placed upon the summit of an artificial mound of earth abstracted from the adjacent beds of the Drift ; and to the north-west it rests upon the edge of an escarpment of the fifth bed of the millstone grit. This mound. or tumulus, is 250 feet in diameter, 25 feet in height, and probably, whenever it comes to be investigated, it may prove to have been erected in the early Saxon period of our history ; or, what is not an unusual occurrence in barrows, that interments have been made in the same mound at different periods, and by different races. Thus, the ancient British raised mounds over the remains of their own people, and their subjugators, the Roman and the Saxon, successively, or as occasion required, took possession of them, and therein laid their own dead, sometimes with an additional covering of earth. "When groups of circles are found they mark battlefields, and some stone circles have been erected since the Christian era. A circle-building race came from the western shores of the Baltic, touching first at the Orkneys ; and, in like manner, we seem to have had a dolmen-building race, who, from the south, first settled in Cornwall, and then spread northwards." The circle, 30 feet in diameter, named above, may be the sole representative of a chieftain's burial, who may have been honoured by either a tumulus of earth or a cairn, with a dolmen or kistaven in the centre of it. The small stone circles and square enclosures may mark the graves by inhumation of friends or comrades "who fiercely fighting fell ;" or they may be simply the foundations of stone huts used by sentries when upon guard. The above circumstances would suggest that the neighbourhood of Clulow Cross has been of some note or importance in a military point of view in Celtic, Romano-British, and Anglo-Saxon times, since from its elevated and commanding position, it embraces a

comprehensive range of other eminences from which signals could be exchanged during warlike times ; and likewise to the north west there is a wide and expansive view of the low-lying districts of the country ; and, moreover, the above site is naturally well adapted for defence, as facing eastward, it was formerly unapproachable, on account of an extensive morass ; and excepting towards the north, the summit of the hill would be gained with difficulty, owing to the steep ascents.

Upon descending the hill from this point, towards Wincle Church, and onwards, within a few yards of the Ship Inn, Dane Bridge, there is a stile or footpath that leads across two fields towards the Bartomley Farm, which from its name will have a Saxon derivation. Near to the above, where the ground has been used for agricultural purposes, there has been turned up gold rings, chains, fibulœ, &c. The soil is of a sandy character, with some small foreign pebbles in it, which denote its Glacial Drift origin. Of this deposit there may have been formed a small tumulus containing either a Roman or Saxon burial ; and this, (probably for the object of plunder), has been levelled, and the above ornaments had escaped the notice of the marauders. Or, without any tumulus, the articles may have been stolen, and hid or secreted for safety by the owners.

About half a mile in a north-easterly direction from Dane Bridge, there is noticeable in a conspicuous position on the upper slope of a steep ascent to the left, what is called the Hanging Stone, which is rather an attractive object to strangers. When examined, however, it is simply a thick, broad, projecting and tabulated mass of stratified and denuded rock, belonging to the fourth bed of the millstone grit, which, on account of its durable qualities, has withstood the disintegrating effects of the weather, and other destructive agencies, for ages upon ages.

Near the Castle Cliff Rocks in the Back Forest, about one mile and a quarter north-east from Swythamley Hall, there is a very curious chasm, known by the name of Ludchurch. Probably the word "lud" may be derived from "lund" (Scandinavian), a wood, grove, or forest; or otherwise from "lud" (Scandinavian), a place of retreat or refuge for the people. A local tradition is ascribed to this spot respecting the use of this chasm as a church in the time of the Lollards. Towards the southern extremity of the Roaches there is a secluded locality named Nabchurch, which very possibly admits of a similar interpretation from "nas" (Scandinavian), a projecting portion of land; or "nab" (Anglo-Saxon), an elevated point of land. Geologically speaking, Ludchurch is a rent running through the third bed of millstone grit, along the line of strike for about 100 yards, from 30 to 40 feet in depth, and with a breadth of from six to ten feet. The walls are vertical and overhanging, and it gives the idea that the front of the hill has parted bodily from the main mass, leaving the fissure along the line of fracture. The following is an extrract from a book lately published, entitled Swythamley and its Neighbourhood:—A flight of 24 steps leads out of the place at its southern end, but the ravine itself winds on a few yards further, until it terminates in a deep hole, recently opened by its present owner. From the bottom of this hole the renowned cavern of Ludchurch descends far below the roof, in places being a great height, but as large stones frequently fall, the descent is attended with great risk and danger. There are men still living who have partly explored it, and got to where they could hear distinctly the noise of water flowing, possibly the river Dane, one of the explorers being William Mills, of the Roche, a man of great courage and veracity. He, provided with ropes, a lantern, and a large ball of twine to

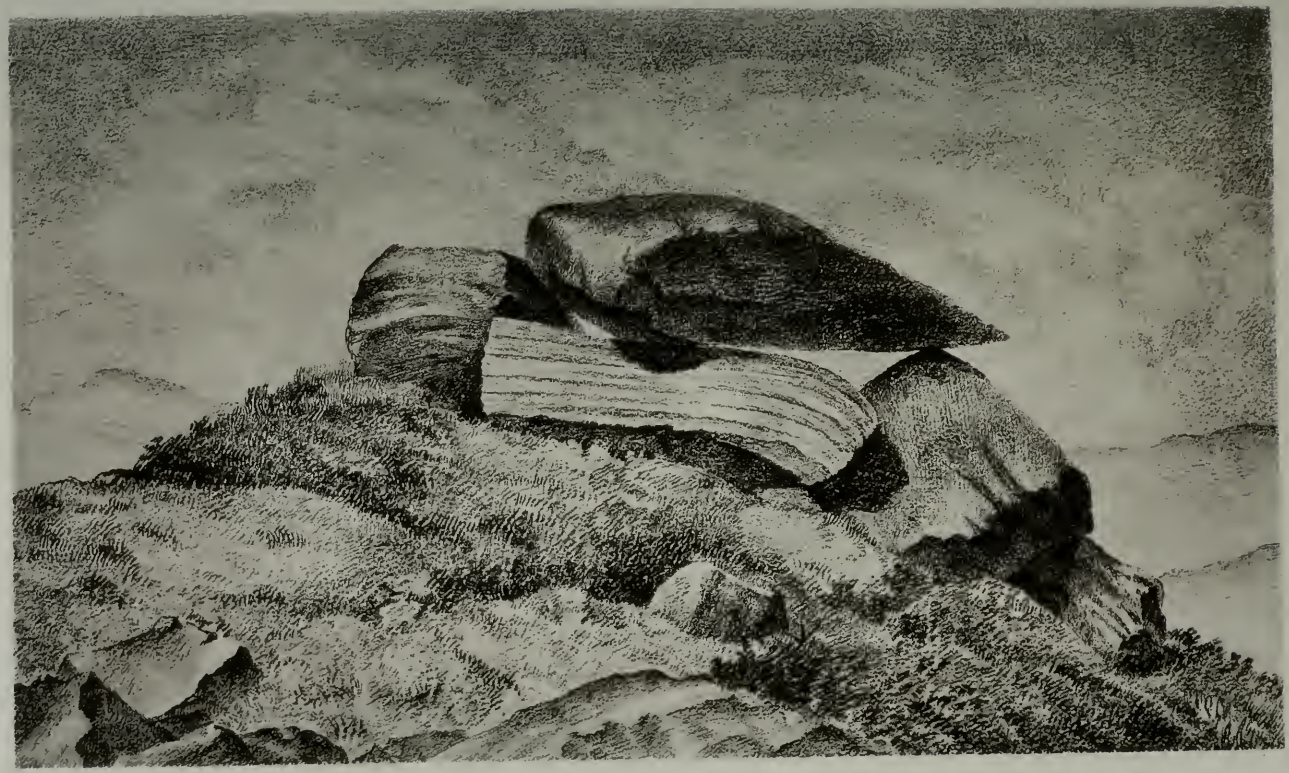
guide his return journey, was underground some hours, and thought there were some signs of Druidical remains, and also steps having the appearance of masonry, but nothing is definitely known about it, as the visit was not repeated." The older inhabitants of the neighbourhood inherit romantic notions about this cave, and many traditionary tales are in vogue among them that are very curious and interesting.

THE ROACHES.

Upon crossing Dane Bridge into Staffordshire, about one mile south-east of Clulow Cross, there lies the Swythamley estate. It is celebrated for its varied and picturesque scenery, especially that part of it called The Roaches, which forms a bold, romantic, and rugged outline along its south-eastern border, the highest point being 1,600 feet above the sea. From "ruck," (German), an oblong hill; or "hrigg," (Anglo-Saxon), a back or ridge. The upper portion of the strata that enters into the composition of this ridge is an extension of some of the Lancashire beds belonging to the Lower Coal Measures, which have run along the Goyt Clough or hollow that extends from Mottram, near Glossop, to Whaley Bridge, and onwards south, as far as the end of the Roaches, a distance of about 10 miles in a direct line. The Roaches proper are about two miles in breadth from east to west, and three in length, tapering down to a point about four miles east of Leek. "Throughout this coalfield, the beds lie with the most perfect regularity in the form of a long trough, broken off in the north by two faults. On each side of this central valley, which is occupied by coal deposits, the massive gritstones slope up the hill in broad sheets of heather-clad rock, ending at the top in rugged crags, with the broken ends of the

first and third beds of the millstone grit striking boldly out into the air. The synclinal arrangement of the strata is thus shown as clearly as in a model, and perhaps it would be as difficult to find a place where the shape of the ground points out so unmistakeably the geological structure of the country. For this reason, this little coal basin, though of small commercial value, is of great interest to the geologist." In a general section of the Roaches, the thickness of the two upper beds of grit (first and third) with shales between them, will be about 400 feet, and the coal measure, sandstones, shales, clay, flags, and ironstone that fill the trough, including six seams of coal at various depths from the surface, will amount to 580 feet. The coal is of an inferior quality; and similar beds are worked about Macclesfield, Whaley Bridge, &c. There is also a fair supply of fossil coal plants, shells and fossil fish. The fourth bed of millstone grit, which is a massive, coarse-grained, hard and red grit, is quarried above Pheasant Clough. The fifth grit, a fine red sandstone, is worked at Roche Gate and Bramcott. The Roaches lie in a long and broad hollow or synclinal of the Yoredale rocks, and the highest point above the level of the sea will be 1,600 feet. The carboniferous or mountain limestone of Derbyshire comes to the surface about three miles east of the Roaches, near Longnor. In the Compleat History of Staffordshire, published 1730, page 95, the following description is given of the Roaches. "Here are also vast rocks which surprise with admiration, called the Henclouds and Leek Roaches. They are of so great a height, and afford such stupendous prospects, that one could hardly believe they were anywhere to be found but in picture. They are so bare, that they have no turf upon them, nor indeed any earth to produce it; which whether they were so from the Creation, or were uncovered by the general Flood, or were washed clean by rain, is not possible to account for, unless we may suppose the turf being taken off to burn, (as is

usual in this country), this latter should carry off the mould, and leave them bare ; but as rocky as they appear, they certainly grow bigger, as has been made evident to demonstration by billets, pebble stones, yea, a man's skull found in them." When walking along the crest of the Roaches for about three quarters of a mile from Roach End, there is to be seen close to the left of the path a rocking stone, and likewise, a little further on, a large-sized dolmen lying near the edge of a perpendicular line of cliffs to the right, with a steep incline to the left. From the proximity of the latter to a high and steep escarpment, this dolmen, no doubt, was always intended to remain a free standing specimen, *i.e.* uncovered either by earth or stones. Its sepulchral chamber, cist or cell, which most likely had contained an urn-burial, is now cleared out. Not far from the above, on the same path southwards, there is to be observed a small tarn at an elevation of about 1,500 feet above the sea. It is known by the name of " Doxy Pool," probably derived from the Anglo-Saxon word " ox," and " pol, (Anglo-Saxon) a pool, *i.e.* the ox's drinking place, which would have afforded a good supply of water to the wild cattle, &c. that had roamed over this district in former ages. It is likewise interesting in a geological point of view, as during the glacial periods this fresh water lake did not always become submerged, and therefore what was left occasionally of the land-surface along with the pool, will refer back to an almost indefinite period of geological time, during which there would have occurred repeated changes in the fauna that had resorted to it, (many of which animals are now extinct, as the mammoth, reindeer, &c.) as well as of the flora that had grown around it, according to the different changes of water-level and variabilities of climate which would have taken place. At a short distance south of Rock Hall, there may be observed on



DOLMEN, ROACHES.

DOXEY POOL. ROACHES.

DOLMEN NEAR ROCK HALL, ROACHES.

the opposite slope of Hen Cloud a block of gritstone, which upon approaching it, is found to be resting or balanced, in the first place, upon a short edge of rock and then upon two upright and pointed stone pillars about eighteen inches in height, which will constitute a dolmen. At a few yards further south of this stone there appears to be the remains of a stone circle, 20 feet in diameter. The above stone, which belongs to the third bed of millstone grit, is irregularly rounded, and its average thickness or width will be 10 feet all round, with a weight of about 20 tons. As the lower portion of it barely clears the natural surface of the rock below, it is unlikely that a sepulchral cist was ever intended to be superadded. It may therefore be classed with battle memorial stones, of a Scandinavian type, which are generally left free-standing and serve as objects of notoriety and historical research. Most likely it was erected by the same people, and about the same period named in my account of the Bridestones; since the possession of this gap in this part of the Roaches would have always been of great importance in a strategical point of view to all contending parties.

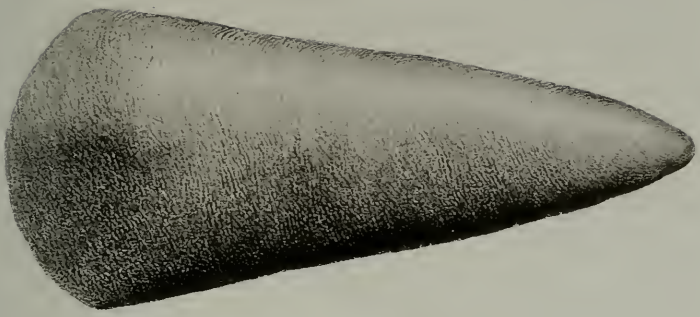
Stones, remarkable for their shape, colour, and other properties, whether natural or artificially altered, appear to have attracted the attention of mankind from the earliest periods, and served as personal ornaments, amulets or charms; and the use of them still lingers on in the northern parts of this kingdom. Generally, they are worn in a small bag hanging by a string round the neck, and have been preserved for many generations in the same family. Great virtues were attributed to them; they are said to prevent the entry of fairies into dairies, preserve milk from becoming sour, keep off diseases, charm off warts, &c., and are valuable alike both to man and beast. The specimen depicted in the plate, is in

length, 3¾ inches, width 1¼, and ¾ in thickness, with network ornamentation cut on a piece of fine and hard-grained millstone grit. It was found on a farmstead close by the Roaches, along with a spindle whorl composed of hard and black shale about one inch in diameter.

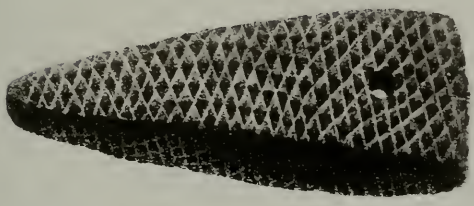
The following is a list of the carboniferous fossils which are obtained in the neighbourhood of Macclesfield :—

In the Kerridge sandstones are found calamites, conifers, equisetums, halonia, favularia, ulodendron, bothrodendron, lepidodendron, sigillaria, stigmaria, and ferns. The four last named with calamites are met with in the coal shales, along with now and then, the aviculapecten and goniatites. Upon the surface of some of the sandstone slabs on Kerridge, are exhibited worm tracks, others bear the impressions of ripple marks, &c. Fish scales, (Megalicthys Hibberti) have also been picked up in some old coal works on the western slope of the hill. The third bed of grit on Teggsnose and at Leadbeater's gardens, supply only a small portion of the above species, viz., calamites, conifers, lepidodendron, sigillaria and stigmaria. A few goniatites and the avicula pecten are sometimes found in the roof of the small seams of grit coal. Dendritic deposits with fucoid-like impressions may also be observed in the Teggsnose and other quarries. The first, second, fourth and fifth beds of grit appear to be barren of fossils. The shales of the Yoredale rocks in Hollin Lane, yield calamites and obscure traces of other plants, and among the thin black shales in the upper quarries of the same rocks at Ratcliffe Wood, are found calamites and the avicula pecten.

Having hitherto confined my observations chiefly to a general description, physical and geological, of the country east of the red rock fault, I will now refer to



STONE CELT.



AMULET.

some points westward of it. With the exception of the Permian beds at Poynton and at Rushton already mentioned, this part of the country, west of the great fault, is entirely composed of Triassic strata dipping north west, and for the most part overspread by beds of sand, gravel and clay, intermixed, more or less, with pebbles and boulders, or in other words what goes by the name of the glacial drift deposits. Sections of the underlying strata are therefore more or less hid, or are only found here and there even in deep brook courses; and in the district under consideration besides those sections I have already noticed, from Poynton to Mow Cop, along the line of the red rock fault, probably a more complete section cannot be found in the whole country than that which is presented at Alderley Edge, which is 650 feet above the level of the sea. This fine escarpment, 400 feet in height, is celebrated for its beautiful and romantic scenery and likewise for its mineralogy. It is five miles north west of Macclesfield, and with the exception of the occurrence of a thin strip of red marl, the interval between the two is occupied by the drift deposits. These consist of rather high mounds and ridges, and in some of the hollows, peat containing trunks of trees, roots, fir cones, acorns, hazel nuts, &c., are occasionally met with. The south western slope of the Edge presents a more regular and simple geological character than any other part of it; and its component beds as they are found to succeed each other, in descending order, may thus be summarised. First, the red marl or upper keuper; second, waterstones, lower keuper; third, brown and white freestone, or building stone; fourth, copper bearing sandstones; fifth, conglomerate sandstone, or the base of the lower keuper; the whole presenting a thickness of 500 feet and resting upon the upper red and mottled sandstone of the first

bunter, whose thickness has not been ascertained. Of the above strata the red marl with its sandstones is noted at Northwich and elsewhere as being the depository of the salt rock. The waterstones have attracted special attention at Tarporley, Lymm, &c., from the circumstance of their containing the impression of the footsteps of that reptile, the Labyrynthodon. The geology of that part of the Edge which forms the steep and abrupt ridge is of a more complicated character, as it has been upheaved along a line of fault, bearing east by west, and while throwing down the red marl at its base, its crest is crowned by the keuper conglomerate sandstone, from which, on a favourable day, a very fine view of the greater part of the Cheshire plain is obtained. The Edge is also noted for its metalliferous products. The fourth bed is worked for copper ore on the western flank of the hill, and the metal is found disseminated for the most part in a soft stratum of white, yellow, or red sandstone, which lies immediately above the conglomerate. The yield of copper ore varies from one to two per cent. and it exists in the state of a green or blue carbonate coating the particles of sand, and occasionally a phosphate of copper is found. Besides copper ore, these basement beds contain other minerals, viz :—sulphate of barytes and lime, galena and the carbonate of lead, the oxides of copper, cobalt, manganese and iron, sulphides of copper and lead, with traces of arsenic, nickel, silver, and vanadium.

Sections in the red marl, which consist of a thick series of finely laminated red and grey marls or shales, with bands of grey or white micaceous sandstone, may be observed in the lane leading up towards the Edge from the old cross. Owing to the covering of drift which is spread over the tracts occupied or supposed to be occupied by this formation, it is seldom visible within the limits of this district. Near Macclesfield, sections in

STONE CELTS.

it may be seen around the Broad Oak reservoir near Fool's Nook, where some of the thinly bedded, red and white sandstones are ripple marked. About half-a-mile south, opposite the towing path by the canal side beyond Fool's Nook, there is to be seen a neat little section in these sandstones ; and also several others along this deep valley that runs by Cow Brook. Likewise a cliff of the thin hard sandstones that lie in the marl, shows well between the Railway Viaduct, near North Rode and Colley Mill. Some thin seams of gypsum or sulphate of lime traverse it ; and at Alsager and Northwich, beds of rock salt.

A short time ago as some miners were at work on the Edge, they came upon a large collection of stone implements, consisting of celts or adzes, hammer heads or axes, mauls, &c. Some were lying upon the sand and gravel, from one to two feet below the surface, along with foreign boulders and pebbles belonging to the drift period ; and others had been left in some old diggings of the copper ore, from three to four yards in depth, along with an oak shovel that had been very roughly used. Nearly the whole had been rudely made, and were more or less smashed ; and they appeared to have been thrown aside, having become useless. They varied in size, and ran up to ten or twelve pounds in weight ; and not one that I have noticed has been perforated for the insertion of a handle, but there was a groove formed round each, near the middle, so that by bending a tough stick tightly along this groove, and securing it below with thongs, and then fastening the ends of the stick together, these would form the handle. With respect to the antiquity of these tools, as to shape, make, and general character, they are certainly of a very primitive stamp, and resemble those commonly seen without holes in museums, which have been brought from various parts of the world, where they are still used

by barbarous races. The specimens now under consideration consist of different materials, viz., chert, syenite, basalts, felstones, porphyries, greenstones, limestones, &c., which are erratics, and abound in the Drift about Macclesfield. Along with the above are those of the local drift, as hard ganister sandstones from the lower coal measures, and quartzites from the second division of the Yoredale rocks. And now comes the question as to the time when these excavations took place. It is well known that some centuries before the Romans arrived in this country, the Phœnicians carried on a lucrative trade with the Celtic tribes of Cornwall, bringing pottery, brass ware, and trinkets, which they exchanged for lead, tin, and hides. Tin at that time was only to be obtained from Britain and Spain, and in certain proportions mixed with copper it is named bronze, which gave a sharper edge to the spears and swords, &c. of the foreigners than those which they had manufactured from copper and zinc, which is brass. Cornwall abounds in copper, and no doubt our aborigines would have acquired a knowledge of the art of mining from the customers who came for their tin.

THE GLACIAL DRIFT DEPOSITS.

The glacial drift deposits are largely represented in and about Macclesfield, and upon the whole they may be subdivided into three sections, although there is the greatest irregularity both in their distribution and bedding. First is the upper boulder clay ; second, sand and gravel ; third, lower boulder clay. The beds of sand and gravel commonly lie both above and below the boulder clay, some of the former being either clayey

STONE CELT.

or in a perfectly dry condition. Occasionally the upper boulder clay is found just below the surface soil without any covering of marine sand or gravel. Both beds of sand and gravel always lie between the upper and lower boulder clays, and there is another kind of clay named brick clay (used for making bricks, &c.). which is simply an admixture more or less of sand with the boulder clay, and it is generally found resting upon the true boulder clay, or on one side of it, or separated from it by beds of sand or gravel, and now and then it is seen under the boulder clay. The sands and gravels along with the upper boulder clay, form for the most part the superficial bedding of this country westward ; while the lower boulder clay is reached along with the beds of sand and gravel at irregular depths below the upper boulder clay. Sometimes the lower boulder clay appears to have been deposited in patches among the lower sands and gravels. Both the upper boulder and brick clays occupy here and there large breadths near the surface ; and again, under certain circumstances, the lower boulder clay is found resting alone upon the solid rock. The boulder clays appear to have become absent in the drift at an elevation of about 1,000 feet above the level of the sea.

The beds of sand, gravel and clay, with few exceptions in this district, contain water worn boulders and pebbles both foreign and local ; and marine shells occur at intervals embedded in fine dry sands or gravels ; also in the boulder and brick clays, at a maximum depth, hitherto discovered, of 197 feet below the surface soil. Occasionally, shells are picked out of fine sand or gravel just below the surface. They are also found in the drift upon the hills 1,200 feet above the level of the sea, which will be 700 feet above the town ; consequently they will have had a range of 831 feet in the drift deposits.

In the Cemetery ground they make their first appearance about 10 or 12 feet below the surface, and for about 50 feet there are few beds of sand or gravel free from these exuviœ. Those that are found in clear sand or gravel are of a creamy white colour, while others in clay partake of its colour. About half the species are found in a fragmentary condition, and of these fragments some pounds have been collected, but the majority are too defaced to be identified. The Turritella and Cardium proved to be the most plentiful, but very few indeed of these, in comparison with the number of their fragments, are perfect. The above, and the Patella, Purpura, Mangelia, Pecten, Fusus Bamfius, Ostræa and Tellina, were first met with at about three yards below the surface, embedded in fine stratified sand or gravel. At about ten feet lower down, nearly thirty varieties were found in almost a perpendicular bed of fine and even running gravel. This bed, upon which the Dissenter's Chapel has been built, proved to be ten or twelve yards in depth, about fourteen in breadth, and four or five in thickness. More perfect specimens were taken out here than at any other part of the ground, especially Murex, Nassa, Purpura, Littorina, Dentalium, Venus, Mactra, Natica, Trochus, Turritella Aporrhais, and Cardium. The floor of the bed was a thick stratum of rather wet sand. At this point the shell deposits appeared to terminate; and it was the lowest level reached by the labourers above the drainage operations. On the same horizon, at a short distance eastward, in a small bed of fine running gravel, four or five Cyprœa Europæa were found in a perfect condition; likewise the Cytheræa Chione, and Cyprina Islandica, both fragmentary, and a large Buccinum Undatum in good condition. But some of the larger shells are indebted to their preservation from their having been embedded in a more clayey

BOULDER STONE,
MACCLESFIELD PUBLIC PARK.

DOLMEN NEAR FLASH.

medium. Each separate cutting presented more or less a change in sorts; and the most fragmentary and universally distributed proved to be the Turritella, Cardium, Tellina, Mactra, Buccinum, Mya, and Cyprina. In a thin bed of fine sand, upon an upper level, there were found some very minute shells in a wonderful state of preservation, viz. young of the Turritella, Nassa, Mangelia, &c. These beds of fine sand and gravel were the most prolific.

Not much less striking than the discovery of these shells is the circumstance of the extraordinary quantity and variety of rock-specimens, &c. which had been associated with them. The boulder clay of this neighbourhood contains, I believe, upon the whole, about the usual number of igneous rocks which are found in it elsewhere; although at the southern extremity of this town, there are some very fine beds of it, entirely free from pebbles and everything else, except pieces of drift-wood and fragments of coal. In the Cemetery ground, the greenstones predominate in the boulder clay; next come the granites, felstones, porphyrys, &c., the whole more or less polished. Blocks of quartz rock are sparingly seen, although pebbles of it abound everywhere. But it is the bed about two or three yards in thickness, immediately below the surface soil, that contains the greatest variety of rock specimens both foreign and local; and although there are igneous rocks in it, similar to those in the till, with others of like nature, still the carboniferous and silurian grits and sandstones exceed all the rest.

In comparison with other localities in this part of the country, very few of the boulders and pebbles present grooved or striated surfaces from friction, but the boulder in the Public Park, which weighs about 30 tons, is a fine example of this peculiarity. It is a porphyritic felstone. Specimens of the rocks contained in the drift about

Macclesfield, consist of several varieties of granite, chiefly from the north, and one probably from Cornwall. Some of them are still undetermined; Rowley Rag, from Dudley, (basaltic), and Snowdonian porphyry have been picked out of it. From the lake districts many kinds of granite, syenites, felstones, (some ashy), porphyries, greenstones, porphyritic jasper, fine felspathic lava, (basaltic), and felspathic or volcanic ashes, (metamorphosed). Likewise silurian grits and slates; coal-measure sandstones with bits of coal and thin seams of shale; also blocks and smaller pieces of the new red sandstone series, some containing copper ore, gypsum, barytes, iron ore, and pyrites, all from Alderley Edge. Also Permian rock specimens, from a distance either north or south. From the Astbury Limeworks, near Congleton, some of its peculiar fossil shells and shales; and from Congleton Edge, specimens of the first and third grits, which are ironstained in such a manner not noticeable elsewhere; and specimens of the local drift extending a few miles round Macclesfield, viz., rough pieces of the millstone grit, chiefly the first, third, fourth, and fifth beds; also those of the Yoredale rocks, all from the adjacent hills lying eastward. The millstone grit and Yoredale rocks obtain a thickness of about 3,000 feet in this locality. Likewise specimens of the lower coal-measure sandstones, some containing fossil plants, viz., sigillaria, stigmaria, calamites, conifers, &c.; also detached pieces of coal, and blocks of ganister sandstone, with impressions of stigmaria and reedlike plants, and lumps of fireclay studded with fossils. From the mountain limestone northwards, specimens of it generally in a nodular form, of all sizes, well waterworn, and very plentiful. Likewise rough pieces of the same, composed entirely of encrinital stems; also lumps of madrepore, corallines, and a few turbinolia fungites. In the lower part of the Cemetery valley, near

FULGURITE.

the Bollin, a disc or quoit, made of baked boulder clay, was picked out of the river gravel. Its diameter is 4 inches ; 1½ inches in thickness, tapering down towards the edge to ¾ in. ; width of hole in centre, 1 inch. The Ancient Britons, when fishing, used them as net sinkers by attaching numbers of them to the lower edge of the net, which dangled towards the bottom of the stream.

In sand pits about Macclesfield, composed of marine drift deposits, fulgurites or vitrified lightning tubes, are sometimes met with, of which see an account in the Appendix.

The following are sections through the drift beds, &c. when sinking and boring for water in and about the town of Macclesfield.

The section at the North Cheshire Brewery supplies the following information :—

Sunk through sand and gravel 33 feet. Borings :—fine sand, 4 feet ; sand and gravel, 4 feet ; brick clay, 18 feet ; upper boulder clay of the geological survey, 13 feet ; gravel with pebbles, 6 feet ; gravel with boulders and pebbles, 11 feet ; fine gravel containing fragments of marine shells, 4 feet ; gravel and clay, 5 feet ; fine sand, 6 feet ; coarse gravel, 2 feet ; clay and gravel, 14 feet ; brick clay, 7 feet ; sandy clay with pebbles containing shells, 4 feet ; lower boulder clay with large boulders, 12 feet ; gravelly clay, resting upon the pebble beds or second bunter sandstone of the Trias, 5 feet ; total 148 feet.

At the Brewery near the railway bridge, Sutton, which as I have named before is close to the red rock fault, in sinking and boring for water some years ago to a depth of 180 feet, the rock was reached at 75 feet from the surface, with the following section :—

Upper boulder clay, 12 feet ; sand and gravel, 8 feet ; lower boulder clay, 10 feet ; quicksand, 45 feet. The rock

pierced (second bunter sandstone), was the same as in the former section; and in both cases a copious supply of excellent water was obtained.

In boring and sinking for water through the drift at the County Asylum, Macclesfield, in the years 1873,-4,-5, the following was the result:—

	FEET.
Sunk through brick clay, with three or four thin beds of quicksand	36
Borings through beds of quicksand, with here and there boulders and pebbles and fragments of marine shells	27
Soft brick clay	34
Very stiff brown and blue upper boulder clay	44
Brick clay	22
Brown sand, with pebbles and fragments of shells	2
Loam	1
Loose running sand	14
Hard and stiff brown and blue boulder clay	3
Very sharp running sand	1
Stiff and dry brown boulder clay, with pebbles	2
Loamy gravel	6
Very tough boulder clay	1
Sand and fine gravel, with marine shells	4
Brown sand	19
Fine gravel and sand, containing foreign pebbles and specimens of broken up local rocks, from the beds of millstone grit and coal measures; also fragments of the lower keuper sandstones from Alderley Edge, some containing small portions of the green and blue carbonates of copper ore and the yellow carbonate of lead	4
	220
Upper red mottled bunter sandstone (not through it) seventy-two feet three inches, with tubes, and fifty-two feet without them, as owing to obstructions and accidents they could not be propelled any further	124
Feet	344

Marine shells ranged at intervals from the surface, viz., at 63, 100, and 197 feet. Thickness of brick clays 92 feet, boulder clays 50 feet.

The thickness of the drift lying below Macclesfield, at different levels of the town, will range from 80 to 170 feet;

consequently at the Asylum, it will be 50 feet thicker and also about that much higher than in the upper parts of the town. The Asylum is one mile from Macclesfield, and the new red sandstone lying below the drift has a north-westerly dip.

In a well at the Brewery, Park-green, Macclesfield, 44 feet in depth, which had been sunk in the drift some years ago, boring operations were commenced in 1874, when at a depth of 88 feet, the upper red mottled sandstone was reached, and at a depth in it of 49 feet 7 inches, a copious supply of water was obtained. The following is a section of the borings through these drift deposits :—

	FT.	IN.
Very rough gravel, with very large pebbles . .	2	6
Very firm boulder clay, with boulders . . .	16	1
Rough gravel, with small pebbles . . .	3	0
Tough boulder clay, with small pebbles . .	4	5
Fine sand, with a few small pebbles . . .	2	6
Fine running sand, with a few pebbles . .	2	1
Coarse sand and gravel, with foreign pebbles, intermixed with some specimens of local origin .	13	5
	44	0
Through red and mottled sandstone .	49	7
Borings	93	7
Sunk	44	0
Total distance from the surface .	137	7

On the Macclesfield Forest, near Walker Barn Toll Bar, the following is a section through the drift which is 1,200 feet above the level of the sea, and it contains 13 species of marine shells :—

Surface soil, (black mould) 1 foot ; ferruginous clays, gravel and small boulders, 6 feet ; red sand, 6 inches ; alternate beds of small gravel and drifted shale, 4 feet 6 inches ; loamy sand, 3 feet ; drifted shale and gravel, with small boulders, and a few fragments of shells, 2 feet 8 inches ; sand and loam, 7 feet 6 inches ; coarse sand with boulders and pebbles, 2 feet 9 inches ; gravelly clay with

a few boulders, 3 feet; dark sandy gravel, containing shells in plenty, depth not ascertained, 2 feet; total 32 feet 9 inches.

List of species of shells:—Cardium edule, Cardium echinatum, Cardium rusticum, Astarte arctica, Turritella communis, Cytheræa chione, Cyprina Islandica, Mytilus edulis, Fusus antiquus, Psammobia ferroensis, Buccinum undatum, Tellina solidula, Mactra solida. Total 13 species.

In the field containing the stone circle with its Celtic burial, already described near Clulow Cross, and which is at an elevation of 1,130 feet above the sea level, the following is a section of the gravel pit in the drift close by, in which has been discovered 13 species of marine shells:—

Black surface soil, 2 feet; coarse gravel with boulders, thin seams of sand and ferruginous gravel, 7 feet; boulders in coarse gravel, and in soft sandy loam, 4 feet; ferruginous gravel, 5 feet; fine sharp red sand, 1 foot; dark sandy gravel, with fragments of marine shells, 2 feet. Sandy loam with pebbles, 4 feet; coarse, dark, sandy-gravel, with small pebbles and shells, 2 feet; fine, bright, red sand, 3 feet; total 30 feet. The remaining strata will lie upon the fourth bed of millstone grit, 10 or 12 feet lower down not yet disturbed.

Names of shells found in the above section:—Cardium edule, Cardium echinatum, Cardium rusticum, Astarte arctica, Turritella communis, Cytheræa chione, Cyprina Islandica, Mytilus edulis, Fusus antiquus, Psammobia ferroensis, Buccinum undatum, Tellina solidula, Mactra solida; total 13 species.

List of marine shells found in the drift in the neighbourhood of Macclesfield. Scale of frequency:—v.r. very rare; r. rare; f. frequent; c. common; x. found in

the Macclesfield Forest, 19 in number; o. whole specimens, *i.e.* not fragmentary; total number of species fifty-five.

Artemis lincta, r.o.x.
Aporrhais pes pelicani, v.r.o.
Astarte elliptica, r.o.
,, artica, r.x.
Arca lactea, v.r.o.
Buccinum undatum, c.
Cytheræa chione, r.x.
Corbula nucleus, v.r.o.
Cyprina Islandica, c.o.x.
,, Europæa, v.r.o.
Cliona, r.
Cardium edule, c.o.x.
,, echinatum, r.x.
,, Norvegicum, v.r.
,, aculeatum, v.r.x.
,, rusticum, r.x.
Donax anatinus, v.r.
Dentalium entale, r.o.x.
,, abyssorum, v.r.o.
Fissurella reticulata, v.r.
Fusus gracilis, v.r.o.
,, antiquus, v.r.x.
Lutraria elliptica, v.r.
Littorina littorea, v.r.o.
,, rudis, v.r.o.
,, litoralis, v.r.o.
Mya truncata, c.o.
,, arenaria, v.r.
Mactra solida, r.o.x.
,, subtruncata, r.o.x.
Mytilus edulis, r.x.
Modiola modiolus, r.
Murex erinaceus, f.o.
Mangelia turricula, r.o.
,, rufa v.r.o.
Natica nitida, v.r.o.
,, monilifera, v.r.o.
Nassa reticulata, v.r.o.
,, incrassata, v.r.
Nucula—species, v.r.
Ostrea edulis, r.
Purpura lapillus, c.o.
Pholas crispata, v.r.
,, candida, v.r.
Psammobia ferroensis, f.x.
Pecten opercularis, v.r.
Pectunculus glycymeris, v.r.
Patella vulgata, v.r.o.
Saxicava rugosa, v.r.o.
Tellina solidula, f.o.x.
,, tenuis, r.o.x.
Trochus cinerarius, v.r.o.
Turritella communis, c.o.x.
Trophon clathratum, f.o.x.
Venus striatula, v.r.o.

The most remarkable species contained in the above list are the Cytheræa chione, Cardium rusticum, Cardium aculeatum, Arca lactea, and Cypræa Europæa. The Cytheræa chione is a southern shell of the Spanish marine fauna and not found any further north now than Carnarvon Bay. The Cardium rusticum is also essentially southern and Spanish, Bantry Bay being now its most northerly and authentic distribution. The Cardium aculeatum reaches its highest northern range in the south or west of England and Ireland. The Arca lactea is also a southern shell, ranging northwards as far as

Berwick Bay and Oban. All the other species are more or less common on the beaches and in the bed of the present British seas. The Cypræa Europæa is a well-known British shell; it is found in Irish drift beds, at Macclesfield, and probably in other places.

Here it may be noticed that the natural section of the drift deposits, as seen from Waters Green upwards to the Old Church, is one of the finest about Macclesfield. The height of this escarpment is 90 feet, and the red rock or new red sandstone will lie about 80 feet lower down, covered by that thickness of the drift. The same circumstance occurs close to the canal bridge on the Buxton Road, where the red rock fault crosses it at a depth of 170 feet in the drift. From the above data it would seem that the town of Macclesfield is built upon an irregular surface of the drift, varying from 80 to 170 feet in depth, that forms what may be called a trough, and through which, at the lowest level, there flows the river Bollin. I have stated before that during the Glacial epochs several oscillations or changes of level took place between land and sea, which amounted on some occasions to a difference of some hundreds of feet; and when the last upheaval of the land occurred, (supposing the submergence had previously been such that the whole of the drift deposits might have been swept away from this district,) it would be interesting to reflect upon the effect which would have been then produced upon the physical aspect of this part of the country in comparison to that which now exists. Skirting the town eastward in a line with the red rock fault from the Buxton Road southwards for about two miles, there would have been exhibited a series of steep and rugged cliffs, formed in the first place as far as the end of Gunco Lane, by the coal measure sandstones, and from thence, at a lesser elevation, by the Yoredale strata, while at their base,

there would have been exposed the denuded surface of the new red sandstone. Of course upon such a cataclysm having occurred as the one just named, the present valley of the Bollin would have been extinguished; and the stream, after having left the carboniferous strata, and crossed the red rock fault in Sutton, would then probably have resumed its ancient bed in the Trias, which it had occupied previous to the deposition of the drift; and this channel, if it could now be inspected, would be seen to take a more direct line towards the base of Alderley Edge, than the one now formed in the drift, which as I have already stated, is about 80 feet above the "red rock" in the Waters and elsewhere. A similar geological feature is exhibited about one mile from the southern end of the town as that on its eastern side. I allude to the fault near Green Bank, Sutton, which runs from thence across the country towards Alderley Edge. This fault crosses the Leek Road near the copper works, and cuts off the upper and lower keuper deposits, which are in this locality on a level with the canal; while the second bunter will probably be about 150 feet lower down, overlain by about that thickness of the drift. The presence of the first bunter is here conjectural. From what I have stated it is manifest, that the present site of the town of Macclesfield is indebted to the drift formation, on account of its levelling properties, or filling up inequalities of rock surface, for the eligibility of its position, since, it is scarcely possible, that in ancient times, such a locality would have been selected for a settlement by the Roman or the Saxon, if it had presented a chain of mural cliffs ranging about 50 yards in height, both on its eastern and southern boundaries.

RIVER TERRACES AND VALLEY GRAVELS.

River terraces and valley gravels are observed to be upon a superficial and limited scale east of Macclesfield, as the river Bollin is but a shallow and quick mountain stream fed by the steep watersheds west of Shutlingslow, Teggsnose, Hollin Lane, and other adjoining slopes. It skirts the town with a slight decline in a north-westerly direction towards Prestbury, and ultimately joins the Mersey at Warburton, north of Warrington.

River deposits, which mainly consist of loamy and clayey silts, sand, gravel, and shingle, are usually classed either as the higher or lower level-valley gravels. The upper portion have in some localities assumed the form of terraces, which denote the different heights at which the river formerly ran. Some of them are of vast antiquity, as is proved by the bones of the mammoth, rhinoceros, hippopotamus, &c., being found in them; and also occasionally the flint instruments of rude and primitive races of men. The lower alluvial flats are comparatively of modern origin, as they contain the remains of existing species of animals, with some of rather older date that have become extinct.

About Macclesfield, the fluviatile accumulations of the valley of the river Bollin, according to the order and period of their deposition, will have occasionally entombed the remains of wild-oxen and horse, wild ass, deer, wild boar, wild cat, wolf, bear, fox, pole-cat, beaver, badger, otter, &c., which in former ages were swept down by inundations from the uplands in the Forest and its vicinity, as well as those of the domesticated animals belonging to more recent times. The aboriginal British wild ox (Bos longifrons), with very short horns and long-fronted head, outlived the Irish Elk and became domesticated by the ancient Britons. During the Roman

occupation of this country, it was kept in large herds for the supply of food to the invaders, and its dwarfish descendants are said to be still extant in the Highlands of Scotland. The progenitor of the wild cattle in Lyme Park, is reputed to be the Urus, a gigantic ox which had lived contemporary with the mammoth, &c. It became extinct in Britain about the middle of the twelfth century. Two species of wild horse, one of middle size and the other that of the Zebra, were formerly indigenous in this country. The wild asses of India and Persia may be seen in the Zoological Gardens, Regent's Park. The red deer or stag, has left its bones and teeth in our river-drift gravels, along with those of the elephant and rhinoceros, &c. Its relics are of common occurrence in quarternary strata ; and its home in this country is now restricted to the wilds of Scotland, where the breed is carefully preserved. Our domesticated pig is the existing representative of a very ancient race of mammals. The same species of wild boar that was hunted by our forefathers had been co-existent with the mammoth, and its remains are found in strata of much older date than that proboscidean. The brown bear only perished as a native of Scotland in 1057. A colony of badgers is now established on the Roaches, near Swythamley Park, Staffordshire. The beaver was not extinct in Wales until after the time of Oliver Cromwell. An otter was taken about thirty years ago at Adlington, and recently otter-hunting has been carried on at Astle Park and in other parts of Cheshire. Wolves were plentiful in England and Wales in the time of Edgar. In Ireland they maintained their ground until about the year 1700. In Scotland they became extinct at a little earlier period. The polecat was sufficiently numerous in former days to be pursued for the sake of its fur. The only representative of the dog tribe in this country is the fox; of the tiger

and lion, the wild cat ; and of the bear, with its plantigrade feet, the badger.

In the brook-courses or feeders of the river Bollin lying north-west of the town, some alluvial ledges or terraces may be observed which prove that the stream has formerly ran at much higher levels. The valley between the Park and Cemetery is a case in point. Here a brook has been formed through 70 or 80 feet of the drift, and in its deposits at various levels, when the Cemetery was in course of construction, many bones and teeth were picked up, viz.—red deer, fallow deer, wild boar, horse, and also those of the extinct ox, Bos longifrons.

Along the valley approaching Prestbury, several ancient levels or terraces may be observed on both sides of the river which will contain ossiferous remains, &c.

When making the Marple Railway Viaduct across the river Bollin near the Lower Heyes mill, several bones of the wild horse were found in some dry and clean river-gravel, two feet above the present level of the stream, three feet from its margin, and it was overlain by three feet of alluvial soil, from which was dug out the ilium of the aboriginal British wild ox, &c. as above.

Mr. Binney, the eminent geologist, has recorded that a few years ago, the molar tooth of a mammoth was found in some river gravel in the valley of the river Dean at Adlington.

Since the occupation of this country by the Romans there has been very little alteration in the level of the Bollin, and from the character and position of the deposits in which the above bones were found, some may be referred to the above era, and others to an older period. A few years ago a quantity of Roman coins were found in the river near Waters green. On a much larger scale and of far older date, terraces occur in the valley

of the river Dane stretching from a little above the North Rode viaduct towards Congleton. Here along this valley, the different levels have been formed more or less in succession, and they occasionally correspond with one another in height on opposite sides of the valley, and that some of them have existed from a very remote period is proved by the fact, that these old river gravels rest upon the red marl without any interposition of the glacial drift, and that the stream has cut its way through the marl to a depth of from 30 to 60 feet. It is in those very ancient river gravels and in fissures or cave-deposits that the earliest traces of man are met with in this and other countries, along with bones and teeth of elephants, rhinoceroses, &c.

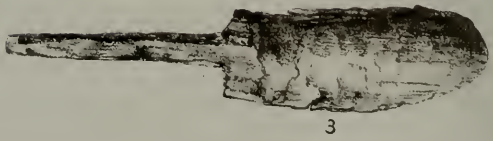
I may here mention that in the Geological Magazine, vol. ii., p. 79, there is given an account of the discovery a few years ago in a limestone fissure at the Waterhouses, near Leek, some bones and teeth of the mammoth, and very lately some bones of the wild horse and bison have been found in the same spot. A similar instance with respect to the mammoth, is recorded as having taken place at the Dove Holes, near Chapel-en-le-Frith, Derbyshire. And many years ago, at Wirksworth, in the same county, the complete skeleton of a rhinoceros was met with in a limestone fissure laid open by mining operations. Likewise lately, in some caves and fissures of the mountain limestone, near Castleton, there has turned up bones of the mammoth, woolly rhinoceros, reindeer, red deer, grisly bear, wild boar, wolf, extinct species of ox and wild horse, goat, badger, dog, cat, water rat, rabbit, &c. a jet ornament, some pieces of charcoal, human bones and teeth, flint, bronze, and iron instruments and ancient pottery. From the configuration of the ground extending about two miles west of this fissure, it would appear, that there has formerly existed an extensive and swampy

piece of ground which during hot and dry seasons would have attracted numbers of the prevailing fauna of the district, as well as animals from a greater distance, some of which would now and then have fallen into the fissure by accident or from other causes, until at length the cavity became filled with their ossiferous remains, and out of it there has been already obtained about 1,000 limb bones, 400 teeth and jaws, and some hundreds of vertebræ. Fissures are common in the carboniferous limestone districts, which for the most part have been formed in consequence of the limestone having become dissolved by rain-water and finding its way down among the softer strata through the joints. Down to the current or postglacial era, fissures and cave deposits embrace various geological periods; some contain the bones of animals, (including man or his rude stone implements), which will date as far back as interglacial or preglacial times.

In a locality named Creswell Crags, on the north-eastern borders of Derbyshire near Worksop, there is a ravine bounded by cliffs of the lower Permian sandstone, in which are visible numerous fissures, two of which have also been examined by Scientists, and they contained the bones of several species of mammals, viz.—hyæna, glutton, bear, wolf, fox, arctic fox, extinct ox, wild horse, sheep, water rat, red deer, reindeer, Irish elk, two species of elephant, woolly rhinoceros, and human teeth. Likewise Samian pottery and a coarser kind of earthenware, chips of flint, and implements formed from quartz pebbles; also bones of a bird and the scales of a cycloid fish.

PEAT BOGS.

In the neighbourhood of Macclesfield hollows occur here and there upon the surface of the drift, and when of



1 TWO TINES OF RED DEER.

2 ANCIENT OAK PADDLE FROM A PEAT BOG.

3 BACK AND FRONT OF AN OAK SPADE
ALDERLEY EDGE COPPER WORKS.

sufficient depth or thickness, trunks of trees are found imbedded in them, along with fir cones, acorns, and nuts. But the most instructive and interesting object of this character about Macclesfield is that of Danes Moss, a general description of which, regarding its natural history &c., will be found further on.

A few years ago during the construction of the Marple line across Tytherington fields, the following section was exposed for about 200 yards :—Surface soil, 2 feet; solid mud, 10 feet; with here and there patches of peat, and trunks, roots, and branches of trees, chiefly fir and oak, and some bones of the horse. Below this was a bed of solid bog three feet in thickness, and two snags of the red deer were found a few inches below its surface. The whole reposed upon about two feet of drift sand and gravel, which rested upon the boulder clay. The present surface-configuration of the ground in this immediate neighbourhood, extending eastward for about one mile, exhibits a shallow basin hollowed out of the drift, about half a mile in breadth; and a small brook, assisted by two or three tributaries, flows through the whole length of it, escaping westward into the river Bollin. There is not much doubt that in former ages this basin for a length of time was occupied by a lake fed by the above stream, which will account for the fresh-water deposit above named; and that it may have been drained either by artificial means or by the natural denudation of its margins forming watersheds into the valleys of the rivers Dean and Bollin, which compose its northern and southern boundaries, as the peat containing the deer horns, &c., which is now overlaid by the mud, has been a land surface, and since that event a great interval of time must have elapsed. At a short distance from the place where the remains of the deer were found, an oak paddle was picked out of

some marshy ground, one yard below the surface, and it is perhaps of early coracle age.

Another section taken about one mile north of the bed of peat along the line of railway, ran as follows, from below upwards :—

	FT.	IN.
Tough boulder clay with pebbles	6	0
Coarse sand and gravel with pebbles . . .	4	0
A level bed of peat . . . . . containing prostrate trunks of fir and oak, likewise the trunk of an oak, 18 inches in diameter and 8 feet in length, standing upright and extending into the bed above, which consisted of marine sand and gravel, with boulders and pebbles .	4	0
	9	0
Surface soil	2	6
Total	25	6

From the above circumstances it may be inferred that intermissions have occasionally occurred during the deposition of the drift deposits, which in this instance had lasted a sufficient length of time for the promotion of forest-growth and the generation of peat. Other instances have been noticed about Macclesfield where patches of peat and prostrate trunks of trees lie imbedded in the marine drifts at various depths below the surface soil, also thin layers of coal and shale.

Further north along the Marple line of railway, just referred to, there occurred an interesting section through the drift. It was 250 yards in length, 30 feet in depth from the surface, and the floor was composed of fine sand and gravel. Overlying this, about nine feet in breadth, there was a remarkable collection of rock specimens both foreign and local, ten feet in height ; and with the exception of a few small pebbles, the heap throughout the above length, was entirely free from either sand or gravel. Most of the foreign boulders were well rolled and waterworn, a few only being ice-marked. The top of the pile was almost perfectly flat, and the scene that

presented itself to the eye, gave the idea of its having been the component part of a sea beach, which will date from a remote period of geological time.

Clarke Lane spans the railway by a bridge about one quarter of a mile northwards of the above interesting section, and at a short distance up the lane to the left, there comes into view what is named Cold Harbour farm, from col, (Celtic) a commanding position, and arbhar (Celtic) used as outposts or resting places. These are generally observed in the vicinity of Roman roads ; and although some are of Celtic origin, the Romans adopted a few of them afterwards under the name of "militares stationes," or military stations.

Thick beds of peat occur on the moorlands near the Cat and Fiddle Inn, on the Buxton road, at an elevation of about 1,800 feet above the sea-level ; and this may be said to be one of the highest as well as the oldest localities in Cheshire, that has been subject to the growth of peat, whenever favourable conditions of climate, &c. prevailed, as far back as preglacial times.

LAKE DEPOSITS.

Lake deposits occupy many of the alluvial expanses in our plains and valleys. The tendency of every lake

fed by running streams is to become shallower and shallower from the sediments deposited in its basin by these inflowing waters; and we have only to watch the cuttings of any main drains or lines of railway through their subsoils to be convinced of the truth of their origin. Generally thick layers of vegetable or peaty soil, followed by beds of silty sand, marl mud, or clay, imbedding the bones of species of deer, oxen, horse, boar, wolf, bear, otter, and other mammalia, with the remains of an occasional paddle, coracle or tree canoe, clearly bespeak their lacustrine formation, and point to the time, when the wild animals of the country were mired in their muds, and the primitive inhabitants paddled across the waters. Lakes of greater antiquity are more readily distinguished by their finer sediments, greater regularity of disposition, the occurrence of shell-marl and peat, and the more perfect preservation of their organic remains. These remains range from the time of the mammoth, great Irish deer, and species of ox and horse, &c., that have been long extinct; also objects of human art, as stone battle-axes, flint arrow-heads, and querns. "There is no county in England that possesses so many meres or lakes as Cheshire. Between Chester and Macclesfield on the west and east; and between Bowden and Wrenbury on the north and south, there are 36 sheets of water, of which Combermere, with an area of 132 statute acres, is the largest. Formerly there were several others which had been drained. Rostherne Mere occupies 115 acres, and is 100 feet in depth. Some of the meres and pools of the county are hollows that have been left on the sea-bottom-surfaces of the drift, others are the result of drift—barriers closing up an ordinary water-shed valley. In the salt district, a few have been formed by a subsidence of the strata from the abstraction of brine."

TUMULUS NEAR CEMETERY.

Behind Mount Pleasant, Prestbury Road, there is to be seen a tumulus, which when explored a few years since, yielded a neolithic or later-stone age burial. At the foot of this mound westward, there are the remains of a peat bog; and an oblong block of greenstone, weighing 25 pounds, was taken out of it, that had been used by the ancient Britons as a hand-grain rubber or triturating stone. It is broadly beveled towards the edges all round, eleven inches in length, nine and a half in breadth, and six in thickness along the central ridges. The following is the result of an exploration of this barrow. Upon an oblong mound of the drift, 30 yards in diameter at the base, and 25 feet in height, 15 feet in thickness of earth had been added to form a barrow. After clearing off the surface soil, a depth of 18 inches of sand and gravel was removed. Below this, came alternate layers of sand and gravel (partaking of an arched form), which were five feet in depth, succeeded by a heap of boulders that formed a cairn three feet in height and twelve in diameter; and some of the stones were split and blackened by fire. Upon the removal of the greater part of them, the following was the result; upon three stones placed in the centre and at the bottom of the pile, which rested upon the natural surface of the mound of drift, there was observed a collection of calcined human bones and teeth, and between two stones placed on the north east side of the bones, there was picked up a highly polished flint saw, with a very fine serrated edge, that measured four inches and a half in length and one in breadth.

This appears to have been a small Celtic settlement, probably dating before the arrival of the Romans in this country; and the peat bog with its water supply, named above, in which the grain crusher was found, is still more or less traceable in an irregular semicircular

form from north to south along the foot of the mound; and thus the natives had always been protected on that side from sudden and hostile attacks. This circumstance offers another example in which those ancient people had selected a locality that would be conducive more or less to their safety. Probably the above represents the burial of a chieftain, or the head of a clan.

Dr. Whitaker, in his History of Manchester, page 368, states that on Sept. 27, 1791, a tumulus was opened on the Macclesfield Common, which contained "some charcoal ashes and a few remains of burnt bones with no urn." Perhaps if a more careful examination had been made, a flint instrument would have turned up.

THE ORNITHOLOGY OF THE DISTRICT ROUND MACCLESFIELD.

A list of the birds that breed, or have bred in this locality within the last 42 years. Those that are rare birds, are marked r.; and very rare, v.r.; or v.v.r., very, very, rare; common birds have no mark.

Bullfinch, v.r.—*Pyrrhula vulgaris.*
Blackcap, v.r.—*Curruca atricapilla.*
Blackbird—*Turdus merula.*
Bunting, black-headed, r.—*Emberiza scheniculus.*
Chaffinch—*Fringilla cœlebs.*
Chiffchaff, r.—*Sylvia hippolais.*
Coot, r.—*Fulica atra.*
Creeper, r.—*Certhia familiaris.*
Crow, v.r.—*Corvus corone.*
Cuckoo—*Cuculus canorus.*
Curlew, v.r.—*Numenius arguata.*
Dipper, r.—*Cinclus aquaticus.*
Dove, Ring, v.r.—*Columba palumbus.*
Dove, Stock, r.—*Columba œnas.*
Duck, Wild, r.—*Anas boschas.*
Flycatcher, spotted, r.—*Muscicapa grisola.*
Goldfinch, v.r.—*Carduelis elegans.*

Green Finch—*Carduelis fringella.*
Grebe, Great, crested, v.v.r.—*Podiceps cristatus.*
Grebe, Little, v.v.r.—*Podiceps minor.*
Grouse, Black, v.v.r.—*Tetrao tetrix.*
Grouse, Red—*Lagopus Scoticus.*
Goose, Bean, v.v.r.—*Anser segetum.*
Hen, Harrier, v.r.—*Circus cyaneus.*
Hawk, Sparrow, r.—*Accipiter nisus.*
Heron, Common, v.v.r.—*Ardea cinerea.*
Hobby, v.v.r.—*Falco subbuteo.*
Jackdaw—*Corvus monedula.*
Jay, r.—*Garrulus glandarius.*
Kestrel, r.—*Falco tinnunculus.*
Kingfisher, r.—*Alcedo ispida.*
Lapwing—*Vanellus cristatus.*
Lark, Sky—*Alauda arvensis.*
Lark, Wood, v.v.r.—*Alauda arborea.*
Linnet, Common—*Linota cannabina.*
Linnet, Mountain, r.—*Linota montium.*
Magpie, r.—*Pica caudata.*
Martin—*Hirundo urbica.*
Martin, Sand—*Hirundo riparia.*
Moorhen—*Gallinula.*
Night Jar, v.r.—*Caprimulgus Europæus.*
Ousel, Ring, r.—*Turdus torquatus.*
Owl, Long Eared, v.r.—*Otus vulgaris.*
Owl, Barn, r.—*Strix flammea.*
Owl Tawny, v.r.—*Syrnium stridula.*
Partridge—*Perdix cinerea.*
Pheasant—*Phasianus Colchicus.*
Pipit, Tree—*Anthus arboreus.*
Pipit, Meadow—*Anthus pratensis.*
Rail, Land—*Crex pratensis.*
Rail, Water, v.r.—*Rallus aquaticus.*
Redpole, Lesser, r.—*Linota linaria.*
Redstart, r.—*Phœnicura ruticilla.*
Robin—*Erythaca rubecula.*
Rook—*Corvus frugilegus.*
Sandpiper, Common, v.r.—*Totanus hypoleucos.*
Shrike, Red Backed, v.v.r.—*Lanius collurio.*
Sparrow, Common—*Passer domesticus.*
Sparrow, Tree, r.—*Passer montanus.*
Sparrow, Hedge—*Accentor modularis.*
Starling—*Sturnus vulgaris.*
Stonechat, v.r.—*Saxicola rubicola.*
Swallow—*Hirundo rustica.*
Swan, Mute, or Tame—*Cygnus olor,*
Swift—*Cypselus apus.*

Snipe, Common—*Scolopax gallinago.*
Thrush, Missel—*Turdus viscivorus.*
Thrush, Common—*Turdus musicus.*
Titmouse, Great—*Parus major.*
Titmouse, Blue—*Parus cæruleus.*
Titmouse, Cole—*Parus ater.*
Titmouse, Marsh, r.—*Parus palustris.*
Titmouse, Long Tailed, r.—*Parus caudatus.*
Wagtail, Pied—*Motacilla alba.*
Wagtail, Grey, r.—*Motacilla boarula.*
Wagtail, Yellow, v.r.—*Motacilla flava.*
Warbler, Sedge, r.—*Salicaria phragmitis.*
Warbler, Wood, v.r.—*Sylvia sibilatrix.*
Warbler, Reed, v.r.—*Salicaria arundinacea.*
Warbler, Garden—*Curruca hortensis.*
Wheatear—*Saxicola œnanthe.*
Whinchat—*Saxicola rubetra.*
Whitethroat.—*Curruca cinerea.*
Whitethroat, Lesser—*Curruca sylviella.*
Woodcock—*Scolopax rusticola.*
Woodpecker, Green, v.r.—*Picus viridis.*
Woodpecker, Lesser Spotted, v.r.—*Picus minor.*
Woodpecker, Great Spotted, v.r.—*Picus major.*
Wren, Common—*Troglodytes vulgaris.*
Wren, Willow—*Sylvia trochilus.*
Wren, Gold Crested, v.r.—*Regulus cristatus.*
Wryneck, v.r.—*Yunx torquilla.*
Yellow Hammer—*Emberiza citrinella.*

Total 93.

The Hobby, Heron, Bean Goose, Black Grouse, and Redbacked Shrike, are the rarest birds that I have known to breed near Macclesfield ; and as the following dont abound in the district, therefore, in proportion, are their nests scarce. Curlew, Waterail, Yellow Wagtail, Bullfinch, Goldfinch, Lesser Redpole, Stonechat, Gold Crested Wren, Reed Warbler, Wood Warbler, Wood Lark, Common Sandpiper, Kingfisher, Marsh Tit, Long-tailed Tit, Redstart, Long Eared Owl, Tawny Owl, Carrion Crow, Jay, Magpie, Coot, Ring Dove, Great Crested Grebe, Little Grebe, Great Spotted Woodpecker, Lesser Spotted Woodpecker, Tree Sparrow, Night Jar, Black Cap, Dipper, Ring Ousel, and Wryneck.

In the spring of 1862, the Nightingale was repeatedly heard and seen near Wilmslow, which created a great sensation ; and it was said that the same circumstance had occurred 30 years ago.

LIST OF BIRDS THAT DONT NEST IN THE NEIGHBOURHOOD OF MACCLESFIELD.

Scale of frequency—w.v., winter visitor ; s.v., summer visitor ; r., rare ; v.r., very rare ; v.v.r., very, very rare ; v.v.v.r., very, very, very rare ; a.v., accidental visitor ; a.a.v., accidental autumn visitor ; a.w.v., accidental winter visitor.

*Golden Eagle, v.v.v.r.—*Aquila chrysäeta.*
*Common Buzzard, v.v.v.r.—*buteo vulgaris.*
*Crested Lark, w.v., v.v.v.r.—*Alauda cristata.*
*Common Crossbill, w.v., v.r.—*Loxia curvirostra.*
*Diver, Red Throated v.v.v.r.—*Colymbus septentrionalis.*
*Brambling, w.v., r.—*Fringilla montifringilla.*
*Pied Flycatcher, v.v.v.r.—*Muscicapa atricapilla.*
Fieldfare, w.v.—*Turdus pilaris.*
*Golden Plover, v.v.v.r.—*Charadrius pluvialis.*
*Gull, Black Headed, v.v.v.r.—*Larus ridibundus.*
*Oystercatcher, v.v.v.r.—*Hæmatopus ostralegus.*
Gull, Common, r.—*Larus canus.*
*Pastor, Rose Coloured, a.v.—*Pastor roseus.*
*Nuthatch, v.v.v.r.—*Sitta Europæa.*
*Hawfinch, w.v., v.v.v.r.—*Coccothraustes vulgaris.*
Redwing, w.v.—*Turdus iliacus.*
*Redstart, Black, v.v.v.r.—*Phœnicura tithys.*
*Redpole, Mealy, w.v., r.—*Linota canescens.*
*Roller, v.v.v.r.—*Corracius garrula.*
*Ruff, v.v.v.r.—*Machetes pugnax.*
*Shrike, Great Grey, v.v.v.r.—*Lanius excubitor.*
Snipe, Jack, s.v.—*Scolopax galinula.*
Siskin, w.v.—*Carduelis spinus.*
*Storm Petrel, a.v.—*Thalassidroma pelagica.*
*Teal, v.v.r.—*Anas crecca.*
Tern, Common, a.v.—*Sterna hirundo.*

Tern, Lesser, a.v.—*Sterna minuta.*
*Wagtail, Grey Headed, v.v.v.r.—*Motacilla neglecta.*
*Wigeon, w.v., v.v.r.—*Anas Penelope.*
*Wren, Fire Crested, v.v.v.r.—*Regulus ignicapillus.*
*Goosander, a.v., v.r.—*Mergus merganser.*
*Great Northern Diver, a.a.v., v.v.v.r.—*Colymbus glacialis.*
*Grebe, Eared, a.v., v.v.r.—*Podiceps auritus.*
*Pipit, Richard's, a.a.v., v.v.v.r.—*Anthus Ricardi.*

Total *32.*

The Storm Petrel and the Terns are driven in tempestuous weather inland, where they have died exhausted or have been shot. Those birds marked with an asterisk, are some of the most uncommon that have visited this part of Cheshire during the last few years.

In the year 1845, the Golden Eagle was captured at Somerford Park, Cheshire, the seat of Sir Charles Peter Shakerley, Esq., and another, in the same county, a few years previously, near Eaton Hall, the seat of the Marquis of Westminster. The Buzzard was shot on the Roaches about six years ago.

The waterfowl connected with the above list, have for the most part been obtained from Wood's Pool, the Sutton Broad Oak reservoir, the reservoirs near Langley, and Turner's Pool near Swythamley. Nearly all the rest of the birds have been shot, either close to or within five or six miles round Macclesfield.

The following list of birds that formerly frequented Derbyshire, is extracted from Pilkington's Derbyshire, published in 1789. He says that the celebrated ornithologist Willoughby has stated, that the latest recorded instance of the Golden Eagle having bred in the High Peak was in 1688. It was found in the woodlands near the river Derwent, "the nest was made of great sticks resting one end on the edge of a rock, the other on two birch trees, upon which was a layer of rushes, and over them a layer of heath, and upon the heath, rushes again, upon which lay one young one, and

an addle egg ; and by them a lamb, a hare and three heath poults. The nest was about two yards square, and had no hollow in it. The young eagle was as black as a hobby, of the shape of a goshawk, of almost the weight of a goose, rough footed or feathered down to the foot, having a white ring about the tail." There is no instance of the eagle having bred in Derbyshire since the above date. About the year 1720 a visitor was picked up on Kinderscout, near Glossop, apparently nearly exhausted by the inclemency of the weather. It recovered and was carried about the country to be shown as a natural curiosity. In 1760 another eagle was seen in Hardwick Park. This is believed to be the last which has been observed in Derbyshire. But in 1782 two Eagles were seen in Sherwood Forest, Nottinghamshire, which is only a few miles from Hardwick.

In 1779 an Osprey was shot at Staveley, near Chesterfield, and another in 1785, at Melbourne. About 100 years ago a variety of Falcons frequented Derbyshire, also the Raven, Kite, Merlin and Common Buzzard. The Honey Buzzard and Hen Harrier were shot at Aston. The long and short eared Owls were getting scarce. Both the greater and lesser Butcher Birds were shot near Derby. The hooded or Roystone Crow was sometimes seen, also the Quail, Rock Pigeon, Nuthatch, Crossbill and Brambling. Black Cock and red Grouse were common. The Nightingale frequented the north east border of the county, particularly in the parish of Cresswell. The Goldfinch, Woodlark and yellow Wag-tail were common."

WATERFOWL.

"The Heron and Curlew were frequently observed ; Bittern, scarce. The following were more or less common, Godwit, Redshank, Grey Sandpiper, Spotted Sandpiper,

Ruff and Reeve, Water Rail, Ringed Plover, Golden Plover, Kittiwake, Sanderling, Dotterel, Oyster-catcher, Dusky Grebe, Great Eared Grebe, Grey Gull, Black-headed Gull, Bean Goose, greater and lesser Tern, Goosander, White-fronted Goose, Red-headed Smew, Barnacle, Pochard, Long-tailed Duck, White-throated and Garganey Ducks and Cormorant. Wild Swans visited the rivers Trent and Derwent in severe seasons."

MAMMALIA.

The following is a list of the Mammalia found about Macclesfield :

COMMON BAT, *(Vespertilio pipistrellus.)*—This species of bat makes its appearance in the twilight of a fine summer's evening, frequenting the sides of woods, glades and shady walks, or skimming along the surface of the tranquil rivers where moths, gnats and other nocturnal insects are most readily found ; but if the weather is not fine, the animal remains shut up in the chinks or fissures of crumbling masonry, or lies concealed in the friendly recesses of some hollow tree.

GREAT BAT, *(Vespertilio noctula.)*——It flies high in the air, and may often be heard uttering a shrill squeak while on the wing.

MOUSE COLOURED BAT, *(Vespertilio murinus.)*—This is the largest of the British Bats. The head of this Bat is long with the ears inclining backwards.

LONG-EARED BAT, *(Plecotus auritus,)* one of the most pleasing of our British Bats, owing to the extra-ordinary transparency and beauty of the ear.

HEDGEHOG, *(Erinaceus Europœus.)*—It is found in most of the temperate parts of Europe and Asia, and though it has a formidable appearance, it is one of the most harmless creatures in existence. Its close covering

of sharp spines, which are firmly fixed in its tough skin, protects it from falls and blows, and as effectually secures it from the attacks of an enemy; for when molested it instantly rolls itself into a kind of ball, and presents nothing but its prickles to the foe. Its usual food is beetles, worms, slugs, snails, and vegetable substances, as fruit, roots, seeds, &c. In the winter, covering itself deeply in moss and leaves, it sleeps during the severe weather, and when drawn out from its bed, scarcely any thing of the creature is to be observed, it exhibiting only a ball of leaves which it seems to attach to its spines by repeatedly rolling itself round in its nest.

The MOLE is a quadruped of the genus Talpa, whose structure admirably fits it for a subterranean life. The rapidity with which the Mole can make its way through a favourable soil, would be quite astonishing, did not its whole conformation and great muscular strength account for it. The food of the Mole consists chiefly of earth worms and the larvæ of insects, and during the summer months it now and then leaves its subterranean abode and preys upon mice, frogs, snails, &c. It is generally met with in shady banks and woody districts; and its greatest enemy is the owl except the mole-catchers.

There are three well known representatives of the Mustelidæ family that frequent this part of the country, viz.—Common Weasel, *(Mustela vulgaris)*; Marten *(Mustela foina)*; Polecat or Foumart, *(Mustela putorius)*; Ermine or Stoat, *(Mustela erminea)*. In summer the Ermine is brown in colour, in the winter it is white, and then it is called a Stoat. The above creatures are distinguished for their ferocity, and the depredations committed by them in rabbit warrens, poultry houses, &c., are too notorious.

COMMON SHREW, *(Sorex araneus.)*—This Shrew is a small insectiverous animal covered with short velvety

fur, and having much of the general form and aspect of the mouse. It frequents dry situations feeding upon insects, worms and grubs, for the pursuit of which its thin snout is admirably fitted either among the closest herbage or under the surface soil. The body exhales a rank, musky odour. This animal is common in hedge-rows, thickets, gardens, &c. It also exhibits much pugnacity and voraciousness, as it is often found dead in and about the places which it usually frequents.

WATER SHREW, *(Sorex fodiens.)*—This possesses the same general conformation as the Common Shrew. Their burrows are found in the banks of rivers, and their food consists of aquatic insects and larvæ, in pursuit of which they dive with great facility.

COMMON OTTER, *(Lutra vulgaris.)*—The natural food of the Common Otter is fish, for the chase and capture of which its whole frame is beautifully adapted. The eyes are so placed that whether the animal is swimming below its prey, behind it, above it, or beside it, their situation, or, at most, the least motion of the head and neck, brings it within the sphere of the pursuer's vision. The whole framework of the animal enables it to make the swiftest turns and bounds in the water, according as the rapidity of its agile prey demands a sudden downward dive, an upright spring, or a side snap. Elegant and easy in its motions, there are few objects more attractive in menageries than the pond (especially if it be kept clean, and supplied with clean water) wherein the Otter is seen to hunt its living prey. The havoc made by these animals in the ponds and rivers is great; for they will go on killing, and eat but a small portion of each fish if it be large, when they find plenty of prey. The Otter has been hunted for some years at Astle Park, about seven miles from Macclesfield, and likewise in several parts of west Cheshire.

THE BADGER, *(Meles vulgaris,)* is generally regarded as a solitary and rather stupid animal, that seeks refuge in the most retired districts. With its powerful claws it constructs a deep and commodious burrow and an apartment at the end of it, lined with dry grass and hay. This retreat it seldom quits until night, when it steals away for the purpose of obtaining food. It lives chiefly on roots, fruits, insects and frogs; also the eggs of partridges and other birds that make their nests on the ground. When attacked by dogs it defends itself with great resolution, and seldom dies unrevenged of its enemies. Its habitat is upon the Roaches.

COMMON MOUSE, *(Mus musculus.)* Too common.

FIELD MOUSE, *(Mus sylvaticus.)* Found frequently.

FIELD VOLE OR SHORT-TAILED FIELD MOUSE, *(Arvicola agrestis.)* Is very common in gardens and cultivated grounds, and is very destructive in young plantations.

BROWN RAT, *(Mus decumanus.)* Too common.

BLACK RAT, *(Mus rattus.)* Is occasionally found in the vicinity of granaries and other farm buildings.

COMMON WATER RAT, *(Arvicola aquatica).* Very common in ditches and water courses.

HARE, *(Lepus timidus.)* Abundant.

RABBIT, *(Lepus cuniculus.)* Abundant.

COMMON SQUIRREL, (*Sciurus vulgaris.*) Is completely formed for an arboreal life, and its tail is extremely long, beautiful, and spreading. It lives upon nuts, beech-mast, the bark of young trees, acorns, leaf-buds and tender shoots. It is most provident in laying up its winter stores, not merely in one place of safety, but in several holes of trees, in the immediate neighbourhood of its own retreat; and there vast magazines of nuts and acorns are to be found in that dreary season when the trees are divested of their fruit and foliage. The squirrel

never appears in the open fields but keeps among the tallest trees, and avoids as much as possible the habitations of men. When in captivity, the Squirrel may be said to be always in motion.

REPTILES FOUND IN THE VICINITY OF MACCLESFIELD.

Forty years ago the COMMON VIPER, (*Vipera berus*,) was often met with on Danes Moss, but after the formation of the North Stafford railway across it, and the erection of a shooting butt upon it, for the use of the volunteers, I believe that this serpent has now become all but extinct in the above locality. It is the only poisonous reptile indigenous to this country, and its bite often proves fatal.

The COMMON RINGED SNAKE, (*Coluber natrix*,) is now scarcely ever seen in this part of Cheshire. Some years ago I had two or three brought to me from Adlington.

THE BLIND OR SLOW WORM, (*Anguis fragilis.*)—A species of viviparous reptile which forms the connecting link between the lizards and true serpents. Its motion is slow, and from this circumstance, as well as from the smallness of the eyes, its names are derived. Its length is about 12 inches, and although formidable in appearance, it is perfectly innocuous, and feeds on earthworms, insects, &c. They lie torpid during the winter, being sometimes found in vast numbers twisted together. I have found them on Bosley Minn and the southern margin of Danes Moss.

The COMMON FROG, (*Rana temporaria*,) is plentiful.

The COMMON TOAD, (*Bufo vulgaris*,) is far less numerous than the frog.

VIVIPAROUS OR COMMON LIZARD, (*Zootoca vivipara*) as its name imports, this reptile is produced alive, while other lizards emit their spawn like fishes. It frequents heaths, thickets and sunny banks ; and several are often seen in such situations basking in the summer's sun, and watching for their insect prey. They burrow in the ground and retreat to their hiding places on the slightest alarm. I have at times noticed this lizard on hedge banks near Alderley Edge and on the sandy borders of Danes Moss.

The GREEN LIZARD, (*Lacerta agilis,*) is an elegant creature and is found in various situations, in gardens, about warm walls, buildings, &c. It is extremely active, pursuing its insect prey with great celerity and readily escaping from pursuit when disturbed.

WARTY OR ROUGH-BACKED NEWT, (*Triton palustris.*)—It frequents shady places and stagnant waters, living principally on insects, is perfectly innocuous, and may be easily known by its dark, almost black, colour,

COMMON SMOOTH NEWT, (*Lissotriton punctatus.*)—This is frequently found under stones, and in damp cellars and outhouses. Its food is small worms and slugs.

BOTANY.

TABLES OF ORDER AND GENERA.

RANUNCULACEÆ.

WILD FLOWERS.	RANUNCULACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Bulbous buttercup	Ranunculus bulbosus	yellow	hedge banks	May
Marsh marigold	Caltha palustris	bright yellow	marshes, river sides	May
Ivy leaved crowfoot	Ranunculus hederaceus	white	wet places	June
Mouse tail	Myosurus minimus	greenish	waste places	May
Wood anemone or wind flower	Anemone nemerosa	white, purplish beneath	woods and thickets	May
Great spearwort	Ranunculus lingua	bright yellow	ditches	July
Lesser spearwort	,, flammula	yellow	wet places	June
Small celandine	,, ficaria	yellow	hedge banks	Mar.-April
Grass leaved crowfoot	,, gramineus	yellow	high and dry pastures	June
Celery leaved crowfoot	,, sceleratus	yellow	watery places	June-Sep.
Creeping buttercup	,, repens	yellow	pastures	June-Sep.
Buttercup	,, acris	yellow	meadows	June
Water crowfoot	,, aquatalis	white	slow streams, ponds	May
Small flowered crowfoot	,, parviflorus	yellow	cornfields	June-Sep.

GERINACEÆ.

WILD FLOWERS.	GERINACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Crane's bill, small flowered	Gerinaceæ pusillum	purple	waste ground	May-Sep.
Herb Robert	,, robertianum	red and white streaks	hedge banks	May-Oct.
Heron's bill	Erodium cicutarium	pink	waste ground	June-Sep.
Round leaved Crane's bill	,, molle	pink	dry pastures	April-Aug.

ORCHIDACEÆ.

Bog orchis	Malaxis paludosa	greenish	peat bogs	Aug.-Sep.
Orchis, spotted	Orchis maculata	pink or white, spotted	heaths	June-July
Smaller butterfly orchis	Habernaria bifolia	greenish white	heaths	June-July
Early orchis	Orchis mascula	purple or white, lip spotted	pastures	May-June
Green winged orchis	Orchis morio	deep purple with green ribs	meadows	May-June

ROSACEÆ.

Trailing dog rose	Rosa arvensis	white or purple stalks	hedge banks	June-July
Tormentil, common	Tormentilla officinalis	yellow	heaths	June-July
,, trailing	,, reptans	yellow	hedge banks	June-July
Dog rose	Rosa canina	pink	thickets, hedges	June
Meadow sweet	Spirea ulmaria	yellowish white	meadows	June-July
Trefoil, lesser yellow	Trifolium minus	yellow	dry pastures	June
Marsh cinquefoil	Comarum palustre	dingy purple	bogs and marshes	July-Aug.

WILD FLOWERS.	ROSACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Goose weed	Potentilla anserina	bright yellow	road-sides, fields	June-July
Spring cinquefoil	,, verna	yellow	hill pastures	April-May
Creeping cinquefoil	,, reptans	yellow	hill pastures	June
Soft leaved rose	Rosa mollis	red or deep pink	hill thickets	June-July
Sloe blackthorn	Prunus spinosa	white, fruit black		Mar.-April
Wild cherry	,, avium	white, fruit black or red	woods and hedges	May
Wild service tree	Pyrus torminalis	white	hedges and woods	May
Wild apple or crab	,, malus	rose colour and white	woods and thickets	May
Sweet briar	Rosa rubiginosa	deep pink	thickets	June-July
Strawberry, wild	Fragaria vesca	white	woods	May-Aug.
Raspberry, wild	Rubus idæus	greenish white	woods	June
Strawberry, barren	Potentilla fragariastrum	white	hedge banks	April-May
Dewberry	Rubus cæsius	white or pale pink	heaths and banks	June-July
Cloudberry	,, chamæmorus	white	mountain moors	June
Bramble or blackberry	,, fructicosus	pink or white	hedges	July-Aug.
Bramble, hazel leaved	,, corylifolius	greenish white	hedges	July-Aug.
Bramble stone	,, saxatilis	greenish white	rocky woods	June
Mountain ash or Rowan tree	Aucuparia pyrus	white, bright red fruit	woods	May
Marsh cinquefoil	Comarum palustris	dingy purple	bogs and marshes	July-Aug.
Lady's mantle	Alchemilla vulgaris	green	dry hill pastures	May-Aug.
Field lady's mantle or parsley piert	,, arvensis	green	fields	May-Aug.
Hawthorn or May	Cratægus oxycantha	white or pink	thickets and hedges	May
Hoary cinquefoil	Potentilla argentea	yellow	commons and pastures	June-Sep.
Avens, common	Geum urbanum	yellow	woods and hedge banks	June-Aug.
,, water	,, rivale	dull purplish red	marshes and river banks	June-July

OLEACEÆ.

WILD FLOWERS.	OLEACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Privet	Ligustrum vulgare	white	hedges and thickets	June
Ash	Fraxinus excelsior		woods and hedgerows	April

TRILLIACEÆ.

Herb, Paris	Paris quadrifolia	green, berry black	woods	May-June

CRASSULACEÆ.

Biting stonecrop	Sedum acre	bright yellow	walls	June
House leek	Semper vivum tectorum	pink	moist walls	July
Mossy tillæa	Tillæa mucosa	reddish	sandy wastes	May-June

ARACEÆ.

Cuckoo pint, lords and ladies	Arum maculatum	greenish and purple	thickets, banks	May

ORONTIACEÆ.

Sweet flag	Acorus calamus	green	river sides	July

PAPAVERACEÆ.

Corn poppy	Papaver rhœas	deep scarlet	cornfield	June-July

NYMPHÆACEÆ.

White water lily	Nymphæa alba	white	clear water	June-July

LILIACEÆ.

WILD FLOWERS.	LILIACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Hyacinth, wild or hare bell	Hyacinthus non scriptus	blue or pink	woods and thickets	May-June

PORTULACEÆ.

Water blinks	Montia fontana	reddish	watery places	April-May

ERICACEÆ.

Cross leaved heath	Erica tetralix	pink	heaths	July-Sep.
Common heath	Erica cinerea	purple red	heaths	July-Oct.
Ling or heather	Calluna vulgaris	pink	heaths	June-Oct.
Marsh cistus or wild rosemary	Andromeda polifolia	pink	bogs	June

MALVACEÆ.

Marsh Mallow	Althæa officinalis	pale rose colour	marshes	July-Sep.

HYDROCHARIDACEÆ.

Frog bit	Hydrocharis, Morsus-Ranæ	white	ponds and streams	July-Aug.

VACCINACEÆ.

Bilberry or whortleberry	Vaccinium myrtillus	pink	heaths	May
Bog whortleberry	,, uliginosum	pink	bogs	May
Cranberry	Oxycoccus palustris	pink	bogs	June
Cowberry	Vaccinium vitis Idæa	pink	dry heaths	May

EMPETRACEÆ.

WILD FLOWERS.	EMPETRACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Crowberry or crakeberry	Empetrum nigrum	purplish, berries black	bogs	June

CRUCIFERÆ.

Charlock or wild mustard	Sinapis arvensis	yellow	common weed	May-June
Wild Turnip	Brassica rapa	bright yellow	waste places	May-April
Hedge gariic	Erysimum alliaria	white	hedge banks	May
Whitlow grass	Draba verna	white	walls and dry banks	March
Shepherd's purse	Capsella Bursa Pastoris	white	a common weed	perennial
Bitter candytuft	Iberis amara	white	fields	July
Lady's smock	Cardamine pratensis	lilac	meadows	May
Watercress	Nasturtium officinale	white	meadows, or slow streams	July

RUBIACEÆ.

Smooth heath bedstraw	Gallium saxitile	white	heaths	June-Sep.
Rough heath bedstraw	,, Witheringü	pale yellow	boggy heaths	July
Woodruff	Asperula odorata	white	dry woods	May
Goose grass, cleavers	Gallium aparine	white	hedge banks	May-Aug.

VALERIANACEÆ.

Great wild valerian	Valeriana officinalis	pink	moist places	June
Marsh valerian	Valeriana dioica	pink	moist meadows	June

CUPULIFERÆ.

WILD FLOWERS.	CUPULIFERÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Beech	Fagus sylvatica	brownish	woods	April-May
Spanish chesnut	Castanea vulgaris	yellowish	woods	April-May
Oak	Quercus pedunculata	yellowish	woods, hedgerows	April-May
Hazel	Corylus avellana	catkins yellowish	thickets	Feb.-April
Hornbeam	Carpinus betulus	brownish green	woods	April-May

CONIFERÆ.

Scotch fir or pine	Pinus sylvestris	catkins yellow	woods, fields	May-June
Yew	Taxus baccata	yellowish	woods, fields	Mar.-April

ACERACEÆ.

Sycamore	Acer, pseudo-platanus	greenish yellow	woods and hedges	May
Maple	Acer campestre	greenish	woods and hedges	May-June

ULMACEÆ.

Common elm	Ulmus campestris	purplish	woods and hedges	Mar.-April

AQUIFOLIACEÆ.

Holly	Ilex aquifolium	white	woods and thickets	May

BETULACEÆ.

White birch	Betula alba	greenish	woods	April-May
Alder	Alnus glutinosa	catkins reddish	moist ground	Mar.-April

TYPHACEÆ.

WILD FLOWERS.	TYPHACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Burweed, floating	Sparganium natans	stamens yellow	lakes	July-Aug.
,, branched	,, ramosum	stamens yellow	ditches	July
,, upright	,, simplex	stigma linear	ditches	July

DYPSACEÆ.

Devil's bit	Scabiosa succisa	blue	commons	Aug.-Oct.
Field scabious	,, arvensis	purple	cornfields, pastures	July
Small scabious	,, columbaria	purple	pastures	Aug.-Sep.
Wild teasle	Dipsacus sylvestris	purple	ditch banks	July

SOLANACEÆ.

Bitter sweet or night shade	Solanum dulcamara	bright purple	hedges	June-Aug.

CAPRIFOLIACEÆ.

Honey suckle	Lonicera periclymenum	pale yellow	hedges, woods	June-July
Elder, common	Sambucus nigra	white, berries black	hedges	June

LEGUMINOSÆ.

Black medick, nonsuch	Medicago lupulina	yellow	fields	May-Sep.
Great birdsfoot trefoil	Lotus major	yellow	bushy places	June-Aug.
Lesser yellow trefoil	Trifolium minus	yellow	dry pastures	June-July

WILD FLOWERS.	LEGUMIONOSÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Strawberry trefoil	,, fragiferum	pink	moist pastures	July
Kidney vetch	Anthillis vulneraria	yellow	dry pastures	June-Aug.
Wood vetch or woundwort	Vicia sylvatica	white and blue streaks	hedges	July
Vetch or tare	,, sativa	purple	fields	June
Tufted vetch	,, cracca	purplish blue	hedges	July-Aug.
Tare vetch	,, sativa	purple	fields	June
Saintfoin	Onobrychis sativa	crimson and white	hills	June-July
Sulphur coloured clover	Trifolium ochroleucum	cream colour	pastures	July-Aug.
Meadow vetchling	Lathyrus pratensis	yellow	meadows	July-Aug.
Milk vetch	Astragalus glycyphyllos	dingy yellow	woods and dry fields	July
White clover	Trifolium repens	white	pastures	May-Sep.
Purple clover	,, medium	deep purple	pastures	July
Birdsfoot clover	,, ornithopodioides	pink	heaths	July
Haresfoot trefoil	,, arvense	pale purple	dry fields	July-Aug.
Marsh vetchling	Lathyrus palustris	purplish blue	meadows and boggy woods	June-Sep.
Birdsfoot trefoil	Lotus corniculatus	bright yellow	pastures and heaths	June-Sep.
Broom	Saroth amnus scoparius	bright yellow	woods and heaths	May-June
Furze, gorse, whin	Ulex Europæus	golden yellow	commons, thickets	Dec.-May
Dwarf furze	,, nanus	yellow	heaths	Aug.-Oct.

POPULUS.

Poplar white	Populus alba	scales brown	moist woods	Mar.-April
Aspen	Populus tremula	stigmas purple	moist woods	Mar.-April
Black poplar	Populus nigra	stigmas purple	moist woods	Mar.-April

TILLIACEÆ.

WILD FLOWERS.	TILLIACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Lime or linden tree	Tillia Europæa	yellowish	woods	July

LABIATÆ.

Horehound	Marubium vulgare	whitish	waste places	Aug.-Sep.
Self heal	Prunella vulgaris	pink or white or purplish blue	fields	June-July
Wild clary	Salvia verbanaca	purple	dry fields, hedge banks	June-Oct.
Wild basil	Clinopodium vulgare	pinkish purple	hills	Aug.
Wild thyme	Thymus serpyllum	flowers in heads	heaths, hedge banks	June-Sep.
Bastard balm	Mellitis melissophyllum	red with crimson spots	woods	June
Betony	Betony officinalis	purple pink	woods	July-Aug.
White dead nettle	Lamium album	white	hedges, way-sides	April-Oct.
Hemp nettle	Gallopsis tetrahit	purplish or white	fields	Aug.
Bee nettle	,, versicolor	yellow, purple spot	cornfields	June-Aug.
Weasel snout	Galeobdolon	yellow	hedges, thickets	May-June
Catmint	Nepeta cataria	pale pink, purple spots	hedge banks	July-Sep.
Ground ivy	Glechoma hederaceæ	blue or white	hedge banks	April-Oct.
Spearmint	Mentha viridis	reddish purple	moist places	Aug.-Sep.
Bugle	Ajuga reptaus	blue, pink or white	woods	May-June
Marsh woundwort	Stachys palustris	purple and white	wet places	Aug.
Purple dead nettle	Lamium purpureum	purple or pink	a common weed	all the year
Round leaved mint	Mentha rotundifolia	reddish	moist places	Aug.-Sep.
Horse mint	,, sylvestris	pale lilac	moist ground	Aug.-Sep.
Water mint	,, hirsuta	pale purple	wet places	

WILD FLOWERS.	POPULUS.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Penny royal	,, pulegium	pale purple	wet places	Aug.-Sep.
Marjoram	Origanum vulgare	rose colour	bushy places	July-Aug.

CAMPANULACEÆ.

Clustered bellflower	Campanula glomerata	purple blue	pastures	July-Aug.
Ivy leaved bellflower	,, hederaceæ	blue	bogs	June-Aug.
Bluebell, hairbell	,, rotundifolia	blue	heaths	July-Sep.
Sheep's scabious	Jasione montana	blue	dry pastures	June-July

HYPERICACEÆ.

Small St. John's wort	Hypericum pulchrum	deep yellow, tipped red	woods and heaths	July
Square stalked wort	,, quadrangulum	light yellow	bushy places	July-Aug.
Water wort	,, elodes	pale yellow	bogs, peaty pools	July-Aug.
Common St. John's wort	,, perforatum	bright yellow	woods, hedge banks	July-Aug.

SAXIFRAGACEÆ.

Yellow marsh saxifrage	Saxifraga hirculus	bright yellow	bogs	Aug.
Meadow saxifrage	,, granulata	white	meadows	May-June

DIOSCOREACEÆ.

Black briony	Tamus communis	green	thickets	June

BORAGINACEÆ.

Viper grass	Echium vulgare	blue	dry fields	June-Aug.
Comfrey	Symphtum officinale	yellow or purple	watery places	May-Sep.

WILD FLOWERS.	BORAGINACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Bugloss	Lycopsis arvensis	bright blue	fields	June
Forget me not	Myosotis palustris	blue, with yellow eye	ditches	June-Aug.
Field forget me not	Myosotis arvensis	light blue	dry places	May-Aug.
Creeping forget me not	,, repens	blue	moist peaty places	June-July
Hound's tongue	Cynoglossum officinale	purplish red	waste ground	July
Gromwell	Lithospernum ,,	pale yellow	fields, waste ground	June

COMPOSITÆ.

Milfoil or yarrow	Achillea millefolium	white	pastures, waysides	June-Aug.
Saw wort	Serratula tinctoria	purple	woods	Aug.-Sep.
Ragwort, common	Senecio Jacobæa	deep yellow	dry places	July-Aug.
,, marsh	,, aquaticus	yellow	wet places	July-Oct.
,, great	,, paludosus	yellow	fens and ditches	June-July
Groundsel	Senecio vulgaris	yellow	a common weed	all year
,, stinking	,, viscosus	yellow	waste ground	July-Aug.
Corn feverfew	Pyrethrum inodorum	white	fields	Aug.-Sep.
Feverfew common	,, parthenium	white	waste places	July
Camomile, common	Anthemis nobilis	white	dry pastures	Aug.-Sep.
Golden rod	Solidago virgaurea	yellow	woods, heaths	July-Sep.
Butter bur	Petasites vulgaris	pale lilac	banks of rivers, meadows	April-May
Coltsfoot	Tussilago farfara	golden yellow	clayey banks	Mar.-April
Black knapweed	Centaurea nigra	purple	pastures, way sides	June-Sep.
Brown knapweed	,, Jacea	bright yellow	pastures, way sides	Aug.-Sep.
Dandelion	Leontodon taraxicum	bright yellow	a common weed	April-Oct.
,, marsh	,, palustre	yellow	marshes	May-Sep.

WILD FLOWERS.	COMPOSITÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Sneezewort or goosewort	Anthemis Ptarmica	white	moist pastures	July-Aug.
Daisy, common	Bellis perennis	white, tipped with crimson	pastures	April. Oct.
,, oxeye	Chrysanthemum leucanthemum	white	dry pastures	June-July
Bur marigold	Bidens tripartita	yellow	ditches	July-Sep.
Welted thistle	Carduus acanthoides	purple or white	road sides	July
Common do.	Cnicus arvensis	pale purple, whitish	a common weed	July
Slender flowered do.	Carduus tenuiflorus	pale rose coloured	waste places	June-July
Marsh do	,, palustris	purple or white	marshes	July-Aug.
Milk do.	Silybumb marianum	purple	waste places	July
Sow do.	Sonchus oleraceus	yellow	common weed	June-Oct.
Carlina do.	Carlina vulgaris	yellow	dry pastures	June-July
Spear do.	Cnicus lanceolatus	purple	waste places	July-Aug.
Meadow plume do.	,, pratensis	dull purple	wet meadows, heaths	July
Woolly headed do.	,, eriophorous	purple or white	waste places	July-Aug.
Tansy	Tanacetum vulgare	yellow	fields	July-Aug.
Wall hawkweed	Hieracium murorum	deep yellow	dry woods, walls	Aug.
Narrow leaved hawkweed	,, umbellatum	yellow	dry woods	Aug.-Sep.
Mouse ear hawkweed	,, pilosella	lemon yellow	dry places	May-Aug.
Wild camomile	Matricaria chamomilla	white	cornfields	July-Aug.
Corn marigold	Chrysanthemum segetum	yellow	corngelds	June-Aug.
Burdock	Arctium lappa	purple or white	waste places, roadsides	July-Aug.
Rough hawkbit	Apargia hispida	bright yellow	dry pastures, heaths	July-Aug.
Hairy hawkweed	Thrincia hirta	bright yellow	gravelly commons	July-Aug.
Yellow goats beard	Tragopogon pratensis	yellow	meadows	June-July

ONAGRACEÆ.

WILD FLOWERS.	ONAGRACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Smooth leaved willow herb	Epilobium roseum	Pale rose colour	common weed	July
French willow herb or rose bay	,, angustifolium	deep pink	moist shady places	July-Aug.
Great hairy	,, hirsutum	pink	wet places	July
Square stalked	,, tetragonum	pale pink	wet places	July
Marsh	,, palustre	pale pink	marshes and bogs	July

SCROPHULARIACEÆ.

Ivy leaved speedwell	Veronica hederifolia	pale blue	common weed	April-Aug.
Germander speedwell	,, chamædrys	bright blue	banks	May-June
Common do	,, officinalis	blue	dry places	May-Aug.
Thyme leaved do	,, syrpyllifolia	blue	pastures	June
Cow wheat, yellow	Melampyrum pratense	pale yellow	woods	July
Foxglove	Digitalis purpurea et alba	crimson speckled or white	woods, hedge banks	June-July
Yellow rattle	Rhinanthus Christi Galli	yellow, two blue spots on lips	meadows	June
,, large yellow	,, ,, major	yellow	cornfields	July-Aug.
Toad flax	Linaria vulgaris	yellow and orange	hedges, commons	June-July
Red eye bright	Bartsia odontites	purple	common weed	July-Sep.
Eye bright	Euphrasia officinalis	white or pinkish	dry pastures	July-Sep.
Louse wort, marsh red rattle	Pedicularis palustris	pink or white	marshes	June-July
Louse dwarf, red rattle	Pedicularis sylvatica	pink or white	bogs and moist pastures	June-July
Germander chickweed	Veronica agrestis	pale blue	common weed	April-Sep.
Brooklime	,, beccabunga	blue	ditches	June-July
Marsh speedwell	,, scutellata	pink	bogs	July-Aug.
Water figwort	Scrophularia aquatica	greenish, lips dark purple	ditches	July

LENTIBULARIACEÆ.

WILD FLOWERS.	LENTIBULARIACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Butterwort	Pinguicula vulgaris	purple blue	bogs	June-July
Small bladder wort	,, lusitanica	yellow	pools or moors	June-Sep.
Pale butterwort	Utricularia vulgaris	pale blue	bogs	June
Bladder wort	,, minor	yellow	stagnant water	July-Aug.

CHENOPODIACEÆ.

Upright goose foot	Chenipodium urbicum	green	dung hills, waste ground	Aug.-Sep.
Nettle leaved	,, murale	green	waste ground	Aug.-Sep.
Red	,, rubrum	reddish	waste ground	Aug.-Sep.
Spear leaved orache	Atriplex erecta	green	waste ground	Aug.

MYRIACEÆ.

Sweet gale	Myrica gale	yellowsh red	heaths	May

GENTIANACEÆ.

Bog bean or marsh trefoil	Menyanthes trifoliata	white tipped with pink	bogs	June
Gentian spring	Gentiana verna	bright blue	hills	April
Centaury	Erythræa centaurium	pink	dry pastures	June-Sep.

LYTHRACEÆ.

Purple loosestrife	Lythrum salicaria	purple	wet places	July-Aug.

CARYOPHYLLACEÆ.

WILD FLOWERS.	CARYOPHYLLACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Creeping pearlwort	Sagina procumbens	white	garden walks, waste places	May-Nov.
Annual do.	,, apetala	green	dry ground	May-June
Little mouse ear	Cerastium semidecandrum	white	waste places, walls	Mar.-April
Starwort	Stellaria holostea	white	hedge banks	May-June
Chickweed, field	Cerastium arvensis	white	dry fields and banks	June-July
,, water	Cerastium aquaticum	white	watery places	July
Chickweed	Stellaria media	white	a common weed	all the year
Spurry	Spergula arvensis	white	cornfields	June-Sep.
,, knotted	,, nodosa	white	wet sandy places	July-Aug.
,, small hairy	,, subulata	white	sandy places	June-Aug.
Campion	Lychnis diurna	rose colour	fields and banks	May-Aug.
,,	,, vespertina	white	fields and banks	May-Aug.
,, bladder	Silene inflata	white	fields and waysides	June-Sep.
Corn cockle	Agrostemma githago	purple	cornfields	July
Marsh starwort	Stellaria glauca	purple	moist meadows	June-July
Ragged robin, cuckoo flowers	Lychnis floscoculi	rose colour, pink	moist meadows	June
Bog starwort	Stellaria uliginosa	white	ditches, wet places	June-July
Lesser do.	,, graminea	white	heaths, hedge banks	June-July
Broad leaved mouse ear	Cerastium vulgatum	white	fields, road sides	April-June
Red sandwort	Arenaria rubra	purple	fields, dry places	

LINIACEÆ.

Narrow leaved flax	Linum angustifolium	pale blue	sandy pastures	July

WILD FLOWERS.	LINIACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Little flax	,, catharticum	white, yellowish	dry pastures	June-Sep.
All seed	Radiola millegrana	white	wet sandy places	July-Aug.

OXALIDACEÆ.

Wood sorrel, shamrock	Oxalis acetosella	white	woods	April-May

POLYGONACEÆ.

Bistort, snakeweed	Polygonum bistorta	pale pink	moist meadows	June-Sep.
Biting persicaria	Polygonum hydropiper	pink	watery places	Aug.-Sep.
Spotted	,, persicaria	pinkish	moist ground	July-Oct.
Small creeping	,, minus	do.	wet places	July-Sep.
Slender headed	,, laxum	do	wet places	July-Sep.
Pale flowered	,, lapathifolium	greenish	dunghills, waste ground	July-Aug.
Common sorrel	Rumex acetosa	red	meadows	May-July
Sheep do.	,, acetosella	red or yellowish	heaths	June-Aug.
Black bind weed	Polygonum convolvulus	greenish	common weed	June-Sep.
Knot grass	,, aviculare	pinkish	common weed	April-Nov.
Broad leaved dock	Rumex obtusifolius	yellowish	common weed	July
Sharp dock	,, acutus	do.	wet places	July
Marsh	,, palustris	greenish	marshes	July
Curled	,, crispus	do.	common weed	June-Aug.

PLANTAGINACEÆ.

Greater plantain	Plantago major	pinkish	common weed	June-Aug.
Ribwort	,, lanceolata	pinkish	do. in pastures	June

UMBELLIFERÆ.

WILD FLOWERS.	UMBELLIFERÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Hemlock, dropwort	Æthusa crocata	white, like celery	river sides	July
Water hemlock	Cicuta virosa	white	ditches	July-Aug.
Fool's parsley	Æthusa cynapium	,,	a common weed	July-Aug.
Burnet saxifrage	Pimpinella saxifraga	,,	dry fields	July-Aug.
Water parsnip	Sium latifolium	,,	ditches	July-Aug.
Goat weed or wort	Ægopodium Podagraria	,,	waste places	May-June
Cicely sweet	Myrrhis odorata	,,	ditches	May-June
Hemlock	Conium maculatum	,,	hedge banks	June-July
Common chervil	Anthriscus vulgaris	,,	banks, road sides	May
Wild carrot or bird's nest	Daucus carota	,,	fields	July
Earth nut	Bunium flexuosum	,,	fields	June

POLYGALACEÆ.

Milk wort	Polygala vulgaris	blue, pink, or white	heaths	May-Sep.

MELANTHACEÆ.

Meadow saffron	Colchicum autumnale	purple	meadows	Sep.-Nov.

URTICACEÆ.

Roman nettle	Urtica pilulifera	green	waste ground	June-July
Common nettle	Urtica dioica	,,	way sides	June-Oct.
Pellitory	Parietaria officinalis	pink	old walls	June-Nov.
Small nettle	Urtica urens	,,	waste ground	June-Nov.
Hop	Humulus lupulus	greenish	hedges	July

ALISMACEÆ.

WILD FLOWERS.	ALISMACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Lesser water plantain or mudwort	Alisma, ranunculoides	pale purple	bogs, pools	Aug.-Sep.
Water plantain	,, plantago	,, ,,	ditches	July

DROSERACEÆ.

Round leaved sundew	Drosera rotundifolia	white	bogs	July
Long leaved	,, longifolia	,,	bogs	July

FUMARIACEÆ.

Common fumitory	Fumaria officinalis	purple	fields, road sides	May-Aug.

NAIADACEÆ.

Grassy pond weed	Potamogeton gramineus	brownish	ditches	July
Shining do.	,, lucens	green	ponds	Aug.
Small do.	,, pusillus	brown	ponds, ditches	Aug.
Long stalked	,, prælongus	,,	pools	July
Flat stalked	,, compressus	,,	ditches	June-July

PISTACEÆ.

Small duck weed	Lemna minor	green	ditches, ponds	June
Ivy leaved	,, trisulca	,,	ditches, ponds	June-July
Thick leaved	,, gibba	,,	ditches, ponds	June

CUCURBITACEÆ.

WILD FLOWERS.	CUCURBITACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Bryony	Bryonia dioica	green, berries red	hedges	May

EUPHORBIACEÆ.

Mercury common	Mercurialis perennis	green	woods and thickets	April-May

PRIMULACEÆ.

Money wort	Lysimachia nummularia	yellow	ditch banks	May-July
Primrose	Primula vulgaris	pale yellow	banks, thickets	Mar.-May
Cowslip	,, veris	deep yellow	meadows, pastures	May
Primrose (bird's eye)	Primula farinosa	pale purple with a yellow eye	moist places on hills	July
Bog pimpernel	Anagallis tenella	pink	bogs	July-Aug.
Pimpernel scarlet	,, arvensis	scarlet	common weed	May-Sep.
,, blue	,, cæruleæ	blue	common weed	May-Sep.
Loose strife	Lysimachia vulgaris	yellow	moist places	July

IRIDACEÆ.

Spring crocus	Crocus vernus	purple half the month	meadows	April

CONVOLVULACEÆ.

Bindweed great	Convolvulus sepium	white	hedges and ditch banks	July-Aug.
Bindweed small	Convolvulus arvensis	pink	hedge banks	June-July
Common dodder	Convolvulus epithymum	reddish	parasite on heath & thyme	Aug.

VIOLACEÆ.

WILD FLOWERS.	VIOLACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Violet, marsh	Viola palustris	pale lilac	bogs	April
Violet, dog	Viola canina	blue	woods, banks	April-Aug.
Yellow mountain violet	Viola lutea	yellow	heaths	May-June
Pansy, heart's ease	,, tricolor	petals deep violet and yellow	fields	May-Sep.
,, corn	,, arvensis	,, pale yellow	fields	May-Sep.

ARALIACEÆ.

Moschatel or muskwood crowfoot	Adoxa moschatellina	greenish yellow	woods, hedge banks	April
Ivy	Hedera Helex	berries green, black when ripe	stems climbing	Oct.

HALORAGACEÆ.

Mare's tail	Hippuris vulgaris	rather reddish	pools and ditches	May-June

CORNACEÆ.

Sweet violet	Viola odorata	deep violet or white	woods, hedge banks	July-Aug.
Dogwood or cornel tree	Cornus sanguinea	white. berries black	hedges	June

SALICACEÆ.

Smooth willow	Salix triandra	scales yellow	wet woods and osier beds	May-July
Green leaved	,, rubra	scales purple	meadow and osier beds	April
Rose	,, helix	scales yellowish	moist ground	March
Purple	,, purpurea	scales purplish	moist meadows	Mar.-April
Sweet	,, pentendra	yellow	river banks	May-June
Crack	,, fragilis	yellowish	marshy ground	April-May
White	,, alba	yellowish	woods and wet places	May

WILD FLOWERS.	SALICACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Creeping	,, fusca	brownish	heaths	April-May
Common osier	,, viminalis	scales brownish	marshes	April-May
Long leaved willow	,, acuminata	scales purplish	woods	April
Rosemary leaved	,, rosemarinafolia	scales black	moist ground	April
Net leaved	,, reticulata	reddish	heaths	May

CYPERACEÆ.

Black bog rush	Schœnus nigticans	brown	bogs	July
Brown do.	,, rufus	,,	bogs	July
Compressed do.	,, compressus	,,	bogs	July
Bull rush, great	Scirpus lacustris	,,	ditches and pools	July-Aug.
Twig rush	Cladium mariscus	,,	ditches and pools	July-Aug.
Cotton grass, hare's tail	Eriophorum vaginatum	brown, hairs white	moors	
Cotton grass, common	,, angustifolium	,, ,,	bogs	
Cotton grass, broad leaved	,, polystachion	,, ,,	bogs	
Creeping sedge	Carex dioica	brown	bogs	May
Flea Sedge	,, pulicaris	,,	bogs	June
Marsh sedge	,, divisa	brownish	marshes	May
Greater prickly sedge	,, muricata	,,	moist pastures	May
Great rough sedge	,, vulpina	greenish	meadows	June
White sedge	,, curta	white	bogs	June
Bog sedge	,, cæspitosa	dark purple	marshes	May-June
Pendulous wood sedge	,, sylvatica	brownish	moist woods	May-June
Mud sedge	,, limosa	brown	muddy bogs	June
Green ribbed sedge	,, binervis	brown	dry heaths	June

WILD FLOWERS.	CYPERACEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
River sedge	Carex paludosa	dark brown	river sides	May
Pink leaved sedge	,, panicea	greenish brown	bogs and meadows	June
Hairy sedge	,, hirta	brown	moist places	May-June
Few flowered sedge	,, pauciflora	brownish	peaty ground	June
Yellow sedge	,, flava	brownish	turfy bogs	June
Slender leaved sedge	,, filiformis	brown	boggy meadows	June
Oval sedge	,, ovalis	greenish	boggy marshes	June

JUNCACEÆ.

Lancashire or bog asphodel	Narthecium ossifragum	bright yellow	bogs	July-Aug.
Common rush	Juncus conglomeratus	brownish	moist ground	July
Small joined	,, uligionosus	brown	moist heaths	June-July
Toad	,, bufonius	greenish	moist heaths	July-Aug.
Moss	,, squarrosus	brown	bogs	June-July
Soft rush	,, effusus	yellowish	moist ground	July
Hard rush	,, glaucus	browntsh	moist ground	July
Round fruited rush	,, compressus	greenish	marshes	July-Aug.
Field hairy rush	Luzula campestris	dark brown	heaths, dry pastures	Mar.-May
Wood hairy rush	,, pilosa	brown	woods	Mar.-May

GRAMINEÆ.

Heath grass	Triodia decumbens	pinkish	moors	July
Floating fox tail grass	Alopecurus geniculatus	greenish brown	wet places	Aug.
Silky bent	Agrostis spica-venti	do.	sandy fields	July
Reed canary	Philaris arundinacæ	purplish green	pools and ditches	July

WILD FLOWERS.	GRAMINEÆ.	COLOUR.	NATURAL LOCALITY.	FLOWERING.
Brown bent	Philaris canina	purplish	damp fields	June-July
Marsh bent	,, alba	pinkish	marshes	July
Waived hair	Aira flexuosa	,,	heaths	July
Sweet vernal grass	Anthoxanthum odoratum	purple anthers	pastures	May-June
Heath brome grass	Brachypodium pinnatum	brown	pastures	June-July
Wild oat grass or haver	Avena fatua	,,	cornfields	July
Rye grass or darnel	Lolium perenne	,,	pastures	June-July
Meadow grass, rough	Poa trivialis	,,	meadows	June
Meadow grass, smooth	,, pratensis	,,	waste ground	June
Meadow grass, annual	,, annua	,,	meadows	Mar.-Nov.
Dog's tail grass	Dactylis cynosurus	pinkish	pastures	July
Quaking grass	Briza media	purplish	downs, fields	June
Quaking grass	,, minor	green	fields	July
Sheep's fescue grass	Festuca ovina	reddish	dry pastures	June

FERNS.

Lastrea dilatata, very common
,, collina, not common
,, spinulosa, scarce
,, montana, common
,, Filix mas, (male fern) common
,, Filix mas cristata, common
Pteris aquilina (bracken) very common
Osmunda regalis, (royal fern) very rare
Bleeknum spicant, common
Polypodium vulgare, common
Athyrium, Filix fœmina, (lady fern) not common
,, Rhæticum or convexum, common
Equisetum limosum, smooth naked horsetail, not common.

Two scarce ferns, the Scolopendrium Ceterach or Sealy Spleenwort, grew a few years ago, on the walls of Swanscoe Park; and the Parsley Fern or Allosurus Crispus, on the eastern flank of Teggsnose.

NATURAL HISTORY OF DANE'S MOSS, NEAR MACCLESFIELD.

ON PEAT MOSSES IN GENERAL.

The following is the substance of a lecture which was given by the author, upon the above subject, at the Town Hall, Macclesfield, in 1866 :—

"At intervals, during the last two or three years, I have paid many visits to Dane's Moss, in order to examine what remained of its Botany. I was induced to take this step on account of the rapid encroachments of agriculture upon its borders, which, at no very distant period, threaten to efface its existence from the surrounding scenery, as well as to extinguish some of its peculiar fauna and flora. For some time past, peat has been the subject of much research and analysis ; and many of its chemical compounds are now successfully employed in the arts and manufactures. It is also one of the latest formations in the geological series, and has contributed many very interesting archæological facts. Peat is a vegetable production, and, mineralogically, it may be considered as the youngest member of the coal family. Much of the surface of England, Ireland, and Scotland, is covered with bogs, as well as that part of the continent of Europe which touches the shores of the German ocean and the Baltic sea. It also occupies considerable areas in North America ; likewise in the Shetland, Orkney, and the Falkland islands, &c. In this country excellent peat is formed at an elevation of 2,000 feet. Within the tropics it rarely occurs. In those regions, decayed vegetable matter is generally very quickly removed by insects, or reduced to its elementary principles by the high temperature which prevails. Superficial peat,

when attentively examined, is found to consist of moss but little altered, and of vegetable fibres partly decayed and compacted by pressure. Towards the bottom, it takes the appearance of a black solid mass which has become either lignitic or earthy in its composition. Its range in depth is generally from ten to forty feet. The plants, by whose decomposition these bogs are formed, appear to consist, for the most part, of two or three kinds of moss,—viz., sphagnum palustre, hypnum cuspidatum, and bryum hypnoides. The above mosses are particularly suited for the accumulation of this peculiar product. They grow to the height of five or six inches, when the lower stems begin to decay, and form a soil, from which the upper portion of the plant continues to vegetate. Thus a successive decay and fresh vegetation of the same stem goes on for a number of years, until a large accumulation of spongy vegetable matter is produced.

The formation of peat is peculiar to humid and cool climates, and the quality of it is much affected by the wetness or dryness of the soil, flatness, shelter, and other causes which influence the temperature and moisture of the atmosphere. It has a tendency to accumulate in all swamps and hollows; and wherever stagnant water prevails, there it increases, filling up lakes, choking up river courses, entombing fallen forests, and spreading over every surface having moisture sufficient to cherish its growth. Besides the mosses already mentioned, several lichens, confervæ, equisetums, shrubs, heaths, reeds, rushes, sedges, grasses, and the like, become converted into peat. These accumulations are of all ages, from the growth of the present year, back to the very close of the glacial epoch. Peat, from containing a large proportion of tannin, is found to possess highly antiseptic qualities, or the property of preserving animal substances from putrefaction for a great length of time; some striking instances of which are on

record, viz.,—two human bodies buried in peat in Derbyshire, about a yard from the surface, were found nearly thirty years afterwards, with the colour of the skin fair and natural, and the flesh as soft as that of persons newly deceased. On the estate of the Earl of Moira, in Ireland, a human body was exhumed about a foot deep in gravel, and covered with eleven feet of bog moss. It was quite fresh and unimpaired, and was completely clothed in garments made of hair. It was probably the hair of the goat, as tradition tells that such was the chief material used in ancient British vestments, before the use of wool was known. The body of a woman was discovered about 100 years ago, in a Lincolnshire peat bog, about six feet from the surface. The head and feet were nearly bent together; and the skin, nails, and hair were in a high state of preservation. She wore leather shoes or sandals, each cut out of a single piece of ox hide, folding about her foot and heel. It may be assumed that she was a person of some rank—perhaps a British Princess; for sandals were confined to the highest classes, or to those who ministered in idol worship.

Besides the peculiar plants which constitute the bulk, peat mosses contain the trunks of the fir, oak, beech, alder, willow, hazel, yew, ash, &c., with their cones, seeds, and leaves—apparently the wrecks of forests entangled and destroyed by the accumulation of the swampy peat, prostrated by storms, with snow or ice, lightning, or felled by the hand of man. These trunks gradually decay, until they are converted into a blackish brown substance resembling peat, but still retain more or less the structure of the wood.

The rate at which a peat bog or moss advances varies so much under different circumstances, that we are precluded from forming any certain estimate of its antiquity, otherwise than from the data implied by the embedded

animal and human relics found in them. The sites of several of our recent mosses were formerly forests, which were cut down at different periods by order of Parliament, because they harboured wolves and outlaws. Some Welsh woods were cut or burnt in the reign of Edward I.; and the same circumstance took place in Ireland, in the time of Henry II., to prevent the natives from harbouring in them and harrassing his troops. And at a less recent period, nearly 2,000 years ago, the Romans, when subjugating this country, adopted the same method; for the ancient Britons, unable to contend with the arms and discipline of the Roman legions, took shelter in their woods, from which they annoyed the invaders by frequent incursions. Mosses of the Roman period are represented by their coins, axes, arms, &c., found in them. In Yorkshire, some of the Roman roads, that were made through the forests, are now covered by eight or ten feet of peat; and many of the trees, especially pines, bear marks of having been burnt; others of having been chopped or split with large wooden wedges, or broken axe-heads of bronze, still fixed in them. In Scotland, some Roman remains have been found of the time of Agricola, at a depth of twelve feet; and only at a depth of five feet there have been discovered hewn stumps of trees, plank roads, armour, and coins; and this thickness of peat was all that had been accumulated since the time when these people had marched their legions across the lowlands of that country. In mosses of greater antiquity, are turned up the bones of the extinct Irish elk, wild ox, wild boar, stag, and other animals; along with the occasional remains of human art, as stone axes, flint arrow-heads, querns, tree canoes, bronze implements, &c., which refer to the early bronze and British stone periods. When a combination of the relics of different periods is exhibited in any peaty deposit, that of the stone age, if represented, is generally discovered in the lower portion of it. The

bronze age immediately succeeded the stone period, and with the bronze we pass beyond the reach even of tradition. The gigantic Irish elk or deer (so named from the prevalence of its remains in the shell-marls and peat bogs of that country), chronologically appears to have existed before the appearance of man in Europe, and survived many of its contemporaries, viz.,—the mammoth, rhinoceros, hippopotamus, cave lion, cave bear, &c. Man also co-existed with the above mammalia, for side by side with their remains, among the ancient river silts, old lake deposits, and bone-caves of this and other countries, his rude stone implements and other weapons have been discovered. From the severity of the climate, at intervals, during the glacial periods, and when England was joined at times to the continent, the above huge pachyderms and proboscideans re-migrated to warmer latitudes. And it is not improbable that a pre-historic human race exterminated the last of the noble Irish deer, after it had survived in these regions, throughout the long icy periods. Some eminent geologists are of opinion that the fossil remains of the mammoth, or some of its congeners, may yet turn up in some of our oldest peaty deposits. In Leigh's History of Cheshire and Lancashire (1770), when describing the morasses of the latter county after they had been drained, in one of them, he mentions the discovery of some bones and antlers of the Irish elk and red deer; also the head of a hippopotamus, accompanied by an engraving, likewise some human remains, stone and bronze instruments, tree canoes, querns, &c.

With respect to the subject of the first advent of man into this "breathing world," perhaps much unnecessary discussion has taken place, and a great deal of uneasy tenderness displayed. Like other events in geological history, we have at present no means of assigning to it a definite date in years or centuries. The time is merely relative;

and all that science can safely do is to ascribe it to an early, though not to the very earliest stages of the Pleistocene epoch, as this is the period when the traces of primeval man become more frequent and unmistakeable, in conjunction with the fossil remains of the animals just described. Great physical changes have occurred since man first peopled the globe. Some regions have been rising above the waters of the ocean; others have been sinking. Rivers have changed their courses; lakes and estuaries have been converted into alluvial tracts and peat bogs; and volcanoes have given birth to new mountain masses. On such mutations history is almost altogether silent; and even where she speaks, her utterance is frequently of less value than her silence. The earth, however, pens and preserves with fidelity its own record: geology becomes the interpreter—

> "There rolls the deep where grew the tree;
> O Earth! what changes hast thou seen!
> There, where the long street roars, has been
> The stillness of the central sea.
> The hills are shadows, and they flow
> From form to form, and nothing stands;
> They melt like mist, the solid lands,
> Like clouds they shape themselves and go."

GEOLOGY, ARCHÆOLOGY, ETC.

Dane's Moss comprises an area of about 300 acres. It is above one mile in length, three quarters of a mile in breadth, and lies in a basin or hollow of the red marl, with a thickness of from 10 to 40 feet. The term Dane's Moss appears to have originated from the circumstance that formerly, owing to certain physical causes, the bulk of the natural drainage of the Moss passed southwards into the river Dane, by two principal outlets, viz., one down by Fool's Nook, the other by way of Gawsworth; and a lesser

discharge found its way northward into the river Bollin. The red marl forms the uppermost member of the new red sand stone series; and in the county of Chester it prevails to a very great extent, generally overlain by the drift. In some parts of the county it attains a thickness of 1,000 feet. Contiguous to the Moss, on its eastern and south-eastern boundaries, the red marl ranges about 100 feet in height. On the north-western boundary it is cut off by a fault, which extends from near Green Bank, Sutton, in a direct line towards Alderley Edge. Except upon the two former boundaries, the surface of the country round the Moss is deeply overlain by deposits, chiefly of the glacial drift periods.

Before I proceed further, perhaps it will be as well to make a few remarks upon the nature and character of what is called the drift period. I shall have to refer to this occasionally during the evening, and some of my hearers may be uninformed about the matter. Most of you will have noticed the thick beds of sand, gravel, and clay, containing boulders and pebbles, which prevail about this town. These are the beds which go by the name of the glacial or northern drift deposits. This title is derived from the fact, that nearly all those deposits can be traced to a northern source, extending over Europe and America to the 43rd parallel of latitude. Many of the boulders and pebbles being specimens of the granites and other igneous rocks, denote a foreign origin, and have been derived from rocks situate at a distance either in the north of England and Scotland, or from more northerly countries, as Greenland, Iceland, and Scandinavia; and this fact is referred by geologists to the effects of a cold climate which prevailed in these latitudes, when the present site of what is now England sat some hundreds of feet lower down, so as to allow the sea to cover her present plains, and flow up many of the highest valleys. This was the time when

at intervals the tops or slopes of many of our hills, such as Shuttlingslow, Axedge, Kinderscout, &c., and the mountains of Cumberland, Scotland, and the north of Ireland were covered by an universal coating of ice, representing groups of ice-clad islands. Occasionally these periods were marked by a cold so intense that animal and vegetable life were in a great measure extinguished. Immense icebergs (the detached masses of old northern glaciers, from Greenland, &c., as well as those of lesser dimensions from Scotland, Cumberland, &c.,) occupied the ocean, heavily laden with detrital matters, such as beds of mud and clay, rough pieces of rock, pebbles, sand, and gravel; these floating southward, deposited their stony freights as they melted. In this manner the plains, flanks, and tops of the hills of Cheshire and other districts were scattered over with countless myriads upon myriads of tons of broken up foreign rocks, of which the boulder in the Park is a fine representative; and among the beds of sand and gravel thus precipitated to the bottom of this wintry sea, were associated marine shells, some of which are identical with those species only whose habitat is confined to the Arctic Zone or more southern latitudes. Specimens of these shells have been discovered in North Wales, 1,400 feet above the level of the sea, proving that since they were left there, the land had been upheaved to that extent. Upon the Macclesfield Forest, the *débris* of marine shells remain at a height of 1,200 feet. The lapse of time that was taken up by the accumulation of the drift deposits may likewise be partly judged of by their great thickness. In this neighbourhood, in some places, they cannot be much less than 300 feet in thickness, and in boring for water, marine shells have been brought up from a depth of 197 feet below the surface.

After this digression I will now proceed. Geologically, it would appear that the present site of Dane's Moss was

formerly occupied by the Red Marl, and during the glacial drift periods, when one of those oscillations of level took place between land and sea, a portion of the marl was removed or scooped out, leaving a cavity or hollow, which became refilled by *débris* that had dropped from icebergs as they melted, and were borne along southwards, towards the gorge or principal natural outlet of the moss water near Fool's Nook, and which, as I have said before, communicates lower down with the valley of the river Dane. A re-elevation of the land succeeded this epoch, when, by the action of conflicting tides and currents, storms, tempests, and other physical phenomena, this hollow in the Red Marl was cleared out of the drift, leaving the cavity high and dry, until at length it became filled by peat. Upon an examination of this basin, the outer and inner edges, sides, and lower parts of it, are found to consist chiefly of fine and coarse sand and gravel, boulder and brick clay, erratic or foreign boulders and pebbles (some of them being ice-scratched); rough and sub-angular pieces of rock which are of local origin, and have been swept off the adjacent hills lying eastward. Marine shells, for the most part fragmentary and scarce, are also found on the western and south-western borders of the Moss, in some small sections of irregularly stratified sand and gravel, and these partake of the same character and species as those that have been discovered in the Macclesfield Forest, and also round the town.

There are few localities where the northern drift deposits afford so much interest, or present a wider scope for investigation, than the neighbourhood of Macclesfield. The geological contour or configuration of the country, particularly the hilly parts of it, may be lithologically characterised as having been more or less moulded by ice, or, at all events, greatly influenced by the effects of glacial degradation, as well as marine denudation, since almost

every foot of ground, comparatively speaking, either upon the upper or lower levels, bears the stamp, or contains some relics of the above agencies.

[Here were exhibited some specimens of the foreign rocks which are found about the Moss and under it. They comprised three or four kinds of granite, greenstones, felstones, porphyries, quartz rock, basalt, silurian grits, &c. These specimens bore evidence of having been brought, at some period or other, either from the North of England, Scotland, Iceland, or Greenland, in which localities the parent rocks prevail. Some specimens of the marine shells, brought from the drift beds on the Macclesfield Forest were also examined.]

The Moss has been worked from time immemorial for the purpose of obtaining fuel; and this process has been carried on, for the most part, on the western boundary, on account of its shallowness ; and no portion of it appears to have been excavated to a greater depth than from ten to fifteen feet. The area thus operated upon is considerable, as it includes nearly the whole length of the Moss, by 300 or 400 yards in breadth, in some places. A clean white sand of the drift period, about one yard in thickness, forms the floor. It contains boulders and pebbles, both of local and foreign origin; also a quantity of twigs, bark, bits of stumps, and small pieces of roots which appear to be the remnants of the growth of brushwood in former ages. Below the white sand there is a bed of a sandy sort of loam, about two feet in thickness. It is of a firm, hard, and tenacious quality, impervious to water, and seems to be the retaining medium by which the bog exists. Its contents are a few small rough and gritty pebbles, apparently of local origin, with the roots of the Scotch fir and oak, and another kind of fir, probably spruce or larch. The above deposit is called "fox bench" by the turf men, and when accidentally pierced, the moss

water rises rapidly through the opening, and overflows the excavations where they are at work. The following is its analysis :—

Organic matter	4·5
Salts of Lime, a trace	
Oxides of Lime and alumina	2·0
Silica	93·5
Total	100·0

Closer to the margins of the Moss, the roots of the yew, beech, hazel, and alder are found to be associated with the above. Some of these trees have been torn up by their roots; others are broken off, and the trunks lie where they fell, or are embedded in the bog above; whilst some of their stumps remain, about two or three feet in height, and are attached by their roots to the soil. Leaves and branches are here met with, along with fir-cones and acorns; and hazel nuts are found in more superficial strata near the borders. Below this deposit comes another bed of white sand, of about the same thickness as the upper one, and containing similar boulders and pebbles, along with a few roots derived from the superincumbent soil. Then follows a mass of coarse clayey gravel, well packed with boulders and pebbles of a similar character to those I have described above. The thickness of this bed has not been proved.

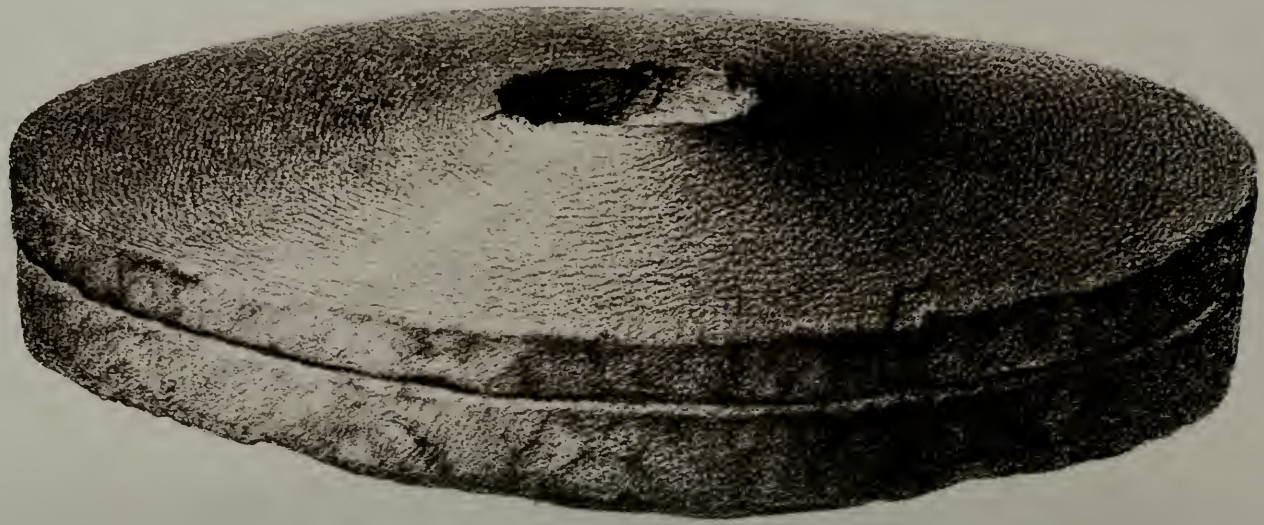
With respect to the question of succession of growth of the different trees that are found embedded in the bog already excavated, the remains of the fir lie below the oak, while the beech, &c., are the uppermost. The oak decays before the fir; the beech retains its silvery whiteness to the last; and many trunks and stumps, especially fir, show signs of having been fired; and in some instances they bear marks of the axe. The trunks of some very fine Scotch firs are sometimes met with in the bog; and a few years ago an oak was extracted from it, which measured four yards in circumference.

[Some portions of the Scotch fir, oak, yew, and a burnt stump which had been obtained from the Moss, were exhibited, along with a slab of fine charcoal that had been manufactured from the bog.]

With the increase of drainage during the last few years, the Moss has considerably subsided; so that, on looking across it, especially in summer, objects are now seen on a level with it that were formerly invisible. In the wet months of winter it swells out. Upon the whole, there is perhaps a general sinking of the Moss to the extent of a couple of yards. There is no doubt that, in former ages, it extended much farther westward, behind the "Rising Sun" Inn, and also in a more southerly direction, towards Gawsworth Church.

In forming an estimate of the age of Dane's Moss, palæontological evidence, or the science of fossil remains is altogether silent upon the subject. The turf diggers certainly speak of there having been exhumed, a few years ago, the bones and horns of an ox, and the antlers of a buck, but no competent person identified their species. These may have been the remains of mired animals of the prevailing fauna. When forming the new Cemetery ground, some bones and teeth of a species of aboriginal British ox (Bos longifrons), were found in the valley gravel, which are in my possession. Upon the whole, I am inclined to think that the ancient alluvia of the neighbourhood of Macclesfield have hitherto afforded but few examples of the relics of extinct mammalia; but there is good reason to be proud of the marine shells from the drift beds, which number above fifty genuine species; and the coal measure sandstones, and shales of Kerridge, &c., are replete with the fossil flora of that period.

With respect to the curiosities, &c., which have been found on or about the Moss, many traditional tales are in vogue among the turf-men upon the subject. No doubt,



QUERN.

from time to time in bygone ages, relics have been disentombed, which, if now extant, would have contributed some interesting facts relating to its archæology. The establishment of a museum in the town would long ago have been an advantage, and it is still a desideratum. For some years I have had opportunities of examining swords, muskets, bridlebits, stirrups, iron spear-heads, and also an ancient bow of the same metal, which have been taken out of the Moss, and were in the hands of various persons in the town and neighbourhood. Of course these articles refer only to comparatively recent times. Some bones of the human skeleton and horse, and a few ancient coins have likewise been found in the Moss. In my collection I have a limestone hammer which was found lately close by the bone works, and also a sandstone hammer from a moss near Marton.

[The lecturer showed the sandstone hammer referred to, also an ancient cross-bow of iron, found by the workmen when digging out the foundations for the bone works on the Moss, and a spear-head near the same place.]

In the museum at Stoke, a few weeks ago, I was shown two querns, which were found in Dane's Moss, when cutting through it for the railway. They are of very rude workmanship, and must certainly date from a very remote period of art. The "quern" is the hand-mill of Scripture. Parched corn, or corn burnt out of the ear, was used. Thus, Boaz presented his beloved Ruth with parched corn; and Jesse sent David with an ephah of the same to his sons in the camp of Saul. In using the quern, two women were generally employed; thus it was prophesied, "Two women shall be grinding at the mill: one shall be taken, and the other left." It is of Asiatic origin, and is still in use in some of the extreme western islands of Scotland. It consists of two portable stones, the lower one a cylinder, with a basin formed in it at the top. An upper stone was

fitted into this, and the corn was ground between them. In the upper stone was a hole to pour in corn, and a peg by way of a handle. The flour ran out by the sides on a cloth, and it required four hours to grind a bushel of corn.

[A representation of the ancient quern was here explained to the auditory by the lecturer.]

In the Cemetery ground, near the brook, about eight or ten feet below the surface, there was found another relic of olden time. It was pronounced by the authorities of the British Museum to be of early English date. It is made of baked clay, and is called a net-weight or net-sinker.

[Here was exhibited a drawing of the net, illustrating the use of the net-sinker.]

As I have stated before, palæontological evidence is dumb upon the subject of the Moss's antiquity, since it appears there is no reliable account of the remains of any extinct animals having been turned up; and with the exception of the quern, no earlier relic of human art has hitherto been discovered in it. Man, or his works, together with the remains of extinct animals, can be traced throughout the ancient alluvia, down to the glacial drift deposits, and, it is said, even as far back as pre-glacial times. His rude stone weapons, with which he first encountered the elephant, as it roamed over the plains and through the forests of what is now Great Britain, appear to be about the first indications of his existence in these regions; and this event is so remote that we can form no conception of its antiquity. The mind refuses to grapple with the question. The first introduction of the quern into semi-barbarous life is comparatively of modern date, and yet it will count from pre-historic times. Another point of view may be advanced, by which the antiquity of the Moss might be surmised, and that is the physical geology of its position, which, from certain cosmical data before named, would appear to be such, that the locality has always been

favourable to the growth of peat, whenever, during the post-glacial period, suitable conditions of climate prevailed with regard to humidity and temperature. At the same time, it is not improbable that the site may have been, more or less, at intervals, occupied by a lake. Then with respect to its depth which, in the deeper parts, has been proved to be about 40 feet, it has been estimated, by able authority, that in certain localities, a thickness of 30 feet of peat has required many thousands of years for its growth. If this circumstance may likewise be advanced as a criterion with reference to age, Dane's Moss may possibly rank with some of the oldest peaty deposits in this or any other country.

INDUSTRIAL PRODUCTS, ETC. OBTAINED FROM PEAT.

One of the great obstacles to the more general use of peat, is the large amount of water which it holds, and the obstinacy with which it retains this water under ordinary circumstances. On an average, solid bog contains about 90 per cent. of it. From this it will be seen, that in cutting out and removing the peat from the bog, it becomes necessary to transport about nine tons of water for each ton of real fuel. "Light fuel, turf cut from the surface strata, is only two-fifths of the weight of water. A cubic yard of this light turf, closely packed, weighs 500lbs.; of good turf, 900lbs. Light turf yields about 74 per cent. of volatile matter, 23 of charcoal, and 8 of ashes. Bog turf, even in its best natural varieties, as prepared for fuel, wants sufficient density for many economical purposes; and though yielding a vast body of inflammable ingredients, evolves at no one point an intense heat; but when mechanically

compressed, it possesses a calorific power little inferior to coal." Turf, after having been kept in a dry house for two years, still retains from 10 to 15 per cent. of water. Compressed peat is used on the continent for locomotive engines, and large quantities of peat charcoal are manufactured in France, Germany, &c. This is a valuable ingredient in the manufacture of gunpowder. Peat is also used for various sanitary purposes, and for manure. In countries where the supply of mineral coal is not abundant, peat is used for generating steam, and for the manufacture of iron, burning lime, &c. The distillation of peat yields a tar, from which are extracted illuminating and lubricating oils and paraffine; besides ammonia, acetic acid, and pyrolixic spirit, and other chemical products. A large amount of combustible gas is also disengaged.

BOTANY.

No branch of natural history affords more satisfaction or pleasure than the study of botany, whether it is pursued for the sake of amusement, healthy recreation, or scientific purposes. In all ages, flowers have been the representatives of innocence and purity; and the love of them seems a naturally implanted passion. The cottage has its pink, its rose and polyanthus; and the villa its conservatories, well stocked with the gorgeous natives of other climates; but the mere contemplation of the latter will not bring half the pleasurable excitement which the search after the wild flowers of our own country affords to the zealous student and botanist. We cherish them in youth, we admire them in declining days; but perhaps it is the early flowers of spring that always bring with them the greatest

degree of gratification; and our affections seem immediately to expand at the sight of the first opening blossom under the sunny wall or sheltered bank, however humble its race may be. In the long and sombre months of winter, our love of nature, like the buds of vegetation, seemed closed and torpid; but, like them, it unfolds and reanimates with the opening year; and we welcome our long-lost associates with a cordiality that no other season can excite, as friends from a foreign climate.

The flora of the environs of Macclesfield comprises about 350 species of wild flowers; and about 200 of these may be enumerated as constituting the botany of Dane's Moss and its immediate neighbourhood. The bog and heath plants on the Moss amount to about fifty species. Those which refer to marshy ground, ditches, and wet places, will include about sixty varieties; whilst the rest, most of which are of a common sort, are to be found in hedges, meadows, thickets, waste ground, waysides, pools, pits, &c., around its borders. To these may be added about twenty species of rushes and sedges, and twelve of the ferns. Dwarf birch, ash, hazel, and willows abound both on the bog and its margins.

The reclamation of part of the Moss by agricultural processes, together with the formation of a railway and a portion of the canal across it, also with a road to the target, have been the means of introducing fresh soil with seeds, and thus establishing the growth of many plants in addition to those which are indigenous to the soil. And this circumstance has contributed to swell out their number to a greater extent than usual, in proportion to the limited space of ground occupied by the above innovations.

I will now refer to my catalogue, and make a few short remarks upon those orders and genera, which contain some of the more important and interesting species of plants in it. I have adopted the natural classification of plants in

preference to the Linnæan system, which is but an artificial arrangement, while the former is constructed according to the natural affinities of the vegetable kingdom. A knowledge of the Linnæan system is more easily acquired, and is more attractive to a beginner in the science; at the same time, the acquisition of both the systems is of considerable advantage.

There are five varieties of orchideous plants which grow about the Moss; viz., the bog orchis, which flowers in August; the smaller butterfly orchis, spotted orchis, green-winged orchis, and the early purple orchis, are border plants, growing either upon the heath or in the adjoining meadows, and these flower in May or June. In our botanical rambles, some of the orchideous plants are recognised at once by their peculiar appearance. The purple orchis, whose root is two-lobed, is remarkable for its splendid colour, and having its broad leaves marked with dark brown spots. And the smaller butterfly orchis possesses a peculiar fragrance, which is diffused for some distance around it.

There are seventeen species of the crowfoot family of plants that grow upon the Moss, and about half of them are of that genus. One, with its bulbous root, is remarkable. The marsh marigold is a very attractive and showy specimen in the early months of spring, as also is the delicate and graceful anemone, or wind flower; likewise the lesser celandine, with its bright yellow and enamelled petals. The above plants are always early and welcome favourites.

Of the natural order Euphorbiaceæ, there is another early harbinger of spring, the common mercury. The stamens and pistils are developed on separate plants. The flowers are green, and not very conspicuous. It is found on the borders of the Moss, in company with the celandine just named.

The dog violet and heart's-ease are seen upon the margins of the Moss, and the latter plant is the origin of our garden pansy. Of the same order, and also companion to the above, is the common primrose. It is one of the most beautiful nurslings of early spring, and few flowers have been a greater favourite with the poets. Shakspeare makes the primrose a funeral flower for youth:—

> "With fairest flowers,
> Whilst summer last, and I live here, Fidele,
> I'll sweeten thy sad grave; thou shalt not lack
> The flower that's like thy face."

The musk wood crowfoot is a singular looking little plant, and is found in places upon hedge banks near the Moss, having a musky scent. An incipient botanist would consider it a very odd production, as its square head, topping a slender stem, is composed of four little greenish-yellow flowers, placed back to back, with a fifth covering the four. It flowers in April, and is not a common plant in this neighbourhood.

Of the rosaceous order of plants, there are eighteen species. The only bog plant among them is the marsh cinquefoil. This plant is not uncommon, and is remarkable for its dark, dingy purple flower, which resembles in shape a strawberry. Among other notable plants of this order growing upon the heathy parts of the Moss, are the common and trailing tormentils, the trailing dog-rose, and the dewberry. The pretty plaited-leaved lady's mantle, and the barren strawberry are found on dry embankments; while the different varieties of roses and brambles crowd the hedges.

Of the cruciform type of plants, there are only a few, which are unimportant; although we must not forget the cuckoo flower, that faithful and punctual flower which heralds the welcome cuckoo.

There are three species of the crane's bill, which are border plants, and are unimportant; with the exception

that this order is the progenitor of our cultivated geraniums. One of the species, the herb Robert, sheds a pleasant fragrance round the place of its growth.

The bilberry and cranberry are found upon the Moss. The former is common, and grows upon the heath; and the latter is a true bog plant. Its thread-like stems are to be seen in the month of June, resting on the white sphagnum moss, bearing its rose-coloured blossoms and berries together. The crowberry or crakeberry is a pretty heath-like shrub, with pink flowers and black berries, and the bog whortle berry is a scarce plant.

There are three varieties of cotton grass which grow upon the bog. These plants, with their fleecy-looking heads of cotton wool, form a striking contrast to some of the floral beauties which bedeck the Moss in summer.

Of the water plaintains there are two of this genus, viz., the common water plantain, and the mudwort or lesser water plantain. The leaves are attached to the roots, and float on the surface of the water, bearing pale purple blossoms upon the many branched stems.

The persicaria number five species. The amphibious persicaria is a beautiful plant growing in the ditches, and flowers from June to September. The biting persicaria is extremely pungent to the taste, as it abounds in an essential oil. The other varieties are common weeds. The sheep's sorrel, which is of the same order as the above, grows upon the heath, and is very abundant.

The hippuris, or mare's-tail is seen in the ditches of the Moss. According to the Linnæan system, it is of that class and order, which includes but three examples in this country. It has the least pretension of almost any plant to floral display, as only one small stamen and one style are discovered at the base of each upper leaf, by which it propagates its species. It is used domestically for polishing brass, as its rough skin contains a good deal of silex, or flint.

The wood sorrel. This plant grows upon the Moss, and it is the true shamrock of Ireland, for which the natives have substituted the common white clover. With its beautiful emerald leaves, this sorrel is a very pretty little plant. It is found in shady places on the heath, where its pearl-white petals are seen in vivid contrast with the dark green moss. The juice is gratefully acid, but when evaporated, it yields oxalic acid, which is a well-known deadly poison.

Of the speedwell and figwort family there are sixteen varieties. Of this order, one of the most lovely of British plants is the stately fox-glove, of which both the purple and white grow upon the Moss. The marsh speedwell is the only bog plant.

The veronicas or speedwells, and the forget-me-nots, although of different natural orders, rival each other in the display of their beautiful bright-blue flowers; and the latter are acknowledged throughout Europe as representing the emblem of friendship; especially as regards the large water forget-me-not, which is a shrubby plant possessing an aromatic odour.

The knotted figwort is a striking looking plant which grows in moist situations on the borders of the Moss; and the lousewort, or dwarf red rattle, grows on the heath, exhibiting either its pink or white blossoms.

There are two kinds of burweed, the branched and the upright, which grow in ditches. The branched burweed always attracts attention, from its sword-shaped leaves and the spherical heads, which are its flowers.

Two species of flax are found upon the borders; viz., the narrow, and the little flax. The former is well-known by its elegant dark-blue flower; and the latter, with its slender stem, is a pretty, modest, little plant.

The butterworts and bladderworts are represented. One of the former is a bog plant, and is very scarce. Both

are perennial, and affect the stagnant water of the Moss. The latter plant is remarkable for having membranous air vessels attached to its stems and leaves, by which, in summer, it floats and expands its blossoms upon the surface of the water. In autumn these vessels become filled with water, and the plant sinks to the bottom in order to ripen its seed.

Two species of the gentian tribe are found upon the Moss; viz., the common centaury, and the bog-bean, or marsh trefoil, the latter being very scarce. With its clover-like leaves, and its white pink-tipped flowers, it is a very handsome plant. It possesses also valuable medicinal properties.

There are four kinds of heath plants found upon the Moss; viz. ling or heather, the marsh andromeda or cistus, and two kinds of heath, the fine-leaved and cross-leaved. As the furze or gorse often spreads a golden light on moors and hills, so the beautiful family of heaths diffuses a rich purple hue over the places of their growth. The Highlanders are acutely sensible to the peculiar features of their native country; the heather is to them a memorial plant, and many a brave man who has fearlessly faced death in its most appalling form, has ben seen to weep like a child when looking upon the simple heather in distant lands. Thus beautifully has a northern poet alluded to the fondness of the Highlander for his native land :—

Flowers of the wild, whose purple glow
  Adorns the dusky mountain's side ;
Not the gay hues of Iris' bow,
  Nor garden's gorgeous varied pride,
With all its wealth of sweets could cheer
Like thee, the hardy mountaineer.

Flower of his dear-loved, native land,
  Alas ! when distant, far more dear !
When he, from some cold foreign strand,
  Looks homeward through the blinding tear ;
How must his aching heart deplore
That home, and thee, he sees no more.

Of the St. John's worts, there are three sorts. One is a bog plant ; the rest are heath plants. This genus gives us an example of the Linnæan class, polyadelphia, which consists of the stamens being collected into separate sets. These plants possess a lively and striking appearance.

The wild valerian grows upon the borders, in moist places, and flowers in June.

There are three examples of the scabious which grow on the edges of the Moss. One of them, the devil's bit, is noticeable for a part of its root having the appearance of being bitten off, and that personage has the credit of being the operator.

The field scabious is a general favourite, with its delicate blue, and globular head, which is formed of numerous florets, with white taper bristles appended to each.

There are three species of the pimpernel. One of them is a bog plant. They have small, bright, and elegant little flowers ; and the scarlet variety is said to close its brilliant blossoms before rain.

The bell-flowers enumerate three varieties ; viz., the small and graceful ivy-leaved bell-flower, which is a bog plant, and is very rare ; and the blue-bell or hare-bell is found on the heath, along with the sheep's scabious.

There are three kinds of forget-me-not. The creeping forget-me-not is a bog plant. The viper grass is of this order. It is an odd looking plant, biennial, very scarce, and grows outside the Moss, flowering in June. Some of its flowers are a bright blue, others pink or a clear purple. It was formerly entertained that this plant was a sure antidote to the poisonous bite of a viper.

The goosefoot species are four in number ; they grow in waste places near the borders of the Moss, and their flowers are of a green colour.

The black bryony and wild vine are ornamental climbing plants, and they sometimes share the hedges together,

with their bright red berries looking beautiful towards the close of autumn.

Of the order which represents the trefoils, vetches, clovers, peas, &c., there are seventeen varieties. These are found growing upon the slightly cultivated parts of the Moss, and there are only three heath plants among them; viz. the dwarf furze, the birds' foot trefoil, and the birds' foot clover. Some of the species are a very important and useful class of plants, both to man and animals; and a few of them possess considerable pretensions to floral beauty. The furze or gorse, and the broom, which are of this order, when in full bloom, with their elegant, rich, and golden blossoms, add a pleasing and very striking effect to our charming rural scenery.

Of the order labiatæ, which contains some of the nettle varieties, there are as many as fourteen species; and the majority of them belong to the mint tribe. There are no bog or heath plants among them.

Plants with compound flowers number thirty-three species. The most familiar examples are the thistles, daisies, milfoils, ragworts, hawkbits, hawkweeds, &c. Only three varieties grow upon the heath. This order is one of the greatest families of the vegetable kingdom; and is said to claim about one-tenth of the known flowering plants. The dandelion, common daisy, and groundsel, flower all the year through; and the thistles comprise some handsome specimens, although late flowerers. The coltsfoot is remembered so far that its blossom precedes its heart-shaped leaves; and its bright yellow flowers, which in some localities carpet the ground, are very pleasing to the eye in the first weeks of spring; and the same remarks will also apply to the butterbur, which is of this order. The yellow goatsbeard has the singular property of opening its petals early in the morning, and closing them about twelve o'clock—hence it is known by the term, "Go

to bed at noon." This curious circumstance is also inherent in the common sow thistle, mouse-ear, hawkweeds, and other plants. One of the composite, the golden rod, must not be passed over; you may notice its straight stem, with its golden yellow blossoms, on dry banks, outside the Moss.

There are only two examples of the saxifrage; viz., the yellow marsh saxifrage, which is a very scarce bog plant; and the meadow saxifrage, which is remarkable for its tuberous root.

The willow herbs consist of five species; and the marsh willow herb is a bog plant. The French willow herb, or rose bay, with its deep pink flowers, and stately appearance, is a very attractive object among its compeers.

Plants of the common garden pink varieties comprehend fifteen species. These comprise the starworts, spurrys, ragged robin, pearlworts, campions, &c. It contains only one heath plant, the lesser starwort. Under the hedges round the Moss, are occasionally found the two campions, scarlet and white. The latter plant becomes fragrant in the evening, and both are objects of no ordinary interest from the brightness and extreme delicacy of their deeply-cloven petals. Nearly allied to the above is the bladder campion, which is found upon the borders, and is easily recognised by its blown up calyx.

Of a different order to the above is the purple loosestrife, a truly ornamental border plant. It is very conspicuous with its bright purple-red spike of flowers.

The sweet gale, or Dutch myrtle, is a well-known fragrant shrub. It grows both upon the bog and heath.

There are seven species of the hemlock, which are not of much importance, with the exception of the spotted conium. It is used in the practice of medicine, and is a deadly poison.

The autumn crocus, or "colchicum autumnale," is also a very valuable medical plant. It used to be found in a meadow near Gawsworth Church, and likewise in great abundance at Henbury Park. It is now extinct in both places ; but a few bulbs remain in a locality near Prestbury, which I have no wish to mention.

The flower of the milk wort is either purple, pink, or white, but generally purple. It is a heath plant, and blooms from May to September, and is one of our prettiest native wildings.

The bog asphodel is both a bog and heath plant, very abundant, and flowers in July. Its rich bright yellow and starlike blossoms greatly enliven the Moss by their presence.

There are two species of the sundew. These sundews are funny little plants, and are supplied with red sticky glands, which act as midge traps.

I have thus given a cursory statement of the more noticeable plants, which flourish and decay upon the Moss and its environs. I must now stop, as time will not allow me to dwell any longer upon this subject. Some aquatic plants, such as the pond-weed, &c., though not so attractive, possess very interesting properties. And the same may be said of the lichens and mosses ; also of the rushes, sedges, and grasses ; and last, though not the least, —the ferns ; one of which, the osmunda regalis, or royal fern, still survives upon the Moss, the sovereign over all its tribe and kindred. And now

"Farewell ! farewell ! bright children of the sun,
Whose beauty rose around our path, where'er
We wandered forth when vernal days begun,
The glory and the garland of the year.
Ye came, the children of the Spring's bright promise,
Ye crowned the Summer with her path of light,
And now when Autumn's wealth is passing from us,
We gaze upon your parting bloom—
Sweet flowers, adieu."

ORNITHOLOGY.

During the course of a life passed much in the country, and occasionally at my leisure, in perambulating the woods, hedges, and fields, I have contracted almost insensibly an acquaintance with some of the creatures that frequent them. Some have engaged my attention by their actions and manners, others have interested me by their innocency and the harmlessness of their lives; and perhaps there is some little partial bearing towards others from long association, or from unknown, undefined causes. The little insights that we have obtained into nature's works are many of them the offspring of scientific research; and perhaps none of the amusements of human life are more satisfactory and dignified than in the investigation and survey of the workings and ways of Providence in this created world of wonders, filled with His never absent power; it occupies and elevates the mind, is inexhaustible in supply; and while it furnishes meditation for the closet, gives to the reflections of the moralising rambler admiration and delight, and is an engaging companion that will communicate an interest to every rural walk. With reference to the ornithology of the district I am about to notice, I have always been an admirer of those elegant creatures that flit around us, their actions and their ways, which are so various and so pleasing; their notes, their nests, their eggs, and all the economy of their lives; nor have we, throughout the orders of creation, any living objects that so continually engage our attention as these, our feathered companions. The neighbourhood of Macclesfield being situated inland, is unable to compete with other localities bordering on the sea or tidal rivers with respect to the number of species of birds that can be classed either as residents or summer visitors. Nevertheless, out of about 200 species which breed in Great Britain, 93 may be said to breed in or near Macclesfield; and of

these about half the number build either upon the Moss or around it.

As time is rapidly progressing, it is my intention to make a few remarks only upon some of the rather scarce birds which build either upon the Moss or its borders: night-jar, bullfinch, sedge warbler, blackcap, twite, lesser redpole, chiff-chaff, black-headed bunting, wheatear, stone-chat, grey wagtail, wood-warbler, creeper, tree sparrow and marsh tit.

The night-jar or fern-owl is the most remarkable bird that frequents the Moss. From its nocturnal habits, it issues forth at twilight to spend the night in search of food, when it may be seen or heard by its peculiar jarring note, gently fanning its way in pursuit of various insects, which are also on the wing. The richly-subdued and blended tones of grey and brown which chequer these birds, well amalgamate with the season when they go forth, and the width of their gape renders it impossible to miss their prey. It is a migratory, and also a solitary bird; two of them are rarely seen together. A remarkable trait in the habit of the bird is, that it perches lengthwise instead of crosswise on the branch of a tree, with its head downwards. It deposits its eggs in a hollow of the ground, making no nest; they are two in number, and are as beautiful and singular in appearance as the bird itself.

The bullfinch, although so well known as a cage-bird, is very rarely seen at large in the neighbourhood of Macclesfield. A pair built their nest in a thick bush on the outskirts of the Moss last summer, and reared their young. The eggs are a pale-greenish blue, streaked and spotted with purple, and unlike those of some of the finch family, they do not fade with time.

The sedge-warbler is not a very common bird in this locality. Its habitat is the watery places around the Moss

where the sedges and reeds grow. It is noted for possessing the property of imitating the notes of other birds, and as it is a night as well as a day songster, its song has often been mistaken for that of the nightingale. When disturbed, although unseen by the passenger, as it is of a very shy nature, it betrays its hiding place by the utterance of its well-known chiding note. The eggs are of a light brown colour, mottled with darker shades of the same.

The blackcap is a very scarce bird in this part of Cheshire. It is also called the "mock nightingale," from having the faculty, like the sedge-warbler, of imitating that bird as well as some others. It favours the thickets outside the Moss, but is seldom seen, being unwilling to be gazed at. Its nest is commonly placed in a bramble or other bush, and it is studiously concealed and watched. Any one noticing or meddling with the nest causes it to be immediately forsaken. The ground colour of the egg is a peculiar shade of faint red, mottled with light or dark brown spots or streaks.

The mountain linnet. It frequents the northern counties and is seldom seen south of this. I have only met with its nest once upon the Moss. It is a stout, plain-looking bird, and shy in its habits. It is named also "twite," from the near expression of that word to its only note.

The lesser redpole or rose-linnet. Very few breed in this part of the country. It haunts one or two places on the borders of the Moss. It is a very pretty, gentle, and lovely little bird, and its nest is a remarkably neat piece of workmanship. Its eggs are a pale bluish green, spotted with orange brown.

The chiff-chaff, or least willow-wren, is a very pretty little bird, and very quick in its actions and movements. It is classed among some of the earliest arrivals of our insectivorous friends. It frequents the coppices and beds of

reeds about the Moss, and likewise those trees of rather lofty growth. Its presence in the latter is quickly ascertained by the passer-by, from its shrill song, which descends with a ringing sound from the topmost branches; and it consists of the two syllables only of its name, differently accented. It builds near the ground, and the nest, which is arched, is skilfully constructed. The eggs are white, with greenish brown spots.

The black-headed bunting, or reed sparrow, is not so common in these parts or about the Moss as the yellow bunting. It is always conspicuous from its black head, and dark plumage. Similar to some other birds, as the partridge, and green plover, it displays a strong instinctive solicitude for its young. When disturbed, it will divert the attention of any one near its nest, by shuffling about the rushes, and trailing itself along the gronnd, as if one of its legs or wings was broken. The male bird takes his turn of sitting upon the eggs during the period of incubation. They are of a pale brown colour, streaked and spotted in a pleasing manner with darker shades of the same.

Wheatear. It is a very common bird in the south, though but few are seen about here. They haunt the stone walls in the fields eastward of the town, in which they make their nests. A few take a fancy to the turf stacks on the Moss for that purpose, which is rather a singular circumstance. It is of a very shy and suspicious nature, always on the alert, and scarcely any bird conceals its nest with greater artifice than the wheatear. The eggs are of a delicate pale blue.

The stone-chat, unlike the whin-chat, is not a very common bird in this district. It frequents the margins of the heath, and is recognised at once by its black head and neck, with its breast of a rich brown orange; and also by its manner, as it flits about from bush to bush and spray to spray. Likewise by its note, which upon the approach of

a stranger consists of a chat, chat, clink, clink, as he sits upon the topmost twig. The nest is found at the bottom of a furze or other bush ; also in the heather. The eggs are a bluish green colour, minutely speckled with dull reddish brown at the larger end.

The wood-warbler or green wren. This beautiful little bird may be noticed on account of its extreme rarity in this neighbourhood. Some years ago I discovered its nest among some thick herbage close to the Moss ; last year one was found on Kerridge, and the eggs were brought to me for identification. They are of a white ground colour, thickly speckled over with red, grey, and dark purple spots. The nest is domed, with a small entrance in the side, and is generally placed on the ground.

The grey wagtail is likewise a scarce bird hereabouts. I noticed its nest in one of my botanical rambles near the Moss ; it was placed on the ground not far from the water. It is a very elegant little bird, and, like others of its class, exhibits the same airy lightness in its flight. The fine yellow breasts of the male birds render them very conspicuous. The eggs are generally greyish white, mottled with light brown.

The common creeper. I have noticed this bird once or twice near the Moss. It is seldom seen on account of its instinct and habits, although a constant resident in this country. As a tree climber it possesses a singular facility of quietly and rapidly shifting its position on the trunk or limb of a tree, so that the eye follows its movements with great difficulty. One instant it is before the spectator, and the next, from the quickness of its action, an intervening branch or trunk or limb of a tree hides the bird from his view. Both the claws and the tail are the chief machinery in its facile movements. With the exception of the golden-crested wren, it is, perhaps, the smallest-bodied British bird. It generally makes its nest

in the hole of a decayed tree. The eggs are white, with a few red spots, generally at the thicker end. While the female sits on the nest, she is regularly fed by the male.

The following birds frequent the Moss, and are to be seen almost daily in summer, viz.—the common snipe, jack snipe, sparrow hawk, kestrel, and cuckoo. The snipes resort to the Moss for their food only. The sparrow hawk and kestrel are there for a like purpose; while the vagrant cuckoo appears to visit it for the object of seizing, now and then, a favourable opportunity to deposit its eggs in the nest of the titlark, in which I have sometimes found it. Formerly, before the formation of the railway across the Moss, the grey lag or wild goose, and the common curlew, used to breed regularly upon it. This is seldom the case now. The rest of the birds upon my list, which build either upon or near the Moss, comprehend those of a more common and familiar character; and although some of them are very amusing and interesting in their associations and habits, time will not permit me to refer to them individually.

The mammalia that are to be found on or near the Moss are upon a limited scale. They consist of the hedgehog, mole, weasel, stoat or ermine, common-shrew, water-shrew, water-rat, field-mouse, short-tailed field-mouse, hare, and rabbit.

The reptiles which exist on the Moss are the common frog, common toad, common lizard, green lizard, water-newt, common smooth newt, and the viper or adder, which is now nearly extinct; and the blind worm.

The nature and habits of many of the above creatures are of exceeding interest, but it would be in vain for me to attempt to elucidate their history in detail.

ENTOMOLOGY.

On whatever side we turn our attention in this world of wonders by which we are surrounded, we constantly find some subject that calls forth our admiration; and as far as our imperfect vision is permitted to penetrate, we observe the same unremitting order and provision for a seemingly mean and worthless purpose, as is bestowed upon a higher and apparently more worthy object. We consider insects as one of the lower orders of creation, but are as perfectly unacquainted, generally speaking, with the objects of their being, though they are constantly crawling and winging their way around us, and their fossil remains are found in strata which date from an immensely antecedent period to that of the first appearance of our race upon this planet. The designs of Supreme Intelligence in the creation and preservation of insect life, and the regulations and appointments whereby their increase or decrease is maintained, and periodical appearance prescribed, are the most perplexing considerations of natural history. In some calm summer's evening ramble, we see the air filled with sportive animated beings; the leaf, the branch, the bark of the tree, every mossy bank, the pool and ditch, all teeming with animated life, with a profusion, an endless variety of existence; each creature pursuing its own separate purpose in a settled course of action, admitting of no deviation or substitution, in order to accomplish or promote some ordained object. Some appear occupied in seeking for the most appropriate stations for their own necessities, and exerting stratagems and wiles to secure the lives of themselves or offspring against natural or possible injuries, with a forethought equivalent or superior to reason; the aim in others we can little perceive, or should some flash of light spring up, and give us a momen-

tary glance of nature's hidden ways, immediate darkness closes around, and renders our ignorance more manifest. Thus, for instance, we see a wonderfully-fabricated creature struggling from the cradle of its being, just perfected by the elaboration of months or years, and decorated with a vest of glorious splendour; it spreads its wings to the light of heaven, and becomes the next moment, perhaps, with all its marvellous construction, instinct and beauty, the prey of some wandering bird; and human wisdom and conjecture are humbled to the dust!

There are many subjects and employments of mankind, which, if we could obtain a competent knowledge of them, will require an almost undivided attention; yet, after all our rising early and late taking rest, we shall know too little to be weighed in comparison with what is beyond our attainment or comprehension. And probably the investigation of the insect world, from the variety it embraces, the season, the subjects, and the vigilance necessary to catch every momentary action, requires from its followers a homage more absolute, and an attention more devoted than most others.

Amid the few branches of science I have looked into for edification and instruction, that of entomology is one in which I have found little time and opportunity for its cultivation. I will therefore leave so deeply interesting a science in the hands of some of the younger members of your Institution, who, at a future period, may be inclined to elucidate the subject.

And now I think I have run over the greater part of my diary,—the humble record of a portion of the animate and inanimate things around me. You who have had the

patience to accompany me through my recital, will probably be surprised that I could take the trouble to register such accounts of such things; and I might think so to, did I not know how much occupation, amusement, and healthful recreation, the seeking out these trifles has afforded me. The little excursions of the naturalist, from habit and from acquirement, become a scene of constant observation and remark. The insect that crawls, the note of the bird, the plant that flowers, the vernal green leaf that peeps out, and the pebble he disturbs with his foot, engages his attention, is recognised as an intimate, or noted for some novelty that it presents in sound or aspect. Every season has its peculiar product, and is pleasing or admirable from causes that variously affect our different temperaments or dispositions; and few perhaps are so dull of mind as to be totally insensible to these changes in their general manifestations. Most unaccountable, I think, has been the neglect hitherto of imparting a practical knowledge of natural history as a portion of the system of education in this country. And well will it be when no man can be considered properly educated who is ignorant of the leading facts connected with the sciences in general. The study of those subjects will give real improvement to the mind, exercise to the memory, and quicken as no other studies perhaps can, the powers of observation and of accurate perception. And still better will it be, when the teaching of these sciences, ranking next to the inspired Scriptures, shall be made a great means to the end of all education, the improvement of the heart, as well as the cultivation of the intellect. We need not dwell with the graceful denizens of the air, the tenants of the hedges and woods, or the grasses of the fields; but to pass them by in utter disregard, is to neglect a large portion of rational pleasure, from which flows contemplations of the highest order. They are all the formation of a Supreme Intelli-

gence, a Divine Creator, for a wise and worthy end; and in the words of a celebrated poet, I will conclude :—

"Nature never did betray
The heart that loved her; 'tis her privilege
Through all the years of this our life, to lead
From joy to joy; for she can so inform
The mind that is within us, so impress
With quietness and beauty, and so feed
With lofty thoughts, that neither evil tongues,
Rash judgments, nor the sneers of selfish men,
Nor greetings where no kindness is, nor all
The dreary intercourse of daily life
Shall e'er prevail against us, or disturb
Our cheerful faith,—that all that we behold
Is full of blessings."

APPENDIX.

At page 53, reference is made to the Fulgurites that had been found in the Drift sand and gravel about Macclesfield; and here may be inserted some correspondence which took place on the subject, by the late Rev. J. C. Meeke:

LIGHTNING.—FULGURITES.

To the Editor of the Macclesfield Courier.

SIR,—Some days ago, in the sand-pit on the west of Bond-street, nigh the new brewery, two vitrified tubes were discovered by the workmen, descending nearly in a vertical direction many feet into the sand-beds. As nothing of the kind had ever before been seen in the pit, portions of these tubes have been shown to several persons in the town—among whom were Mr. Sainter and myself. At first sight, it was suggested, that they were *Serpulites*. But this idea was abandoned on learning that the tubes were of great length, and their sides vitrified from end to end; and Mr. Sainter suggested they were *Fulgurites*. On further examination, that suggestion was verified.

As these objects are rarely met with in this country, a more particular description of them may be acceptable to many of your readers.

Rocks and summits of mountains have often been observed to bear marks of fusion from the action of lightning; and occasionally vitreous tubes, descending into banks of sand, mark the course of the electric fluid. In its passage downwards, it vitrifies the sand and forms tubes, varying in diameter from a line to 2½ inches. They usually narrow as they descend, and mostly terminate in a point. Some years ago, Dr. Fiedler exhibited

several of these fulgurites in London, of various sizes and lengths, dug out of the sandy plains of Silesia and of eastern Prussia. They have since been discovered in several other sandy districts on the European continent, and also occasionally in sandhills, in England, near the sea. In 1825, I met with one in a mound of sand forty feet high, by the sea-side, near Hartlepool, a portion of which is in my possession. Fulgurites were first attributed to the action of lightning by Dr. Hentzen, in 1805. They are usually placed almost vertically in the sand, and are nearly all hollow. At a certain depth they occasionally divide into two or more tubes, to each of which are sometimes attached lateral branches of a few inches in length, terminating in a point. It is, doubtless, certain obstructions which the electric fluid meets with in its passage through the sandbeds that give rise to these divisions in the tubes. Their ramifications are known in many instances to end in springs of water below the sand, and which are supposed to give direction to the course of the electric current. The internal surface of the tubes, though not even, is always smooth, the sand of which it is formed, having been converted into perfect glass, usually brilliant—sometimes resembling a variety of opal called hyalite, of a yellowish, grey, or white colour, representing small beads. The forms of the tubes are much varied, and are surrounded exteriorly by a rugged crust, consisting of partially fused grains of sand, the colour depending on the nature of the strata through which they pass. The parts of the tube in the upper bed containing more or less soil are black; in sands containing oxide of iron, grey; in white sands, they are colourless.

Before I conclude, I beg permission to describe the geological position in which the tubes in question were found in the above-mentioned sand-pit. The upper four feet of the sand-bank consist of what geologists call the

drift gravel, composed of ferruginous sand and numerous water-worn pebbles of various sizes, originally derived from twenty to thirty different kinds of rock, existing in sites in Shropshire, North Wales, Anglesea, the most northernly counties of England, or in Scotland. Below this gravel lie beds called the drift sand, various in colour and degrees of purity, of unascertained thickness. In the upper of these beds, the tubes were found. They commenced, no doubt, at the surface, but seem not to have been discovered by the workmen till after nine or ten feet of the higher beds had been removed. They have been traced to the depth of about twenty-two feet from the top of the bank. The whole of one of them, the workmen believe, has been extracted, (erroneously, I think,) and which narrowed at its lowest extremity almost to a point, the diameter inside not being more than a line, and the very end of all having apparently not been seen. The internal diameter of the tubes varies from one line to seven or eight. The inner surface is smooth, glossy, and in parts beaded. Their exteriors are more or less rugged, and of a greyish colour. The sand lying immediately round the tubes is much discoloured, probably by the action of the lightning on the oxide of iron contained in the sand-beds. One of the tubes, at about eighteen feet down, took a bend westward, at an angle of about 50 degrees from the vertical line. The portion of this tube, yet undisturbed, runs under the face of the sand-bank, and cannot, at present, be traced to its termination. There being two tubes, only about four feet apart, may have arisen from the fact, founded on experience, that places which have been once struck by lightning are often struck a second time.

When the remarks on the fulgurites were made in the above-mentioned paper, they could not be traced down to their full extent, and a complete account of them

was held in abeyance for some time. During this interval one of the fulgurites was lost sight of, through the carelessness of the workmen. The locality of the other, however, was carefully noted by a flagstone being placed over it. The reason the latter could not be followed beyond twenty-two feet from the surface, was that at that depth, its position being closed to the perpendicular section of the sand at the end of the pit, it departed from its vertical course at an angle of about 50 degrees, running under the artificial cliff, where it could not be pursued, in consequence of the great looseness of the sand beds.

At the end of about six weeks from the time of the discovery of the fulgurites, the pit was extended, a fresh section of the sand being worked out; and when the stone which covered the one not lost sight of, was reached, Mr. Sainter and myself were apprised of the fact, and we immediately went to the pit. In tracing this fulgurite down the remaining six or eight feet, we found that there were offshoots from the main pipes springing from it, at angles of from eight to twelve degrees, resembling the rootlets that are seen springing from the tap root of a tree. These were of much smaller dimensions than the main tube, and the walls of which were so extremely thin and brittle, that they could not be preserved. They were about nine or ten in number, and sprung from the principal pipe at different distances; were of various lengths, from two to twenty inches, and each terminated with a tube whose diameter was not more than the fortieth part of an inch. The principal pipe was traced down to a layer of loamy, brick-coloured clay, nearly if not quite impervious to the water which rested on its surface, and with which, a hole being dug in it, it was immediately filled. The extreme portion of the main tube was also small, being in its lowest

SANDSTONE HAMMER, FROM A PEAT BOG.

twelve inches not more than one-eighth of an inch in diameter, and whose walls were likewise too thin and brittle to be kept together.

It is, perhaps, too superfluous to add that water or springs at various depths beneath the earth's surface, where there are no conducting mediums above, as lofty trees or buildings, determine the spot at which the electric current, descending from the storm-cloud, enters the earth, and in some measure gives it its direction downwards.

Believe me, yours respectfully,

J. C. MEEKE.

Macclesfield, Dec. 10, 1862.

ADDENDA ET CORRIGENDA.

The foreign boulder in the Park (p. 51), is seven feet in height, with a vertical and horizontal circumference of 24 feet. Some of these erratics have been left by floating icebergs as they became stranded on the hills east of Macclesfield, at an elevation of about 1,400 feet above the level of the sea.

On the same plate as is depicted the above boulder, there is the small sketch of a dolmen, which is similar in its origin and conformation to that noticed near the pool on the Roaches. It lies about three miles from this point in a north-eastern direction, near the village of Flash.

In addition to the rare birds named at p. 73, as visitors, two others may be mentioned, viz:—Virginian Partridge and Little Crake.

Knight's Low in Lyme Park is a fine, conical and well-wooded hill about 250 feet in height. Its summit forms a rounded platform about 40 paces across it, and some obscure traces of stone and earthworks, (probably the remains of a cairn), are visible on the surface. There is not much doubt that the barrow-burial of a distinguished person has taken place here in early Saxon times, hence the word "low" or "hlœw."

At a locality near Clulow Cross named Cess Banks, a small tumulus containing a Celtic urn-burial was lately investigated by some members of the Macclesfield Scientific Society, the particulars of which were given at a meeting of some of the members by the Vice-President.

In the same plate (p. 65) in which is represented an ancient paddle as found in the Tytherington fields, there is also a sketch of a an oak shovel, (back and front,) which was found in the copper workings, along with the stone implements, on Alderley Edge.

The two hammers shown on the annexed plates are described at page 119; the grain rubber, 69; and the disc or net sinker, (which has been omitted to be named) at page 53.

Page 77.—In northern regions, during winter, the Ermine or Stoat becomes milk white; in summer it is reddish brown or black.

Page 43.—In the plate along with the amulet is shown a fine stone celt from near Buxton.

ERRATA.—At page 71, in the list of birds, the Greenfinch is latinised "Carduelis fringella," vice "Fringilla chloris."

At page 93, read "Labiatæ" for "Populus."

Page 42, at end of seventh line, for left, read *right*.

HAND GRAIN RUBBER, CEMETERY

LIMESTONE HAMMER, DANE MOSS.

BOTANY.

Latin Index to the Natural Orders of Plants.

Index to English Names of Plants.

GENERAL INDEX.

* *These Tumuli have been investigated, and some of the others more or less disturbed.*

MACCLESFIELD :
SWINNERTON AND BROWN, PRINTERS.