

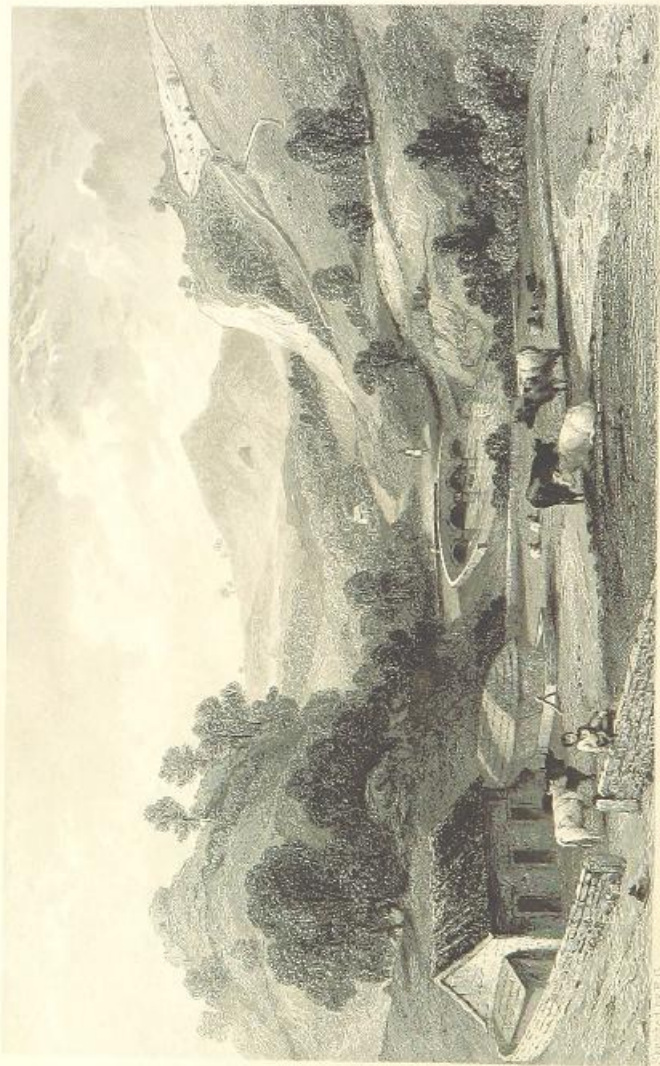
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THE
NATURAL HISTORY

OF THE
COUNTY OF STAFFORD.







Engraved by H. Adair.

A View in the Valley of the Marny, Suffolk, England.

THE
NATURAL HISTORY
OF THE
COUNTY OF STAFFORD;
COMPRISING ITS
GEOLOGY, ZOOLOGY, BOTANY, AND
METEOROLOGY:
ALSO ITS
ANTIQUITIES, TOPOGRAPHY, MANUFACTURES,
ETC.

By ROBERT GARNER, F.L.S.

“ Qui docet discit.”

LONDON:
JOHN VAN VOORST, PATERNOSTER ROW.

M.DCCC.XLIV.



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14

LONDON :

Printed by S. and J. BENTLEY, WILSON, and FLEM,
Banger House, Shoe Lane.

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INTRODUCTION.



It is now about a century and a half since Dr. Robert Plot, LL.D., published a *folio* volume of the Natural History of Staffordshire. We should not be very incorrect if we were to say, that this might as well have been entitled a natural history of any other county as of Staffordshire, so little connection have many of his disquisitions, learned though they are, with the natural history of this district in particular. In fact, it was the custom of philosophers of that age to wander far away from their proper objects. And even when the subject, like natural history, was one of pure observation, writers of the time mentioned preferred rather to obtain matter for their essays in the retirement of their closets, from their own imagination, or from the heavy *tomes* of earlier authors, than to consult the book of nature, or to make use of their own powers of observation.

Plot was the keeper of the Ashmolean Museum, in which situation he was placed by the individual whose name it bears, Elias Ashmole. Ashmole was born at Lichfield, in the year 1617, and the history of his native county by his friend was published only a few years before his death. Ashmole himself published nothing relating to the county, except an account of "the Arms, Epitaphs, &c., in some churches and houses in Staffordshire." In his youth he was one of the choristers in Lichfield Cathedral.

At a date, however (1593), anterior to the time of Ashmole, was born in this county a man, who, from his close observation of the objects of nature, claims a notice here, we mean Izaak Walton, "the father of fishermen." He was born at a farm-house, still standing, called the Half-head, near Shallowford, or Shawford, on the line of the Grand Junction Railway, north of Stafford. To Staffordshire, Walton, during the political troubles of the time, occasionally retired; and he left part of his property at his death, subject to certain conditions, to the town of Stafford. As a naturalist this amiable man was well informed for his time, more so than some of his editors would admit; in fact none but a true brother of the piscatorial art should undertake to edit Walton's works. Walton lived till the year 1683, being at his death ninety years of age; no doubt in the meadows of this part of the county he often plied his subtle craft, as indeed may be inferred from the following verses, in "the Complete Angler:"

THE ANGLER'S WISH.

I in these flowery meads would be;
 These crystal streams should solace me,
 To whose harmonious bubbling noise
 I with my angle would rejoice,
 Sit here, and see the turtle-dove
 Court his chaste mate to acts of love.

Or on that bank feel the west wind
 Breathe health and plenty, please my mind
 To see sweet dewdrops kiss these flowers,
 And then wash'd off by April-showers;
 Here hear my Kenna sing a song,
 There see a black-bird feed her young,

Or a laverock build her nest;
 Here give my weary spirits rest,
 And raise my low-pitch'd thoughts above
 Earth, or what poor mortals love:
 Thus free from lawsuits, and the noise
 Of princes' courts, I would rejoice.

Or with my Bryan, and my book
Loiter long days near Shawford brook ;
There sit by him and eat my meat,
There see the sun both rise and set,
There bid good morning to next day,
There meditate my time away,
And angle on, and beg to have
A quiet passage to a welcome grave.

Learned and curious as is Plot's volume, if we except a few facts apparently furnished to the author by contributors, as the occurrence of a few rare birds, or a few fossils (well engraved, however, in his plates), not much natural history is contained in the work particularly applicable to this county, as was observed above. There is no extensive list of plants or animals, which observation would have obtained; and most of the species noticed are not the rarest. However, allowance should be made for the then little advanced state of science. Had the learned author depended more upon his own observation, he would not have been led into the errors which he fell into, from his credulous dependence on the information of others; nor would he have found his task so irksome, as he informs us it had been; for how much less agreeable is it to wade through the voluminous works of old authors for information, than to roam through the mead and the wood, by the streams, and over the rocks and hills; and at almost every step to observe objects that interest both the sight and understanding!

The second part of "the Complete Angler" was added by Charles Cotton, Esq., who was born in the year 1630. The family of Cotton had obtained the estate of Berresford by marriage with the heiress, and at this picturesque spot, on the banks of the Dove, this poet and writer on the piscatory art resided. His character was a mixture of the gentleman, scholar, and rake. Some of his poems

on various subjects, as well as those alluding to his native county and to Derbyshire, are splenetic, and appear tinctured by the despondency originating in his constantly embarrassed circumstances. At one time he describes the scenery around his pleasant family mansion in the following lines—

“ Environ'd round with Nature's shames and ills,
Black heaths, wild rocks, black crags, and naked hills ;”

whilst at others his verses breathe a more amiable spirit, and are descriptive of the beautiful spots by which he was surrounded. The following lines, laudatory of that most pleasant of rivers, the Dove, are a specimen of his purest poetical taste :

O my beloved nymph ! fair Dove,
Princess of rivers, how I love
 Upon thy flowery banks to lie,
And view thy silver stream,
When gilded by a summer's beam !
 And in it all thy wanton fry,
 Playing at liberty,
 And with my angle, upon them,
 The all of treachery
I ever learn'd, industriously to try !

O my beloved rocks, that rise
To awe the earth and brave the skies,
 From some aspiring mountain's crown,
 How dearly do I love,
 Giddy with pleasure, to look down,
And, from the vales, to view the noble heights above !

O my beloved caves ! from dog-star's heat,
And all anxieties, my safe retreat ;
What safety, privacy, what true delight,
In the artificial night
 Your gloomy entrails make,
 Have I taken, do I take !
How oft, when grief has made me fly
To hide me from society,

E'en of my dearest friends, have I
In your recesses' friendly shade
All my sorrows open laid,
And my most secret woes intrusted to your privacy!*

At Cotton's death his mansion of Berresford was alienated from his house, and it has recently been again purchased by the family to which it gives name.† At present the mansion is in part unroofed, and the wind whistles through its deserted halls, the windows being without casements. One part of the mansion is, however, still used as a farm-house.

A very remarkable man, who was also a collector of plants, as well as a good botanist, Jean Jacques Rousseau, once resided at Wootton Hall, in Staffordshire, where an asylum was furnished him in the year 1766, from his real or imaginary enemies, through the influence of his friend Hume. He here evidently wrote part of his "Confessions," but in a note which occurs in them, he speaks in no admiring strain of his situation, beautiful though it is, but wild. He must doubtless, however, have had pleasure in the plants which he collected in this retired spot. He is remembered to have frequented much "a circular cluster of oaks called the Twenty Oaks." He is also said to have visited frequently that beautiful scene Dovedale, only a walk from Wootton, and to have there scattered the seeds of many of the mountain plants of his native country; if so, they did not germinate, or the plants died away, as none at all likely to have so originated now exist. It is more probable that he busied

* At the church of Ilam is also a pleasing specimen of Cotton's powers, in an epitaph to the memory of his friend Robert Port, Esq., whose family were the original proprietors of the estate, now in the possession of the Russells.

† The Beresfords of Ireland are derived from the ancient possessors of Berresford.

himself in the romantic grounds at Wootton, and he may have assisted in the planting of garden plants, which we have noticed to grow there in a half wild state.

In the year 1756 Dr. Darwin, the celebrated author of "the Botanic Garden," &c., began to practise as a physician at Lichfield. His first patient is said, by Miss Seward,* to have been Mr. Inge, of Thorpe Constantine, and she further adds, that Darwin restored him after he was given up by Dr. Wilkes, of Willenhal, then an eminent practitioner, and also distinguished as an antiquary of the county's history. One circumstance which engaged Darwin's attention was the earthquake which occurred in 1795. It was felt at Burton, Lichfield, Tutbury, and Repton, in a very sensible manner. In the Gregory mine near Ashover, one hundred and fifty fathoms deep, the miners at work were much alarmed, and a gust of wind which accompanied the shock blew out their candles. The original correspondence relating to this event is in the Staffordshire Advertiser, Nov. 25th 1795.

Amongst the Lichfield philosophic *coterie* at this time, besides the *colossus* of literature, Johnson, who it is well-known was born there, (1709,) were, Captain Keir, who has given an excellent account of the geology of the southern part of Staffordshire; Boulton and Watt, the engineers; Dr. Small of Birmingham, Messrs. Michell, Edgeworth, and Day, all occasional visitors of Darwin. To these may be added Mr. Mundy, the author of "Needwood Forest;" Mr. Sneyd of Belmont, a botanist and great planter, whose picturesque residence at Belmont Darwin celebrates; and Miss Seward. Mr. Gisborne, the author of the "Vales of Wever," married Miss Pole, the

* Miss Seward was the daughter of the Canon Residentiary of Lichfield, and her family resided in the Bishop's palace.

daughter of Darwin's second wife ; and Darwin placed his son Charles, whose death was premature, with the Rev. S. Dickenson, of Blymhill, well known as a botanist. In Darwin's poems are also addresses to individuals distinguished in the history of our county,—to Brindley and Wedgwood ; and from his description, in several places, of its scenery, he appears often to have made excursions into the more retired districts, as in the valley of the Manyfold. With the assistance of Mr. Jackson and Sir B. Boothby, constituting the Lichfield Botanical Society, part of the works of Linneus were translated and published at Lichfield.

We may, perhaps, be allowed to add from Miss Seward's narrative, the following little pleasing account relating to this imaginative and elegant author,—who may be styled particularly the poet of art and science, whose taste for philosophy, perhaps, in some measure, spoiled the poet, whilst his powers of imagination were almost incompatible with the cool investigations of science. The Doctor purchased, 1777, about a mile from the city, “ a little, wild, umbrageous valley, amongst the only rocks which neighbour it so closely. It was irriguous from various springs, and swampy from their plenitude. A mossy fountain of the purest and coldest water imaginable had, near a century back, induced the inhabitants of Lichfield to build a cold bath in the bosom of the vale.” In “ this tangled and sequestered scene,” also existed a rock, “ which, in the central depth of the glen, dropped perpetually about three times in a minute.” With these capabilities the Doctor would be at no loss to make the spot a little botanical paradise, which in fact he did, and here, with his poetical friend Miss Seward, he laid the foundation of his very remarkable poem “ The Botanic Garden.”

In the year 1798 appeared the first volume of the great work of the Rev. Stebbing Shaw,* on the county, a work principally antiquarian. Shaw, however, succeeded in obtaining the assistance of several valuable scientific contributors — of the Messrs. Dickenson of Blymhill, and of Captain Keir, alluded to above; also of other botanists, Messrs. Bourne, Foster, and others. Since the time of Shaw, and previous to the great work of Mr. Murchison, Dr. Thompson of Birmingham, and Mr. Aikin, have given some account of the geology of parts of the county; and to these may be added Mr. Jukes.

In the year 1817 appeared the topographical work of Mr. Pitt, who had previously written an “Agricultural Report” of the county. This is a production of but few pretensions, except that of a compilation, but, no doubt, is more generally useful than any other.

The old work of Erdeswick can scarcely be mentioned here, as it is almost confined to Heraldry and Pedigree. Erdeswick died at as early a date as 1603, and his fine and remarkable monument is to be seen in Sandon Church. Dr. Harwood † published a modern edition of his “Survey,” in the year 1820.

* Born near Stone, 1760.

† We have just seen the account of the decease of this venerable and learned clergyman.



NATURAL HISTORY

OF

THE COUNTY OF STAFFORD.



CHAPTER I.

GEOGRAPHY—SITUATION—HILLS—RIVERS—MERES AND POOLS—MOSSES AND BOGS—SPRINGS—HEIGHT OF HILLS.

STAFFORDSHIRE is one of the most central counties of England and Wales. In shape it is, as Camden observes, rhomboidal, its two acute angles being situated to the N.N.E. and S.S.W. It stretches from about $52^{\circ} 23'$, to $53^{\circ} 13'$ of north latitude; and from $1^{\circ} 36'$, to $2^{\circ} 27'$ of west longitude. The extreme south of the county is pretty nearly in the same latitude as the north of Suffolk on the eastern coast, and the town of Aberystwith on the western coast of our island; and the extreme north is in the same latitude as the isle of Anglesea to the west, and the city of Lincoln to the east. Its greatest direct breadth is thirty-four miles; its greatest direct length fifty-three; and its greatest oblique length fifty-nine. Measuring it by the map, and making no allowance for declivity of surface, it contains about 1130 square miles. It is about thirty-eight miles from the nearest point of it westward to the mouth of the Mersey; sixty-eight to the Bay of Cardigan; sixty-six to the Severn at Bristol, and sixty-five miles to the Wash, on the eastern coast of the island.

Staffordshire is bounded by Cheshire to the north-west, by Derbyshire to the north-east; by Leicestershire to the east; by Warwickshire to the south-east; by Worcestershire to the south, and by Shropshire to the south-west.

HILLS.

Staffordshire may be considered rather a subalpine, or hilly district. The great chain of hills which extends from Scotland southwards into the centre of England, enters the county at the north. Here, then, it is of quite a mountainous character. But in this and the adjoining county of Derby, this great ridge becomes less apparent. Some of the Welsh ridges, likewise, extend through Shropshire, and are continued into the high lands of Ashley, Sheriff Hales, &c., situated on the western border. In the south of the county, also, the surface becomes hilly in a remarkable manner, though the hills do not attain the altitude which they have in the north. Here the ridges generally run in a north-west and south-east direction, as they do likewise in the adjoining county of Worcester. The Beacon Hill, Wren's Nest, Dudley Castle Hill, and the Rowley Ridge, all stretch in that direction to the S.E., from Staffordshire into Worcestershire. To these may be added the Clent Hills. The ridge of hills, west of the Smeslow, called Abbot's Castle Hill, with other ridges in the adjacent part of Shropshire, and the hilly chains on the borders of Leicestershire to the east, have the same bearing. If we glance at a geological map of England, we shall be able to account for the situation and direction of these different lines of elevation; we shall discover the several *foci*, where the elevating force has been concentrated, and from which the ridges run, in

the toadstone, or igneous rock of Derbyshire, the trap formations of Wales, the basalt of Rowley and Clent, and the sienite, &c., of Leicestershire.

In the south the sandstone hills, called Kinfare Edge, rise boldly and abruptly above that pleasant little town, and decline very gently towards the south; presenting a sandy plain on that side towards Worcestershire. Beacon Hill, and others to the east of Walsall, have also rather a fine appearance; indeed the whole of the south of the county is hilly and picturesque, though much defaced by mining operations, and the spread of manufactures. Between the hilly surface of the north and south, we have a wide extent of country of a flatter description, yet far from presenting generally the tame appearance of the neighbouring plain of Cheshire, into which it runs to the north-west; for, to the east, we have an elevated track of land,—Needwood Forest, formerly covered with trees, and uninclosed till the commencement of the present century; and another great ridge of higher hills may be said to extend from the north of Birmingham, in a north-west direction, through the whole county, forming the rounded high hills of Barr, Cannock Chase, Sandon, Hilderstone, Tittensor, &c. These last are formed by the accumulation of gravel, whilst, on the contrary, those of Needwood Forest are clay. Similar hills of gravel or sandstone rock occur likewise at Hopwas, to the south of Cheadle, &c.

Staffordshire presents that diversified character of scenery which hilly districts generally do; but the nature of the subsoil, and more particularly the geological formation, has a great effect in disposing to a difference of aspect. In the limestone district to the north-east of the county, we have a similar appearance to what the neighbouring

county of Derby presents. High hills, attaining an elevation of twelve or thirteen hundred feet above the level of the sea, and of a round outline, are thick upon the surface. These hills present somewhat the appearance of the Downs of the south of England, and are covered with a short sweet herbage, beautifully green in showery weather, but soon scorched in dry seasons. The grey limestone rock is often seen on their sides only half covered by the turf. This district is broken by deep valleys, dales or gullies, along which commonly (though many are dry) a river or rivulet runs; and occasionally, by the geological convulsions of nature, we see the hills to have been, as it were, rent, and to present their naked faces, or *escarpments*, in the form of high perpendicular rocks. Such are those south of Buxton, and at Matlock in Derbyshire; and in Dovedale, and Wetton Valley, at Beeston Tor, &c., in Staffordshire. At other times the limestone occurs along the valleys in huge isolated or grouped pillars. Such are the curious, and frequently grotesque rocks of Berresford and Dovedale, called Tisington Spires, Piccory Tor, Dovedale Church, the Twelve Apostles, &c. Occasionally, as it is well seen in Middleton Dale in Derbyshire, they have a curious castellated appearance. Probably most of the dales are on the lines of faults in the strata.

The limestone hills are exceeded in height by those of the grit district. The whole of this is an elevated tract of from five to eighteen hundred feet altitude. Here, however, the hills have a wider base, and present a dark appearance, being barren, and, when uncultivated, covered with ling, heath, sedges, rushes, and cotton grass, which seldom appear on the more genial limestone. Some of the little valleys and hill-sides have, however, yielded to

the hand of man, and look the more beautifully green by contrast with the black moors. Much of the high ground on Axedge, Morredge, Cloud, Wetley Moor, &c., is either heath, still in a state of nature, or what is as bad, wet bog. In spots almost to the summit of Axedge, however, we see patches of beautiful turf, or small enclosures in which is raised the late crop of potatoes, and occasionally oats. The rocky shattered state of the surface in some spots quite prevents any attempt at cultivation. The valleys in this district are frequently picturesque, with small rivers, forming occasionally fine cascades over the grit rocks. The Roaches, the Swithamley, and Ramshaw Rocks, north of Leek, present very bold ridges of dark grey grit; and the north of the Pottery coal-field is likewise surrounded by a belt of them, forming great hills and lines of cliffs, which present their shelving sides towards the Pottery valley, and their abrupt faces in the opposite direction. Such is Mow Cop, surmounted by its old tower, and by an isolated rock, called "the Old Man of Mow," Congleton Edge, and Cloud; the latter of a fine dome-shape, as seen from the south, but abrupt and beetled on the Cheshire side. From Cloud southwards, the rocky ridges above Biddulph and Knypersley, Brown Edge, Ball Edge, Baddiley Edge, and Wetley Moor, are all on the same exact line, their elevation due to the same force, and forming the eastern side of the Pottery coal-field, as Mow Cop and Congleton Edge do the western. There are other remarkable ridges, (or edges as they are called,) at Wetley, Ipstones, and Whiston. These northern districts are frequently well-wooded; there are remains of old forests on the west side of Mow Cop, at Back Forest, Morredge, &c. And most of the valleys are varied with natural thickets. These

extensive woods, of which remains are still visible, were formerly part of the forest of Macclesfield.* Down the Churnet on both sides, at Belmont, Consall, Froghall, Oakamoor, Alton, Wootton, as well as in other districts, we see, thanks to the foresight of several planters of the last century, a succession of woods as beautiful and extensive as the eye can desire; often hanging in a picturesque manner from the rocky and abrupt hills.

The surface of that triangular valley, the north Staffordshire, or Pottery coal-field, has been beautiful in former times, from its diversified and bold sweep of surface; but now we must look here for the prospects produced by the commercial enterprise of man, rather than for the picturesque in nature. Extensive potteries occupy the site where, a century back, the ploughman pursued his healthy calling; and the ancient gabled homesteads of the agriculturist have nearly given place to the numerous mansions of the manufacturers. Here the soil is wet, cold, and clayey; and the dense masses of smoke from manufactories, iron-works, &c., are prejudicial to vegetable and animal life; a fact which we fear will be too apparent by a glance at our Statistical tables at the end of the volume.

The mining district of the south of the county is likewise more remarkable for the appearance of industry which it presents, than for its rural prospects; though the country is naturally possessed of many beauties. The remarkable range of hills, of which the northern part (Sedgeley), are limestone, and the southern (Rowley), darker basalt, here divides the coal district into two portions. The

* In the reign of Edward the First the Abbot of Dieulacres, near Leek, was indicted for killing and carrying away two stags from the forest of Macclesfield.—*Harleian MSS.*

rocks at Wren's Nest are of a singular form, having evidently been lifted up by some force from the centre, whilst in a half solid flexible state. The old castle of Dudley stands upon a similarly formed hill. The basalt puts on a picturesque, and even columnar appearance at Pearl Quarry, Hailstone, and Barrow Hill, &c.

West of Stourbridge the country is loose sand, till we come near the Severn, when we have a variety of soils and geological strata. This south-west extremity is the lowest part of the county; being in some places less than one hundred feet above the level of the sea. Where the Trent leaves the county, on its eastern side, the other lowest point, the elevation is probably fifty feet higher. At this south-west corner are some fine woods, part of the ancient forest of Wyre.

The middle of the county in general presents a remarkably rich appearance. The valleys are fertile, watered by the Trent and numerous tributaries, and adorned with the mansions and parks of noblemen and gentry, with pleasant towns, and one old city, Lichfield, with its three-spired cathedral, as well as numerous villages. In this tract the soil is frequently a strong red clay, well suited for tillage, and yielding much wheat, beans, &c., but in other places, on the contrary, a light sandy, or gravelly soil prevails, more adapted for turnips or barley, and, as observed before, there are in this district ridges of gravelly hills; but to the west the soil becomes more peaty, and flat mosses, or bogs, frequently exist, as they more commonly do when we arrive in Cheshire. In certain parts of Cannock Chase, though dreary upon the whole, there exist beautiful hills and glades, down some of which little streams trickle. The remains of the forest

which, as late as the seventeenth century,* entirely covered these hills, are seen in many places in the old oaks and birches; and frequently amongst the luxuriant ling, gorze, and brakes, the traveller is startled by the rising of the black-cock, whilst the stag is seen browsing in a half wild state in the more retired spots. The following lines were suggested by this scene, and are given by Plot from the "Iter Boreale" of Thomas Masters:

"Hinc mihi mox ingens Ericetorum complet ocellos,
 Sylva olim, passim Nymphis habitata ferisque:
 (Condensæ quercus, domibus res nata struendis,
 Ornavitque foco, et validæ spes uncia classis)
 Nunc umbris immissa dies; Namque æquore vasto
 Ante retro, dextra, læva, quo lumina cunq̄ue
 Verteris, una humuli consurgit vertice planta,
 Purpureoque Ericæ tellurem vestit amictu,
 Dum floret, suaves et naribus adflat odores:
 Hæ ferimus saltem amissæ solatio sylvæ."

RIVERS.

The Trent, which with its tributaries drains nearly the whole of the county, rises in the north-west part of it, between the village of Biddulph and the hill Mow Cop. The small brook soon passes through Knypersley pools. Near this spot, likewise, a branch of the river Dane rises, running in the opposite direction northwards, and escaping from the summit of the valley mentioned above, by an interruption or chasm in its rocky side, to the north of Biddulph Castle. The Trent runs southward, passing through the reservoirs at Greenway Bank, and by Stoke-upon-Trent. It next runs through the fine sheet of water

* In the Lansdowne MSS. is "An account of the wood and timber growing in the Forest of Cank, in Staffordshire, 1588, by Mr. John Taverner, Surveyor." Many thousand oaks were blown down in a hurricane, 1593.

at Trentham, and then past Stone, and the pretty village of Weston. It afterwards skirts for two miles the park at Ingestre, and at Great Haywood receives its first considerable tributary, the Sow. Its direction from Trentham to this point has been south-east, through a rich and pleasing country.

The Sow rises at the west border of the county, runs through a small lake, Copmere, by the episcopal residence of Eccleshall, and below Chebsey receives the Meece, rising on Whitmore Moss, and running along side the Grand Junction Railway for several miles. It also receives Clanford Brook, which passes Ranton Abbey. The meadows through which these small rivers run are rich, but rather marshy. The Sow then passes near the little ruin of Cresswell Chapel, by the ancient county Town of Stafford, and, a mile or so below it, receives the Penk, which flows from the south, where it collects the waters of various streams,—Eaton and Whiston Brooks from the west edge of the county, and Saredon Brook from Cannock Chase to the east.

The Trent now becomes a fine river, gliding past the beautiful parks of Shugborough, Oakedge, and Wolseley, to the town of Rugeley. Running eastwards hence through a rich country, it passes Armitage, the Ridwares, Handsacre, where it is crossed by an iron bridge, and an ancient stone one, and King's Bromley, to the south of Needwood Forest, and then by Alrewas and Wichnor, near which place it is crossed by the Roman road, Icknield Street. It has, in this course, received several streams from the forest to the north, and from the borders of Cannock Chase to the south. At the edge of the county it makes a turn to the north, receiving first, however, the Tame from the south, and the Mease from the east.

The Tame rises from the south of Cannock Chase, and collects tributaries from the country to the east of Wolverhampton and Dudley. It passes Hampstead and Perry Hall, and the beautiful mansion of Aston, running by the side of the railway, till north of Birmingham it makes its *exit* from the county, and becomes a Warwickshire river. It turns then to the north, dividing the two counties, and, entering Staffordshire again, passes under the walls of Tamworth Castle, receiving the Anker, and then its course is by Comberford, Fisherwick, and Elford, to its junction with the Mease and Trent, much of its transit having been through rich and beautiful meadows.

The Trent then turns north-east, passes Walton, Drake-low, and Stapenhill, and reaches Burton, its course lying by the site of the ancient abbey and the church; here it is crossed by a very long and ancient bridge. It then leaves the county and enters Derbyshire, having in the latter part of its course separated Staffordshire from Derbyshire. Here it is not navigable for any vessels but pleasure-boats. As it leaves the county it receives the Dove, and to this spot from its source it has probably a fall of about 350 feet.

The Dove rises in a mountain bog, at the north extremity of the county, upon Axedge. At its source it must be near 1700 feet above the sea, and it has a fall to the Trent of 1550 feet. It rapidly declines over the grit rocks in the valley below its rise; where the Leek and Buxton road crosses it by means of a rude bridge. It next passes for some miles through wild commons, separating Derbyshire from Staffordshire, and running south-east. Near Church Sterndale it glides between some very high limestone rocks on one side, and grit-stone hills, almost as high, on the other. The valley

is now beautiful as far as the little town of Longnor, for some miles south of which it becomes tamer, though still extremely pleasing. At Berresford it has the limestone on both sides, and here is the sweet spot Pike Pool, interesting to fishermen and lovers of the picturesque, where is likewise the celebrated fishing-house, built by the poet Cotton. To the right on the rock is an old ruin, and the almost equally dilapidated family mansion of the unfortunate versifier and angler. After forming a deep still pool, in the middle of which rises a grotesque limestone pillar, the stream soon enters a defile, seven-



PIKE POOL.

ral miles in length, with very lofty and steep rocks on each side, as fine as those of Dovedale, though bare of wood. Further down, passing several retired cottages and an old mill, it enters the last-named valley. Here its course is sometimes over the outspread green-sward at the bottom of the valley, at other times between rocks which stand in the stream, and confine its waters. Occasionally it tumbles over the edges of the limestone beds in small cascades. On either hand rise fine rocky hills,



DOVEDALE.

their sides sometimes hollowed by caverns, or piled with high pinnacled peaks of grey limestone. In one or two places the loose blocks seem almost tottering on the brows of the cliffs, forming rocking-stones. The Staffordshire side of this valley is beautifully wooded. Emerging from Dovedale, between the two hills Bunster and Thorpe Cloud, the Dove receives the Manyfold below Ilam, and its course suddenly becomes of a very different character.

“Thy murmurs, Dove!

Pleasing to lovers, or men fall'n in love,
 With thy bright beauties and thy fair blue eyes,
 Wound like a Parthian, while the shooter flies!
 Of all fair Thetis' daughters none so bright,
 So pleasant to the taste,—none to the sight—
 None yields the gentle angler such delight;
 To which the bounty of her stream is such,
 As only with a swift and transient touch,
 T' enrich her barren borders as she glides
 And force sweet flowers from her marble sides.”

COTTON.

The Manyfold rises but a mile or two from the source of the Dove, and runs in a parallel course, only separated from it by a hilly ridge. It receives brooks from the

north Staffordshire moors; the valley in which the first part of its course lies being pleasing but tame. It then passes the hill on which the mine of Ecton is situated, and here serves in several places the mills for breaking and washing the ore. It now enters the valley of Wetton, where the scenery becomes grand, there being fine hills on either side, isolated grey limestone rocks, woods, and hanging thickets, several old cottages and bridges, together with an extraordinary cavern in the side of a rock, which rises 350 feet above the stream.* A little above Beeston Tor, a fine bold rock, the Manyfold receives the Hamps from a deep valley opening from the south.

The Hamps rises also from the moors, running first south-east, but near Waterfall it turns northward, and winds for several miles through the beautiful and sequestered valley above mentioned.

The Manyfold then passes down the valley below the old halls of Castern and Throwley, by Ilam. But though these two little rivers, Hamps and Manyfold, flow in the course described, such is the case only during floods, for when the rivers are not swoln, they sink, the former at Waterhouses, and the latter near Wetton mill, into fissures in the earth, between the limestone beds, and have a subterranean course, the former for two miles and a half, and the latter for three miles and three-quarters, supposing the communication direct. In dry weather we see only their beds, full of great stones, which have been carried down from a considerable distance in floods. These dry channels join at Beeston Tor. If measured in all their windings each would be about seven miles. Both rivers rise again to the day, nearly

* This cavern is called by Darwin Thor's Cavern. Its more usual name is Thur's house, Thursehole, or Hobhurst Cave.

together in Ilam gardens, and close to the bed of the river, described above as flowing after rains. After running through these beautiful grounds and the village, the Manyfold soon joins the Dove.

The Dove then enters a wider and very rich valley, passing Thorpe, Okeover, Hanging-bridge, Calwich Abbey, Norbury, and Rocester, below which it is joined by the Churnet.

The Churnet is a less rapid and mountainous river than the three just described; soon after its origin it runs through the large canal-reservoir at Rushton, and afterwards receives streams from Biddulph, Wetley Moor, &c., if, indeed, one of these should not be considered its source. The Churnet then enters a beautiful valley at Cheddleton, having well wooded hills on each side, with an occasional flint-mill; it next passes Belmont and Oakamoor, the fine scenery still continuing through all its course, the hills, however, becoming more rocky, and the sandstone cliffs jutting out from their sides, and overhanging the bed of the river, their strata here being horizontal, and their beetling aspect probably due to the carrying away in ancient times of the intervening masses from the present valley. At Alton the river washes the foot of the rock on which the old castle is situated, and on the other side are the beautiful grounds and residence of the Earl of Shrewsbury, Alton Towers. The valley now becomes wider, and after a course of several miles in a south-east direction, the Churnet falls into the Dove.

The Dove continues to divide the counties of Staffordshire and Derbyshire, passing through the same fertile valley mentioned above, by Crakemarsh, Doveridge, Marchington, and Tutbury Castle, meandering in a south-

easterly direction, and skirting the northern extremity of Needwood, to its junction with the Trent.

The Dane also has its rise on Axedge, near the source of the Dove. This stream, as observed above, takes an opposite course through the plain of Cheshire, and its waters are discharged into the Mersey, on the western coast, through the Wheelock and Weever. For some distance it separates the two counties of Cheshire and Staffordshire. It is at first a very rapid and precipitous stream. The Wheelock and Weever derive some other rivulets from the flank of Mow Cop, and the north-west of the county.

Other rivulets from the western borders join the Tern, Meess, and Worf, and so enter the Severn.

Lastly, the Smeslow, at the south-west of the county, runs in a southerly direction by Trysull and Stourton Castle, and west of Stourbridge is joined by the Stour, and then enters the Severn, and so, as is well known, empties its waters into the Bristol Channel; whilst on the contrary the Trent discharges itself into the Humber, and thence into the German Ocean, on the eastern coast.

The Severn runs only a mile or two through the south-western extremity of the county. It is here a fine river, navigable for boats of ninety tons. At Upper Areley there is a ferry over it.

MERES AND POOLS.



One of the finest sheets of water in Staffordshire is the large one, perfectly oval in form, called Aqualate Mere, which is about one mile long, and half a mile broad, situated on the western border of the county, where there

are also several other small lakes or meres, of inferior size to that of Aqualate, but, like it, of perfectly natural formation. The artificial reservoir near Rushton Spencer, formed by damming up a deep valley, is nearly two miles long, by half a mile broad, being fed by a cut from the Dane. The fine pool near Norton, on Cannock Chase, is one mile long, by three-quarters broad. There are other large pools, natural or artificial, at Trentham, Betley, Copmere, Blymhill, Patteshull, Chillington, Pensnett, Hednesford, &c.

MOSES AND BOGS.

Peat-bogs originate in flat or concave surfaces, on the high lands, thinner ones on the sides of mountains, but on the lower grounds they sometimes form perfectly level beds of considerable extent, surrounded by gravelly or sandy hills. In the last case, if the peat be cut through, a deposit of fine sand is frequently found beneath it, and it is probable that the water with which peat-bogs abound, comes principally from this sand, into which it percolates from the high land surrounding the bog; beneath the bed of sand, in some cases, a stratum of clay occurs. The bogs of west Staffordshire and of Cheshire are commonly perfectly flat, though rivers or rivulets frequently arise from them. The trunks of trees, in a fallen state, are often found buried beneath peat, the stocks, however, sometimes remaining in their natural position. At Congleton Moss, at the foot of Mow Cop, a great number of these stumps of trees have been laid bare, several yards of peat having been removed. In this and other instances we may see that peat-bogs were formerly forests, and this was probably one reason that the moss began to rise. The trees found at Congleton are birch, alder,

oak, willow, and we think fir. Peat-diggers in Cheshire assure us that they sometimes see the marks of the axe on the timber found, and no doubt many bogs originated after this island became inhabited. There is, as is well known, extreme difficulty in draining peat-bogs, so as to render them fit for cultivation. Yet it is remarkable that in many cases, when the peat is once removed for fuel, a sound bottom is obtained, which bears good crops, and shows no tendency to grow peat again; proving that bogs were only formed under peculiar circumstances. In the Cheshire plain we see luxuriant crops close to the cut wall of peat.

Certain mosses, as *Sphagnum*, *Dicranum glaucum*, and *Hypnum*, ling, rushes, cotton-grass and sedges, principally assist in the formation of peat. Very deep pools, which are frequently circular in form, and are constantly decreasing in size, are prevalent in peaty districts.

SPRINGS.

There are a few rather remarkable springs in the county. The salt-springs will, however, be mentioned in the geology of the district. Several of our springs contain so much calcareous matter in solution as to have a petrifying property; such occur between Sandon and Gayton, at Forest-side near Uttoxeter, and on Morredge. A spring of a sulphureous character arises at Codsall, formerly of great note for the cure of skin-diseases, and where a building still exists, called the Leper-house. Over a spring at Willenhall, Dr. Wilkes raised a stone, thus inscribed: "Fons oculis, morbisque cutaneis diu celebris. Anno Domini, 1728." Plot gives a full account of other springs; one a sulphureous one at Butterton, near Leek, at which

place we noticed, in 1840, a water smelling of sulphuretted hydrogen, and strongly chalybeate; at this time a lead mine is being opened on the spot, and it has disclosed a bed of iron pyrites, to which no doubt the water owes its properties; the strata are limestone shale. The beautiful spring at Willowbridge was at one time celebrated for its medicinal virtues; at the present period it is covered with an ancient stone building, and empties its plentiful waters into a large circular bath or basin, overshadowed with trees; in the seventeenth century Dr. Gilbert wrote a treatise on the real or supposed virtues of this spring. Springs containing much iron in their waters are numerous in the north of the county, on coal strata and limestone shale. A tepid spring is said by Plot to exist near Berresford, but we have not met with it, though the spot is on the same line of fault as Buxton. A spring near Knypersley was once celebrated for the cure of the king's evil; it is still to be seen, its waters tasting somewhat ferruginous, and being discharged into several cisterns. Near the spring is a remarkable hermitage, if it is not rather a British antiquity, analogous to the *tollmen* of the west of England. Other springs formerly celebrated are too numerous to mention, and we must refer to Plot for an account of them; two of the most noted of these were, one at Ingestre and St. Chad's Well, near Lichfield. The spring still existing near Stowe was recommended by Sir John Floyer.* It is found to contain oxide of iron, carbonate of lime, muriates of lime, magnesia, and soda, with carbonic acid, and sulphuretted hydrogen gases.†

* Sir J. Floyer was a native of Lichfield, and physician to Charles II. He recommended the cold water treatment, absurdly revived several times since.

† Woolrich.

Wherever we have beds of sand, gravel, or porous rock, resting on strata of clay, the water percolating through the former, and meeting the latter, rises to the surface very pure and filtered. Clear and copious springs abound, from this cause, at the edge of coal-fields, but few pure ones exist in their area from the mineral nature of the strata. On limestone (from its numerous fissures) water must be retained in tanks, or pools lined with clay, the common method in Staffordshire. There are, however, some fine springs on limestone in Dovedale, at Crowdygate, and Castern. There is also a remarkable spring at the foot of the rock on the summit of Mow Cop, which is never dry, though much used; it is not easy to account for this, in such a situation, with very little higher ground above it.

HEIGHT OF SOME HILLS IN STAFFORDSHIRE, &c.

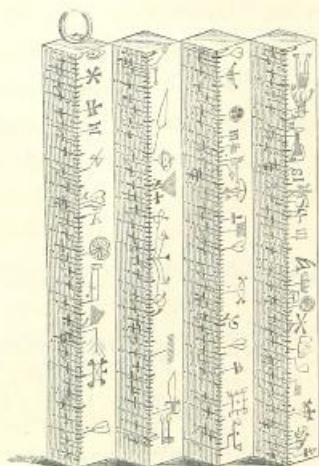
ORDNANCE SURVEY, ETC.	Feet above the Sea.	ASCERTAINED BY THE BAROMETER	Feet above the Sea.
Wever Hills	1150	Axedge, in Staffordshire	1689
Ashley Heath	808	Bagnall Village	728
Axedge	1756	Buxton, Lower Town, (<i>Derb.</i>)	896
Mow Cop	1091	Throwley Hall	784
Castle Ring	715	Rock above Thor's Cave	919
Barr Beacon	653	Butterton Village	936
Clent Hills	900	Bed of the Manyfold below	
Walton Hill	1007	Wetton	562
Kinfares Edge	550		
Beacon Hill	654		
Dudley Castle	550		
Wren's Nest	500		
Barrow Hill	600		

HILLS IN THE ADJACENT PARTS OF OTHER COUNTIES.

ORDNANCE SURVEY, ETC.			
Holme Moss, (<i>Derb.</i>)	1859	Lizard, (<i>Salop.</i>)	479
Mam Tor	1350	Hawkstone	812
Brandon Hill, (<i>Leic.</i>)	853	Wrekin	1320
		Beeston Castle, (<i>Chesh.</i>)	556

CHAPTER II.

METEOROLOGY—TEMPERATURE—ANNUAL AMOUNT OF RAIN.—TABLES.



RUNIC ALMANAC.

WE would endeavour in the next place to give some account of the climate, mean temperature, annual amount of rain, &c., of the district which we have taken upon ourselves to describe; affixing to the observations which we have made for this purpose in North Staffordshire, and those by Mr. Ick, of Birmingham, (which we give by his permission,) a short sketch of meteorological knowledge. We were led to do so from remarking that, though many people are habitual observers of the barometer, the

direction of the winds, form of the clouds, &c., few are at all acquainted with the elements of Meteorology, a deficiency arising, in some measure, no doubt, from the absence of any popular treatise on the subject. This must be our apology for introducing remarks which may be thought unnecessary in a work like the present.

How high the atmosphere which surrounds the earth extends, is not known, but it is so high that its weight is considerable, though we are not aware of the fact from our sensations. Upon every square inch of the earth's surface, or of our bodies, its weight or pressure is about fifteen pounds; it is heavy enough to support a column of water, in a pipe or tube, about thirty-four feet high, when the counteracting pressure is taken off above, as it is in a common pump. Mercury is about thirteen and a half times heavier than water, and, therefore, the air can support a column of mercury only the thirteenth and a half of thirty-four feet, or about thirty inches in height. If we furnish ourselves with a glass tube, thirty-two inches in length and closed at one end, fill it with mercury, and then invert it, placing its open extremity in a cup, the mercury will run out till the column attains the height of about thirty inches, it being supported at that altitude by the pressure of the atmosphere.

Such a column of mercury will, however, soon be seen to vary much in height, by one or two inches or more, as we are on high or low ground, or according to the state of the weather. For instance, as we ascend an eminence the weight of the air becomes less, which is also the case in foul weather. And, as it has been found, that when the air is light, rain follows; and, on the contrary, that when it increases in weight, and its pressure augments, we have fine weather, such a tube of course

foretells these changes, and is in fact the *barometer*. However, we fix the tube in a frame for security's sake, and furnish its summit with a scale, by which we can read off the height of the column in inches and tenths, and if the instrument has the small sliding scale called a *vernier*, in hundredths. For convenience, in many common instruments a globe is blown at the lower end of the tube, which is likewise there turned upwards, and into the globe the mercury falls, instead of into a cup, the external air having access to it by a little hole. It requires, however, close observation to notice the slighter changes in these forms of instrument, and, therefore, Moreland's Diagonal Barometer is frequently used, in which the tube at its upper part is inclined, or bent from the perpendicular line. As the mercury stands equally high above the cistern, whatever the form or position of the tube, it will when rising only one inch in an upright tube, occupy a much greater length in this, and of course its changes will be much more perceptible. In the common Wheel Barometer of Hook the height of the mercury at the upper end of the tube is not observed at all, but the ascent and descent of it in the lower limb of the tube, which is bent up, but not furnished with a globe, which ascent and descent are the reverse of those above, and require to be indicated in a correspondent manner. Here a float swims on the top of the mercury in the short reflexed part of the tube, and to this float a string is attached, which is passed over an axis in the centre of the dial face, on which axis is fixed an index finger, and the string, being drawn down at the other extremity by a weight, turns the index, and so shows any change on the graduated dial. This last form, though not used by the scientific observer, serves to make very perceptible small changes

of the atmospheric pressure, and is consequently more generally used than other more accurate instruments. All the varieties of barometer are seen to fluctuate together with great regularity, though situated at a great distance from each other.

As the pressure of the atmosphere decreases the higher we ascend, of course the barometer lowers in the same *ratio*. This we may state it to do, in general terms, at the rate of one-tenth of an inch for ninety feet of elevation at the ordinary temperature of summer. Suppose the barometer were 30 in. (*fair*), at the level of the sea, (which is thought to be about its average, or mean height there, in all countries, as ascertained from numerous observations,) at Leek, Wolverhampton, or Newcastle-under-Lyme, it would be about $29\frac{1}{2}$ in. (*change*); on Ashley Heath, or the Rowley Hills 29 in. (*rain*); at the village of Flash, on Morredge, Mow Cop, or the Wever Hills $28\frac{1}{2}$ in. (*much rain*); and on Axedge 28 in. (*stormy*); and yet with the same probability of fine weather. A barometer on our highest land, with the dial fixed on correctly, that is, with the thirty inch height placed by the maker in London thirty inches above the level of the mercury in the cistern, when barometers are standing at about thirty inches in the metropolis, will in fact seldom attain 30 in. (*fair*), but very commonly be nearer 28 in. (*stormy*), or still lower. Hence we see the incorrectness of putting the words *fair*, *rain*, &c., on the dial at all; for, to make the top of the column ascend as high as the word *fair*, (30 in.) in fine weather in high situations, the tube must be raised more than it ought to be, or, what is equivalent, the dial depressed, or a greater quantity of mercury added. It would be better if the scale of inches on the dial-plate were always correctly placed, and the words *change*, *fair*, &c., omitted.

Such an instrument would afford us some information of the height of our residence above the sea, and might be compared with the observations made at distant places by other good instruments. If we must have the words *change, fair, &c.*, it should be learned as nearly as possible what is the height of the situation in which the instrument is placed above the level of the sea, and this may frequently be pretty accurately done by ascertaining the height of the nearest canal, or other known level, and then it may be easily calculated, by Sir. G. Shuckburg's table, what is the average height of the column, at such an altitude; for, as it is constantly varying, the average height can be ascertained only by taking the mean of a great number of observations in any place. The same thing may likewise be known by comparison with other barometers at the same moment. The word *change*, or *mean*, might then be fixed opposite to the average height of the mercury, at a situation of such an altitude above the sea. The height of the Grand Trunk Canal at Stoke-upon-Trent, is about 360 feet, the mean temperature of the district about 47°. Divide 360 by 90 feet, which is about the height that a fall of one-tenth of an inch of the quicksilver indicates, at the above temperature, by the table alluded to, and four-tenths of an inch remain to be subtracted from thirty inches, the mean height of the barometer at the level of the sea, giving 29.6 in. as the average height of the instrument at the author's dwelling, being pretty nearly the height as obtained by daily observations for the space of a year, as will be seen hereafter. In such a situation the word *change*, or *mean*, therefore, might be placed opposite to 29.6 in. as marked on the scale, and with the other words alluded to might be engraved on a sliding, or moveable piece. As the

mercury rises above, or falls under this point, we may expect in the first case fine weather, particularly if it is in a rising state; and on the contrary rain if it is below it, and also actually falling at the time of observation; for it must be recollected, that the mercury when it is low, but at the same time rising, is more indicative of fine weather, than when it is high, but at the same time falling, another fact proving the fallacy of attending to the words *fair*, *stormy*, &c.

In ascertaining very accurately the height of the column of mercury in the barometer, there are some corrections to be applied, such as those for the capillary action between the sides of the tube and the mercury; for the expansion of the air in ascending heights, as the higher we get the rarer the air becomes, and the rises and falls of the mercury will not be so great as nearer the level of the sea; for the expansion and contraction of the mercury from temperature; and lastly, if the instrument has not what is called a guage-point to the cistern, we should determine the diameters of the bore of the tube and of the cistern, of whatever form the latter may be; for, in ascertaining the amount of a change, a fall for instance, it must be remembered, that the mercury as it falls from the tube must rise in the cistern, and this rise of so much ought to be also subtracted from the height of the column in calculating the real fall. If the area of the tube is one-tenth of that of the cistern, a fall in it of one inch will cause a rise in the latter of a tenth, and consequently we shall have only an apparent fall of nine-tenths of an inch.

The *mean* height of the barometer varies but little with the changes of the seasons, but more in the different months, as may be seen in the tables at the end of the chapter.

RULES FOR OBSERVING THE BAROMETER FROM PATRICK, ETC.

The rising of the mercury presages in general fair weather, and its falling foul.

In very hot weather the falling of the mercury fore-shows thunder.

In winter the rising presages frost, and in frosty weather, if the mercury falls three or four divisions, there will certainly follow a thaw; but in a continued frost if the mercury rises it will certainly snow.

It sinks lowest of all in very great winds, though they are not accompanied with rain.

A N., N. E., N. W., and E. wind raise the barometer most. A W., S. E., S., and S. W. wind lower it.

When a change in the mercury is immediately followed by a corresponding change in the weather, expect it to last but a short time.

When the mercury rises or falls gradually for several days expect a corresponding change, and that the coming weather, fair or wet, will continue.

Storms are preceded by remarkable falls of the mercury.

WINDS, ETC.

If by any cause the equilibrium of the atmosphere be disturbed, if, for instance, a rarefaction is produced at any part, and a consequent rush of the surrounding air to such a locality in order to supply the deficiency, such a movement produces the phenomenon of wind. Thus the equinoctial gales, and the north and easterly winds of spring, occur from the greater rarefaction of the atmosphere in the tropical regions at those periods, inducing a flow of air from the polar regions. A wind generally sets in from

the sea to the land during the day from a similar cause, the heating of the air on the land, and on the contrary from the land to the sea during the night, from the more rapid cooling of the former. It has likewise been ascertained by the anemometer, about to be mentioned, that there is pretty constantly an increase of wind about the middle of the day.

In the centre of England an E. or S.E. wind brings dry weather; a N.E. gloomy, and sometimes less dry; a S. wind brings warm but occasionally stormy weather, particularly if inclining to the S.W.; if the wind is N. we have fine cold weather; but if it tends to the W. cold with rain, hail, or snow; a W. wind is wet, S.W. stormy.

Various instruments have been invented to point out the direction, force, variation, &c. of the wind, and to register the same. In the better wind-vanes a rod comes down from above into any apartment which may be desired, and moves the finger of a dial, on which the points of the compass are marked; such a one we noticed at Beaudesert, in the apartment of the illustrious owner. But one of the most perfect instruments of this kind is the *anemometer* invented by Mr. Osler, of Birmingham, and which is in use at the Philosophical Institution of that town. In this instrument the direction of the wind is shewn upon a sheet of paper, placed upon a table beneath the rod from the vane, and constantly moving by clock-work, by means of a pencil attached to a rack and pinion at the bottom of the rod. The force of the wind is ascertained by a pressure-plate, a foot square, attached below the front of the vane, and consequently always turning to it; this plate presses against a spiral spring, and by a proper mechanism moves another pencil on the paper, and registers the force. A rain-guage is also added to

this instrument, registering the hourly quantity of rain which falls.*

MOISTURE OF THE ATMOSPHERE, ETC.

The atmosphere always contains a quantity of water in the form of invisible vapour, and the higher the temperature of the air, the more of this may be suspended in it; and on the contrary, the lower its temperature the less can it retain. During a hot summer day, immense quantities of vapour arise from rivers and low meadows, much more than during night; but we see the exhalations only in the evening and at night, when the sun is withdrawn, and the air becomes colder; so much so, that it is unable to retain all the vapour which arose from the heated water or ground, and which is consequently in part separated, and becomes visible in the form of a meadow-fog. Clouds are frequently formed in a similar manner, the watery vapour which rises from the sea, &c., meeting with cold air in the higher regions of the atmosphere, is rendered visible in the form of cloud, or even becomes precipitated as rain. When the vapour has thus become visible it may again disappear if the air grows warmer; thus we frequently see a cloudy night and morning succeeded by a brilliant day; on the contrary, after a clear star-lit night, clouds, mist, or rain frequently come on, continuing during the day, and disappearing again at night. But extreme dryness of the air is not always productive of transparency of it; in the finest and hottest part of summer there is very commonly a dull opaque state of it; and, on the contrary, when the air is saturated

* A description of this instrument has been published, with illustrative engravings.

with moisture, provided there be a sufficiently high temperature, it is remarkable for its transparency, and very distant objects then become visible. Thus, in some parts of North Staffordshire the Wrekin is seen only in this state of the air, and to be able to see it clearly is considered a good sign of wet.

With respect to rain its precipitation frequently occurs when clouds of opposite electricities rush together; hence we notice an escape of electric fluid in the form of lightning during heavy showers. In fact the electric fluid has probably much to do with the formation and configuration of clouds, as well as their precipitation in the form of rain, hail, &c. Hutton, however, considers clouds and rain generally to occur from the concurrence of two volumes of air, nearly saturated with moisture, and of different temperatures; we have said before that the power of the air to retain moisture is according to its temperature; the mass of air produced by the union of such two portions has a temperature the mean between that of the two, but, according to Hutton, the diminution of the power of retaining aqueous vapour is in a higher ratio than the decrease in temperature, and consequently a part of it will form clouds, or be precipitated as rain, snow, &c. When clouds are seen to descend we may know that the lower regions of the atmosphere are also becoming incapable of holding the contained water in the state of invisible vapour, and that precipitation must take place; thus, to see the clouds lower and envelope the tops of the hills presages wet. In winter fogs frequently foretell snow, showing that the air is become much colder. Fogs from the low grounds are most abundant in autumn, particularly after the grounds have been heated by a hot summer. Hail principally attends thunderstorms in sum-

mer; if it falls in winter, it is during snows; it also frequently prevails in April.

The following are some of the varieties of clouds: *cirrus*, (a lock of hair, or tuft of feathers,) betokening wind; *nimbus* (a black rain-cloud); *stratus* (a level sheet); *cumulus* (a heap, or pile) seen in summer; *cirro-cumulus*, a system of small clouds, like a flock of sheep; *cirro-stratus*, *cumulo-stratus*, &c.

The degree of moisture existing in the air has been attempted to be shewn in various ways. The awn of the wild, or mad oat, (*Avena fatua*,) is hygrometrical, twisting or untwisting, as the air is dry or moist; and it may be mounted with a light index, and fixed in a circular scale, so as to form a simple *hygrometer*. The common scarlet Pimpernel, (*Anagallis arvensis*,) is known by the husbandman not to expand its beautiful little flower except in fine weather. The common cord-moss, (*Funaria hygrometrica*,) is also, as its Latin name bespeaks, hygrometric; and the cone of the fir opens in dry weather, and closes in moist. A piece of Cheshire rock-salt is sometimes seen hanging in a cottage, to show the state of the air by its dryness or deliquescence. A piece of catgut, or thin shaving of whalebone, or a human hair, freed from its natural oiliness, are all delicately susceptible of moisture, shewing its occurrence in the air by their different degree of tension, and they were used by Saussure and De Luc in the construction of hygrometers. But Daniel's hygrometer is now most frequently used; it is formed by two hollow spheres of glass, connected by a bent tube, one of them being of black glass. The black globe can be cooled to any degree, as it contains some ether, by dropping a little of the same liquid on the opposite globe, enveloped in muslin for the purpose. The

rapid evaporation of the ether dropped on the covered sphere produces cold, which condenses the vapour of ether within its interior, and to supply the vacuum the ether evaporates rapidly from the opposite black ball, producing cold in it also. We may thus lower its temperature in the manner described to such a degree, that we shall shortly see a beautiful zone of dew or moisture form around the black ball, as we notice the moisture to form on the outside of a glass of cold water in damp weather. By means of a small delicate thermometer, placed in the interior of the instrument, we may see at what degree of temperature the dew is deposited, or what is called the *dew-point*; and the lower this is under the temperature of the air, (which is also shewn by a thermometer placed on the stem of the instrument,) the less probability is there of rain; as the air must either be cooled down to that point, or its quantity of watery vapour must be increased, before condensation into rain can take place. This instrument, therefore, is one of the best weather-glasses; but certain considerations must be kept in mind, as the time of the day, for instance; a greater difference being to be expected between the dew-point and the external temperature in the middle of the day, than in the morning and evening; the prevalent direction of the wind, &c., must also not be forgotten.

TEMPERATURE, ETC.

It is well known that the *thermometer* is the instrument by which the heat of any substance is exactly made known, and it is well understood to shew the degree of heat by the expansion of the enclosed fluid, which takes place according to its degree of temperature. *Regis-*

tering thermometers are not so generally known. To register the lowest point which the instrument attains at any time during the night, without our presence being required, a spirit thermometer is used; its stem is bent horizontally, and a bit of fine glass rod is placed in the spirit in the tube; when the fluid contracts from cold it draws down this little body, which also, when it again expands, it leaves at the lowest point which it had attained. On the contrary, if we wish during the heat of the day, to register the highest point which is reached, we use a mercurial thermometer of the same form; when the mercury rises it pushes on a bit of steel, which it leaves at the highest point attained when it again contracts from decrease of temperature. By the common thermometer 32° is the degree at which water freezes, and 212° that at which it boils; zero is 0, or 32° below freezing, a degree of cold only rarely known in England, but attained in North Staffordshire, as in other places in the year 1838.

According to Kirwan's table, a district, situated in such a latitude as North Staffordshire, 53° , should have a mean annual temperature of $50^{\circ} 2'$; but this, partly from its being rather a hilly situation, is too high. Taking off a degree of temperature for every hundred feet of elevation, as has been proposed, we should have a temperature of about $45\frac{1}{2}^{\circ}$, as the mean of the annual heat of North Staffordshire, at 370 feet altitude; this agrees pretty well with the observations given at the end of the chapter. During the years 1840-41-42 the highest degree of temperature attained was 80° , which occurred in the month of August 1842; the lowest was 10° , in January 1841.

It may be observed that, though the mean temperature of places of different altitudes decreases the higher we

go, yet, as was noticed by White, intense frosts are frequently most severe in low situations, and certain observations at the end of this chapter agree, as may be seen, with this remark. From the occasional more intense cold in lower situations, shrubs and plants will often survive great frosts better when growing in more hilly and exposed places; and this effect of cold on the low grounds is often increased by the damps which arise, covering the plants with moisture, which renders them liable to be enveloped in ice. They are also retarded from premature vegetation in more exposed places, and consequently are less liable to be injured on that account.

RADIATION OF HEAT, DEW, ETC.

On clear fine nights, when there are no clouds in the sky, the surface of the earth becomes much cooled by emitting or radiating its heat, as there are no clouds above to radiate back again to the earth. In cloudy weather this cooling down does not take place, as the heat given off is supplied by that received. The result of this cooling down of the surface of the ground by radiation is, that the aqueous vapour of the atmosphere is condensed upon it in the form of dew. Radiation it is well known goes on most rapidly from rough or pointed bodies, and hence we see that dew is only deposited on such—we see it for instance particularly on the grass. It is deposited in a remarkable manner on pointed bodies; thus when dew is falling, towards the evening, we see, in passing through a field of young corn, that every blade presents the beautiful appearance of a drop of dew at the point, without as yet any other part of the leaf having the least moisture upon it.

The cooling of the surface from radiation is so great, that we shall frequently be surprised if we leave a registering thermometer during the night on the grass. The freezing point will be approximated in many clear nights even in summer. For the same reason we notice frozen dew or hoar-frost on the grass, long before the nights are become generally frosty. As observed above, radiation does not go on when there are clouds above; at least they radiate back again, and the ground is not cooled. The same may be said of other overhanging bodies; no dew or hoar-frost is ever seen under a tree, or in the shelter of a wall. The knowledge of the principles on which this phenomenon occurs is of great use to the gardener, as by a very slight covering he may prevent, to a very great degree, the cooling of his tender plants, frequently destroyed or retarded in their vegetation from the effects of radiation; a canopy of the thinnest stuff will answer this end as effectually as a much more substantial covering.

RAIN.

In England more rain falls on the western coast than on the eastern, and more in hilly districts than on the plain. The former circumstance arises from the clouds which are formed over the Atlantic Ocean discharging their rain principally on the western side of the island; the latter from the attraction and interception of clouds by the hills, and from the discharge of their electricity by them. In the northern hilly part of Staffordshire, no doubt, the quantity of rain which falls is more than it is in the flatter, and more central southern part. The annual quantity of rain which falls at Liverpool is thirty-four inches; at Manchester thirty-six; at Chatsworth

twenty-seven; at Derby twenty-four; at Birmingham twenty-six, and at Hereford twenty-seven.* The quantity which falls in the southern and middle portions of the county may be a little more than that of Birmingham, as they are less central, and nearer the western coast, as well as more hilly in many parts. The northern part of Staffordshire being more mountainous, and nearer the sea, may be inferred to average more than this amount; the quantity which falls here may probably be the mean of the amount which falls at Manchester, Liverpool, and Chatsworth; as we are situated in the triangle formed by connecting these three places by lines, this would be thirty-two inches. The author can, he is sorry to say, only give from his own observations the result of a measurement of the quantity which fell in the years 1840 and 1841, at Stoke-upon-Trent—that is for two years, a period of time much too short to be of much service in forming an exact notion of the average quantity of rain in any district. No doubt the amount which falls in Staffordshire is pretty nearly what it is supposed to be above, though the conclusion is drawn more from comparison than from actual observation.

The quantity of rain which falls at London is twenty inches; Land's End forty-one; Norwich twenty-five; Chichester thirty-two; Keswick sixty-seven.

The most rainy months generally are the autumnal and early winter, the least so January and the spring months. In April, though showers are frequent, the quantity is not above the mean monthly average.

A rain receiver placed on a high building collects less rain than if placed nearer the earth. This perhaps arises

* By an inch of rain is meant as much as would cover the ground one inch deep, were it not to sink into it or evaporate.

from a considerable portion of rain being formed lower down in the atmosphere, than the height at which the receiver is situated. From the same cause sometimes, when we are on a high hill, we are only enveloped in mist; when we descend its side, we find rain coming down; and at its foot, we have a heavy fall.

CLIMATE, SOILS, ETC.

The mean temperature of a district depending principally, as observed before, upon its latitude and altitude, of course the higher northern part of the county is colder than the southern. Other circumstances must also be taken into consideration; a clayey soil is wetter and colder than one of a sandy or gravelly nature—the former we have in the north, and the latter, with some exceptions, in the south; and this adds to the coldness of the air in the former district. In the warmer sandy parts of the south and middle of the county the harvest, though much later than in the south of England, (a fortnight or more,) is much earlier than it is in the best clayey districts of the north of the county, and more so than in the richer red clays in the centre, or the more tenacious soils around Wolverhampton, where the vegetation is not much, if any, forwarder than in the earlier parts of North Staffordshire. The Shropshire, and even the Cheshire plain is earlier than the best parts of the northern portion of Staffordshire. In the latter the lower moorland is about as forward and warm as the higher limestone districts, where, however, at the foot and sides of the limestone rocks, vegetation is sometimes remarkably precocious, being sheltered and favoured, from the air being warmed by the reflection of the solar rays. The high

moorlands are very bleak and exposed, with a cold soil and little shelter; here the summer is late, and short: snow has been known to lie at Midsummer, or even in July, in the clefts of the rocks on the high hills. Even oats will not ripen in some parts, and the autumn is frequently advanced before the hay-harvest is finished. The wet soils of the coal and grit districts require extensive draining, and even then it is difficult to free them from rushes, moss, and sedges; on the contrary, the limestone is remarkably dry, seldom requiring draining, though there are a few tracts which are exceptions to this remark.

A warm sandy soil prevails on the western border of the county, particularly in the hundred of Seisdon to the south, and about Betley to the north; occasionally in the light soils the red sandstone rock appears, and along the western border of the county, the soil is frequently peaty; much of this latter is poor, but the light soils in general are suitable for barley, turnips, rye, and wheat. The quantity of pebbles seen on the surface, in some parts of the county, both accumulated in gravel banks, and also mixed with the superficial soil, is extraordinary. The red marl, though not so warm and forward as those tracts where the soil is sandy or gravelly, forms one of the richest agricultural districts, yielding rich crops of wheat and beans, and forming fine grazing land; also growing the largest timber.

In the coal districts the soil is as observed above, clayey and cold. The oak, however, naturally thrives here, and it appears that many coal tracts have, a few centuries back, been forest, or at least well wooded; when, however, in such localities, manufactures, with their accompanying smoke and sulphureous vapours increase, not only the oak, but most other trees languish and die. Many

common evergreens, as firs, laurels, &c., cannot be made to grow, and in the neighbourhood of spots where ironstone is calcined almost every plant and tree is destroyed. In coal districts trees also lose their leaves, in some instances weeks before their natural time, and the botanist remarks that no mosses or lichens, with one or two exceptions, such as that of *Lepraria viridis*, grow upon them. Some rather uncommon plants, however, are partial to coal districts, as many ferns; the wet clayey soils, which, in a former state of the earth, produced them so fine and in such profusion, as may be seen from the fossils of the coal strata, being still favourable to their growth. *Hieracium sylvaticum*, and *sabaudum*, *Reseda luteola*, *Cynoglossum officinale*, and *Lepidium Smithii*, plants not generally common, are frequently seen on coal-pit hillocks. Many annual plants, wheat and oats amongst the number, also thrive tolerably well in coal districts; potatoes grown there are inferior.

Basaltic hills yield good pasturage for sheep; the turf is fine and verdant, and not so often scorched as on the limestone. The banks of the Severn about Over Areley being the most southern part of the county, and elevated the least above the sea, have a climate favourable to the growth of fruit; here cherries, pears, and the cider-apple, are grown. Hops are occasionally cultivated, and Sir H. Lyttelton reared the vine and made good wine at his residence here. The mulberry and fig, like the vine, seldom seen in the north of the county, also thrive in this neighbourhood, with little or no shelter. We never knew the chestnut to be productive in North Staffordshire.

In the north moorlands of Staffordshire the air is bracing and pure; in these cold open districts, the spark of human

life, to speak metaphorically, burns less vividly, but lasts longer, than in more genial districts, and remarkable instances of longevity occur. Children, however, sometimes look sickly, perhaps from too coarse a diet, and it is not improbable that many of the young, who are weakly, die from the effects of an inclement atmosphere. Pulmonary consumption also, is, as may be seen from our Statistical tables at the end of the volume, more prevalent here than in the warmer and drier districts. Goitre, or Bronchocele is common, both in the hilly parts of Staffordshire and Derbyshire; it seems most likely that some calcareous, barytic, or other impurity in the water is the cause of this singular complaint. Though there are many old people in the moorlands, they are frequently, like other individuals who have lived long, and been employed much abroad in all weathers, bent with chronic rheumatism.

Plot concludes, and with good reason, that our hilly gravelly districts, not too much wooded, are particularly healthy, the air being pure, the soil dry, and the water free from mineral matter.

The influence produced on the health by the miasmata of low marshy districts, is never seen in our county in the shape of ague. Continued fever has of late years been prevalent and fatal in rural districts, even in the most isolated and secluded spots. We can see no cause for this, unless it is in the little regard for cleanliness, to be noticed in country dwellings.

SYNOPTICAL TABLE OF METEOROLOGICAL OBSERVATIONS, STOKE-UPON-TRENT.

SUSPOSED HEIGHT ABOVE THE SEA 370 FEET.

1840.	BAROMETER,* at 9 o'clock, A.M. uncorrected.				EXTERNAL TEMPERATURE.							Dew-point, † 9 o'clock.	Prevailing Winds, at 9 o'clock, A.M.	Rain in Inches.
	Highest.	Lowest.	Mean.	Royal Society, Mean.	Mean Highest.	Mean Lowest.	Highest.	Lowest.	Mean, 9 o'clock.	Mean, 9 o'clock, Royal Society.	Mean, 9 o'clock, Birmingham.			
January.	30.02	28.47	29.34	29.80	46.3	34.4	56.5	22.5	38.7	40.4	39.0	36	S. & S.W.	2.70
February.	30.34	28.34	29.57	29.91	42.3	33.5	51.0	28.0	37.3	39.3	38.3	36	E., S.E. & S.	2.25
March ..	30.38	29.46	29.98	30.24	43.3	33.9	48.5	26.0	38.0	39.7	38.3	31	N. & N.E.	.35
April ..	30.07	29.31	29.78	30.07	55.5	42.6	73.5	32.0	48.0	50.9	50.1	43	N. & S.	.91
May	30.09	28.98	29.50	29.91	57.5	47.7	67.5	39.0	53.0	56.3	52.5	47	N.E., E. & W.	3.40
June	29.93	29.33	29.65	30.01	63.7	51.8	75.0	43.5	57.6	62.6	58.4	52	S.W., W. & N.W.	3.30
July	29.92	29.09	29.53	29.92	61.9	51.8	73.5	47.0	57.4	61.5	57.5	53	S.W., W. & N.W.	4.06
August..	29.99	28.66	29.61	29.96	67.6	55.7	75.5	48.0	61.4	64.3	62.6	57	S., W. & N.W.	3.72
September.	29.90	28.49	29.45	29.82	56.6	46.1	70.0	36.5	51.4	57.3	52.7	50	S., S.W. & W.	3.84
October.	30.31	28.70	29.66	29.98	50.7	39.3	55.5	32.0	44.6	47.2	45.8	43	N. & W.	2.28
November.	30.12	28.41	29.25	29.63	46.8	37.3	55.0	27.0	41.6	44.1	42.3	41	S.	5.21
December.	30.34	28.13	29.80	30.12	38.8	31.6	52.0	24.0	34.8	34.4	34.2	33	N., E. & S.	.38
			29.59	29.95					46.8	49.3	47.6			32.41

* The instrument used was a Mountain Barometer, made by Watkins and Hill.

† The dew-point is too high; it was taken in a warmer aspect than the spot where the thermometer stood.

On the 13th of November, at 4 P.M., the barometer stood (corrected, except for temperature) 27.997, attached thermometer 47, its lowest point during this year. It was highest on the 8th of March at 9 o'clock A.M., when it stood (corrected) 30.470, attached thermometer 48. Thus its range was 2.473 inches, or nearly two inches and a half. The highest temperature recorded at the Royal Society was 83.0, the lowest 21.2. The quantity of rain which fell in London was 18.68 inches, at Birmingham 21.44. Rain or snow fell at Stoke-upon-Trent on 216 days, in London only on 125. At Stoke-upon-Trent there was a N. wind on 62 days, N.E. on 23, E. on 35, S.E. on 20, S. on 75, S.W. on 42, W. on 71, N.W. on 38.

April 26th, highest temperature in the shade, at one o'clock, 63; with the bulb blackened and exposed near a reflecting surface, 108. April 29th, highest temperature in the shade $64\frac{1}{2}$; lowest at night 47; exposed on the grass at night 31; exposed in the sun 96. July 6th, lowest night temperature 48; on the grass 40. August 8th, highest day temperature in the shade $75\frac{1}{2}$; lowest night temperature $51\frac{1}{2}$; on the grass 39. September 20th, lowest night temperature 44; on the grass $33\frac{1}{2}$.

SYNOPTICAL TABLE OF TEMPERATURE, &c., STOKE-UPON-TRENT.

1841.	EXTERNAL TEMPERATURE.					Mean, 9 o'clock.	Prevailing Winds, at 9 o'clock, A.M.	Rain in Inches.
	Mean Highest.	Mean Lowest.	Highest.	Lowest.	Mean, 9 o'clock.			
January	38.1	30.3	47.5	10.0	33.8	N. and N.W.	2.27	
February	40.5	32.5	50.0	21.0	36.2	N.E. and S.	1.33	
March	51.8	40.0	57.5	32.5	45.0	S., S.W. and W.	2.55	
April	52.7	40.5	67.0	35.0	47.4	N., S. and W.	1.40	
May	63.7	48.0	79.0	42.0	56.6	S.E., S. and W.	3.23	
June	63.5	49.6	71.0	41.0	58.4	N., S.W. and N.W.	2.57	
July	64.0	52.6	73.5	45.0	59.7	N., W. and N.W.	4.91	
August	64.9	50.0	73.0	45.0	60.8	S., S.W. and W.	4.97	
September	62.8	51.8	74.0	35.0	57.7	S. and S.W.	4.90	
October	52.7	43.4	59.0	35.0	48.0	E., S.W. and N.W.	5.35	
November	46.4	37.3	54.0	23.0	41.5	E., S., S.W. and S.	4.35	
December	44.3	36.0	51.0	20.0	40.0	S., S.W., W. and N.W.	4.22	
					48.7		42.05	

The highest temperature recorded at Birmingham was 85, the lowest 12, the mean 49.14. The quantity of rain which fell at Birmingham, was 30.595 (average 26 inches). Rain or snow fell at Stoke-upon-Trent on 215 days, at Birmingham on 233. At Stoke-upon-Trent there was a N. wind on 56 days, N.E. on 14, E. on 29, S.E. on 17, S. on 76, S.W. on 58, W. on 71, N.W. on 44.

At Birmingham the mean height of a superior barometer placed 462 feet altitude above the sea, was 29.411 inches.

Lowest mean temperature ascertained by a night thermometer, placed at the altitude of 1100 feet on Mow Cop, in North Staffordshire, from December 3rd, 1840, to March 3rd, 1841 (registered by — Jamieson), $28\frac{1}{4}$; lowest mean temperature at Stoke-upon-Trent, at the altitude of 360 feet, during the same period, $31\frac{1}{4}$; the instruments were placed in very sheltered situations in both cases. But though the nights were colder on Mow Cop, yet in an intense frost which occurred, the cold was greater at Stoke; this occurred in the night preceding Friday the 8th of January, when the thermometer at Stoke was 10 or 22 below freezing; in more exposed situations it stood at 7. It never sunk so low in the high locality; in the night in question, it lowered only to 14.

SYNOPTICAL TABLE OF METEOROLOGICAL OBSERVATIONS,

Made at the Birmingham Philosophical Institution during the twelve months of the year 1842, by WILLIAM ICK, F.G.S., Curator.

1842.	BAROMETER, 9 A.M.			BAROMETER, 3 P.M.			EXTERNAL THERMOMETER.			
	Highest.	Lowest.	Mean.	Highest.	Lowest.	Mean.	Highest.	Lowest.	Highest Mean.	Lowest Mean.
January	30.136	28.788	29.594	30.136	28.438	29.582	42.0	21.0	35.70	30.07
February	30.150	28.728	29.516	30.102	28.684	29.482	53.5	25.0	43.67	34.09
March	29.962	28.850	29.404	29.950	28.954	29.438	57.5	31.5	49.01	33.04
April	30.010	28.936	29.382	29.964	28.940	29.668	76.5	30.0	57.92	37.25
May	30.104	28.732	29.527	30.052	28.763	29.517	70.0	39.5	59.83	43.88
June	29.972	29.264	29.676	29.964	29.162	29.650	85.0	44.0	69.37	50.06
July	30.048	29.192	29.588	30.060	29.183	29.583	76.0	45.0	66.14	50.97
August	30.096	29.392	29.677	30.056	29.310	29.663	86.5	45.0	70.95	55.96
September	29.899	28.928	29.522	29.902	29.048	29.475	77.0	42.0	62.58	49.23
October	30.172	28.372	29.618	30.136	28.468	29.599	58.0	29.0	50.49	40.61
November	30.146	28.370	29.307	30.084	28.386	29.285	52.0	32.0	45.13	37.55
December	30.104	28.950	29.706	30.084	28.928	29.722	58.0	32.0	48.80	42.38
			29.548			29.555			54.97	42.51

1842.	DEW POINT, 9 A.M.			DEW POINT, 3 P.M.			WIND.		RAIN. Inches.	No. of Days.	
	Highest.	Lowest.	Mean.	Highest.	Lowest.	Mean.	Greatest Force.	Direction.		Rain or Snow.	Fair.
January	45.0	21.5	32.29	41.0	21.0	33.30	23lbs.	S.W.*	2.025	18 days.†	13 days.
February	46.0	26.5	37.19	49.0	27.0	39.67	19lbs.	S.W.	1.290	15 days.	13 days.
March	49.0	32.0	40.90	51.0	31.5	41.73	15lbs.	W.S.W.	2.690	27 days.	4 days.
April	52.0	34.0	41.15	54.0	32.5	41.90	5lbs.	N.W.	.555	6 days.	24 days.
May	55.0	39.0	46.98	54.0	41.0	47.14	10lbs.	S.W.	2.490	16 days.	15 days.
June	60.0	47.0	53.57	65.0	43.5	51.70	6lbs.	S.S.W.	1.110	9 days.	21 days.
July	63.0	47.0	54.99	63.0	44.0	54.79	9lbs.	S.S.W.	2.770	15 days.	16 days.
August	69.0	50.0	60.25	73.0	43.0	61.37	8lbs.	W.	1.655	12 days.	19 days.
September	61.5	45.0	53.58	64.0	46.5	55.16	13lbs.	N.E.	2.995	14 days.	16 days.
October	49.0	34.0	42.89	54.0	31.0	43.73	13lbs.	S.S.W.	.685	11 days.	20 days.
November	43.0	33.0	40.62	50.5	34.5	42.92	10lbs.	S.	4.500	22 days.	8 days.
December	53.0	36.3	45.21	55.0	35.0	47.03	13lbs.	W.N.W.	.800	13 days.	13 days.
									23.765	178	187

* It may be noticed, that the column marked "direction of the wind," indicates the point from which it blew during the height of the storm.

† The amount of rain being registered at 9 A.M. every day, the quantity, however small, which may have fallen during the twenty-four hours preceding the observation, is noted. Therefore, on the days marked down as fair, it must be understood that there was no deposition of rain, snow, or hail; for the pluviometer indicates the quantity, however small, from the '005 of an inch upwards.

“ Thus it will be seen that the greatest barometric pressure registered during the year 1842, was 30·172 inches; this was at the observation at nine A.M. on the 9th of October. The lowest was 28·370 inches; this occurred at nine A.M. of the 25th of November. The difference between the extremes was 1·802 inches. The mean height of the barometer for the year was 29·551 inches. The highest temperature during the year happened on the 18th of August, when the thermometer in the shade rose to 86·5. The lowest was during the night preceding the 24th of January, when it fell to 21·5. The difference between the extremes of temperature being 65. The mean temperature of the whole year being 48·74. Rain or snow fell on 178 days; and the total quantity was below the average of former years, namely, 23·765 inches; the mean annual average of six years being 25·085 inches. Thus the dryness of 1842, as contrasted with 1841, is very remarkable. The quantity of moisture deposited during 1841 was 30·595 inches; an excess over last year (1842) of 6·830 inches, or nearly seven inches. The greatest force of the wind registered by Mr. Osler’s anemometer was at two P.M. on the 26th of January, namely, 23lbs. on the square foot, the direction being South-west.”

June 12th, highest temperature in the shade 71, exposed to the sun’s rays 92, with the bulb blackened 93, ditto, and placed near a reflecting surface 110; Stoke-upon-Trent.

1840, March 2nd, temperature of a spring in Trentham Park, 48; weather frosty.

1841, February 25th, temperature of the same, 48; weather cold.

1841, May 31st, temperature of the same, 48; weather hot.

1841, September 27th, temperature of the same, $47\frac{1}{2}$; after hot weather.

1841, September 7th, temperature of the stream in Pool's Hole, Buxton, 45; after wet weather.

1840, June 4th, temperature of the water in the Speedwell Mine, Castleton, and of that in Peak Cavern, 46; weather fine.

Temperature in the mud at the bottom of the Ecton Mine, 53.

Temperature at the bottom of a coal pit, at Fenton, 1040 feet deep, 66; when ill ventilated, as high as 80 or 90.



CHAPTER III.

HISTORICAL ANTIQUITIES, ETC.



EFFIGY OF A CRUSADER, DRAYCOTT.

ALTHOUGH it was not originally the author's design to enter at all into the Topography and Antiquities of Staffordshire, yet he is perhaps correct in thinking that a short and condensed account of them may prove interesting; more so, in fact, to some readers than the other portions of this volume. And he may observe that such a union of antiquities with Natural History, has been sanctioned by the example of authors of note, of whom he need name no other than White, in his interesting History of Selborne.

In the following sketch he has almost wholly excluded pedigree and heraldry; not that he looks with indifference upon ancient descent and gentle blood, but that he has neither the leisure, knowledge, nor documents requisite

to give a genealogical history of Staffordshire families. Shaw has already done this for part of the county, and Erdeswick and Harwood may also be consulted, together with many records, manuscript and published, in various collections and libraries, sufficiently known to those who addict themselves to such researches.

In the following account he is generally indebted to his own observations only, having himself visited most parts of the county, and most of the antiquities and parish churches* therein described; but he must also confess that he has borrowed from other publications, particularly that of Shaw. Shaw's great work was left unfinished at his death, and probably will always remain so: it embraces but two of the five Hundreds; the principal part of his collection is now in the possession of a gentleman, who appears to spare no trouble in its preservation and increase (to whom the writer of this volume acknowledges himself indebted), but who has probably no intention to give it to the public. Other collections are preserved in the possession of noblemen and gentlemen to whom we have scarcely a right to allude; but it would be a bold undertaking—the Herculean task of finishing the ponderous work which Shaw commenced, by wading through these many antiquarian records, and printing and illustrating them on the plan pursued in the volumes alluded to.

Other local histories which may be mentioned, and to which the author is occasionally indebted, are Pennant's Tour, Dr. Harwood's History of Lichfield, Clifford's History of Tixall, Sir Oswald Mosley's History of Tutbury, and Dr. Oliver's History of the Collegiate Church of Wolverhampton. To the names distinguished for their

* To Mr. Thomas, of Sandon, he is also, however, particularly indebted for an account of several churches.

researches into our county history, (and in many cases, consequently, into the pedigree of their own ancient families,) may be added those of Ashmole, Burton, Buckeridge, Chetwynde, Degge, Digbie, Dodsworth, Fielde, Falconer, Ferrers, Gough, Huntbach, Hurdsman, Loxdale, Lyttleton, Smyth, Tollet, Vernon, Wightwick, Wilkes, Wyrley, and Wolferston.

Though researches into pedigree do not, as observed above, enter into the plan of the present work, the following enumeration of ancient Staffordshire families may be inserted from the old antiquarian Degge; premising that his list is but an imperfect one, many names of ancient houses, now or formerly existing in the county, such as Anson, Audley, Boughey, Blount, Curzon, Berresford, Leveson, Paget, Sneyd, Fowler, Talbot, Swinfen, Meynell, Stanley, Skrymsher, Fynney, Port, Stafford, Swinnerton, Paganel, Somery, Lawley, Sutton, Delves, Malveysin, Basset, Verdun, Wolferston, and Whorwood, *cum multis aliis* not occurring in this list, which was compiled, moreover, nearly two centuries ago.

“ These families have been owners of estates ever since the Conquest :

Biddulph.	Brereton.	Corbyn.
Aston.	Coyney.	Comberford.
Noel.	Drayeote.	Wirley.
Harcourt.	Bagot.	Okeover.
Mountford.	Cotes.	Rudyard.
Wolseley.	Wightwick.	Peshall.
Broughton.	Wrottesley.	Congreve.

“ These are ancient families, that now (1660,) enjoy estates :

Manwaring.	Chetwynd.	Macclesfield.
Erdeswick.	Chetwood.	Giffard.
Gray.	Wilbraham.	Astley.
Vernon.	Fitzherbert.	Heveningham.
Leigh.		

“These are good ancient families :

Bowyer.	Littleton.	Degge.
Lane.	Rugeley.	Thicknesse.
Kinnersley.	Arblaster.	Minors.”
Egerton.	Grosvenor.	

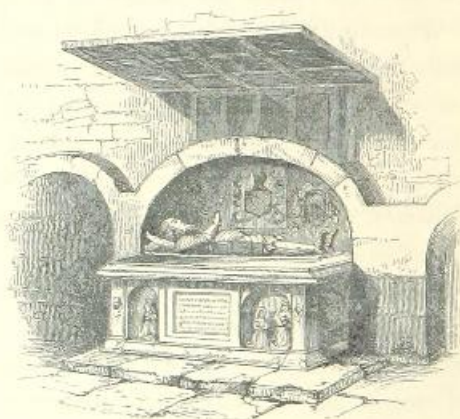
To this list Dr. Harwood adds the following note : “Of the ancient families thus enumerated, who were owners of estates about the time of the Conqueror, how few remain ! Wolseley, Bagot, Wrottesley, Okeover, now (1820) reside upon the spot where the mansions of their paternal ancestors, through all their successive generations, have stood. The castellated walls, with their lofty turrets and massive bastions to repel the attack of the invading foe, or the treacherous neighbour ; the shining armour, the richly-coloured glass, with all the heraldic ensigns of baronial splendour, no longer remain. The loud horn, which called the powerful knight with his numerous retinue to the sports of the chase, no longer blows ; and the minstrels and the dance, which closed the toils of the day,—all are passed away ; leaving behind only a faint shadow of former greatness, in the more meretricious and luxurious refinements of modern decorations. Cotes resides at Weston, but yet possesses the land of his paternal ancestor. Gresley, of Drakelow, no longer holds his paternal inheritance in this county, but resides on the spot upon which his illustrious ancestor was placed, in Domesday Book. Wightwick, Wirley, and Broughton, yet possess some portion of their inheritance, but have migrated to other counties. Coyney, Dudley, Ferrers, and Kynnersley, possess their lands by female descent. Basset, Macclesfield, Heveningham, Hillary, Noel, Harcourt, Welles, Draycotte, Comberford, Peshall, Arblaster, Astley, and Rugeley, are extinct in the county.”

The author trusts that his native county possesses sufficient that is interesting in an antiquarian and topographical point of view, to render the following account not unacceptable to the reader. In our ancient ecclesiastical edifices for instance, (and the account of all modern ones, as well as all that relates to civil matters and customs, and to trade and commerce, are foreign to our purpose,) in these venerable and often ample structures, raised by the piety of our forefathers, may be found interesting examples of the different styles of English architecture; some knowledge of the history of which gives an additional charm to the sight of them. In the remains of Tutbury Priory we have, for example, a specimen of what is commonly called the Saxon, or perhaps in most cases more properly the Norman architecture, of exquisite workmanship, unsurpassed, and in some respects, unequalled by anything in the kingdom, and dating from a little after the Conquest. We may see portions of the same style in St. Chad's Church at Stafford, the remains of Stone Priory, those of Burton Abbey, (one arch,) and in the most ancient parts of the churches of Byshbury, Tamworth, Shenstone, Gnosall, Armitage, Longdon, Yoxall, Trentham, Caverswall, Kinfare, Newcastle, and in the north transept of Lichfield Cathedral; though in a few of the cases, the examples may not, perhaps, be genuine. In the more ancient parts of these buildings we have only rounded arches, the pointed or true Gothic having been introduced, probably, not earlier than the time of the Crusades. In the ruins of Croxden Abbey, the south transept of Lichfield Cathedral, in portions of St. Mary's Church at Stafford, the churches at Ellenhall and Bree-wood, and in several others, we may notice the lancet-shaped windows of the earliest variety of Gothic archi-

ecture. The nave of Lichfield Cathedral is in a later style. In other examples, as in the front and lady-chapel of Lichfield Cathedral, the north transept of St. Mary's Stafford, the chancels of Audley and Cheddleton churches, &c., that beautiful style called the Decorated Gothic may be seen; whilst in many other instances, as in Wednesbury, Gnosall, Penkridge, and Madeley churches we have examples of what may be termed, from the disposition of the transomes, mullions, and tracery of the windows, the Perpendicular, or Transomed Gothic.

What can be more interesting or venerable than the mouldering tombs so frequent in our old churches, as in those of Audley, Ashley, Elford, Tamworth, Draycott, Blore, Trinity Chapel, &c., presenting us with a chronological series from the stone coffins or tombs, with swords, crosses, and other emblems cut upon them, to the beautiful modern monuments, mural or otherwise, in which the chisel of Westmacott, Nollekens, or Chantrey, has produced effects that rivet our attention, and excite the softest feelings of sympathy! Coffins ornamented in the way alluded to, some of which may be as old as, or older than, the Conquest, are still to be seen at Croxden, Byshbury, Dieulacres, and Audley, and more ornamental ones, at Rocester, Milwich, and Drayton Bassett. The one at Rocester is placed erect in the churchyard; that at Milwich forms a landing-place on the belfry stairs. In a few cases these monumental slabs are inlaid with brass inscriptions, crosses, &c.; such exist at Caverswall and Lichfield. The inscriptions are frequently in Latin or ancient French, in Roman characters. Brasses of this description, but with the effigies of the deceased warriors and dames in engraved and inlaid brass, continued to be used till after the Reformation; there is one of the fourteenth cen-

tury in Audley church, and another of a late date in the neighbouring church of Madeley, also several at Tamworth. Our most ancient monuments with sculptured figures are those, of which we have several examples, where the effigy lies under an arch or niche, the oldest entirely in chain mail, sometimes with a surcoat and kite-shaped shield, the helmet fitting the head closely, or frequently truncate at the top, as in that of Hugo Malveysin, the hands grasping a massive sword, and the legs frequently crossed, to indicate that the warrior commemorated had been to the Holy Land, or had at least taken some religious vow. Effigies more modern have only the neck enveloped in chain, the body and limbs in plate armour, with the rich cointisse, or surcoat; such is that of Sir John Stanley, at Elford, and those to the heroes of Poitiers and Agincourt. Altar tombs succeed, often of extremely beautiful



ALTAR TOMB AT DRAYCOTT.

sculpture, and commonly formed of alabaster, of which some of the more ancient have engraven figures in black line on the top; others, especially the more recent ones,

the recumbent statues of the deceased, in later times gilt and painted, and the warriors in plate armour; they are adorned on the sides with figures of children, monks, angels bearing shields, grotesque animals, trefoils, quatrefoils, &c., and covered or not with canopies of oak, marble, or stone. Of such tombs we have examples in most of our ancient churches, frequently enclosing the remains of the highborn, the brave, the learned, and the fair, now neglected, and in many cases without a record by which we may know to whom they belong; though they have commonly an inscription in relief in old English characters along the upper surface of the cornice, having a very ornamental appearance. Altar tombs of ancient date are superior in sculpture to those more recent, in which the figures are stiff and formal. The more modern effigies at Ashley, for instance, are inferior to some of those of Draycott, &c.; and a Grecian taste begins to prevail in the former cases in the style of the canopies; and kneeling figures are frequently introduced. A skeleton effigy is sometimes added in altar tombs, such are seen at Lichfield, Handsworth, and Uttoxeter; at other times, the deceased is represented enveloped like a mummy in a funeral habit, of which there is an example in Ashley church. Mural monuments become numerous after the sixteenth century, and are generally in the classical style, emblazoned, and adorned with a variety of marbles; and frequently with kneeling figures in the formal dress of the times. The antiquarian Erdeswick's tomb in Sandon church is said to have been sculptured by himself in part; it is dated 1601, two years before his death. Erdeswick is represented in it recumbent, and in spurs, his two wives kneeling above him. The tomb of Bishop Overton, in Eccleshall Church, is in a similar style, with a profusion

of sculpture, and others exist at Patteshull, Wolverhampton, Colwich, &c.

Many beautiful altar tombs with fine canopies existed formerly in Lichfield Cathedral; these disappeared during the civil wars,* and we can only form an idea of them from the views given by old antiquarians. Formerly many of our churches had their windows ornamented with beautiful stained glass, with armorial and other devices, as at Elford, Clifton Camville, Lichfield, Hamstall Ridware, Longdon, Hanbury, Byshbury, Tettenhall, Enville, Audley, Checkley, Trysull, St. Mary's Stafford, &c., in all of which places only portions remain, though many of the devices have been preserved by Ashmole and Dugdale.

BRITISH ANTIQUITIES.



DRUIDICAL CIRCLE, ARBOR LOW.

The antiquities which exist in Staffordshire, referable to the British period, are not numerous. There seems some reason to suppose that the Druids had a station in one part of the county, though no circle of stones now remains to confirm the supposition. Near Aldridge, or Aldrich, there is a spot called Druids' Heath, with the very perfect treble entrenchment upon it, of which a plan may be seen

* To the same cause, the violence of the Parliamentarians, may be attributed the present mutilated state of many other altar tombs, the effigies being without limbs, or the inlaid metal being torn out; also the great destruction which took place at this time of the painted glass in our church windows.

in Shaw's Antiquities; southwards is the lofty eminence called Barr Beacon.* There are also other mounds and entrenchments near Druids' Heath, one mound to the south being surrounded with a ditch. At Over Stonall, in this neighbourhood, is a large and very remarkable fortification of earth, surrounded by a trench which is double in some places, called Castle Old Fort; this, however, we would refer to the Saxons, and it was perhaps raised in the time of the Heptarchy.

The Bridestones, situated on an extensive and desolate moor in the north of the county, is probably of a British origin. This in fact answers to a Kistvaen. The appearance suggests the idea of a tomb, six or seven large flat stones being placed so as to form a lengthened enclosure, or chest of four sides, the ends directed east and west; several of the stones are broken, and one, now seen within the rest, may have been a lid. There is also a high stone or pillar placed at the corner of the east end of this chest, and another smaller one at some paces distant, with two or three blocks scattered about.

Some curious grit rocks in the north of the county, about Leek, Flash, and Swithamley, have been supposed to owe their particular form and position to the rites of the British inhabitants of this island, some of them being similar to the Logan-stones of Cornwall. At the latter place the rocks are very remarkable, forming what is called Lud's-church. There are on the Roaches also many circular cavities in the rocks, or *rock-basins*, generally full of water; these, however, with many of the grotesques stones of the neighbourhood, owe their origin to natural causes.

* The name Aldrich means *Ancient Station*, and Barr would import that here was a place of sacrifice.

There are one or two erect pillars in this neighbourhood, which are not so easily accounted for.

Between Flash and Quarnford we discovered an undoubted Cromlech, or British altar; this does not appear to be the one alluded to by Loxdale, in Shaw's Antiquities. It must certainly be in part of artificial construction, and is a very remarkable curiosity. Each stone would weigh many tons.

Near Knypersley Reservoir is an antiquity exactly analogous to the Cornish Toll-men; consisting of one large stone of enormous weight, supported on two others, leaving a passage between, which some recluse of ancient times must have fitted up as a dwelling,—traces of a door and fire-place remaining.

About three miles east from Hartington in Derbyshire, on the Staffordshire borders, still remains a very perfect Druidical circle called Arbow Low. The circle of stones is complete; the blocks, however, without exception, are thrown down. This ring is surrounded with a ditch, and an external ridge of earth, having a north and south entrance. There are some other less perfect remains of a similar description in this neighbourhood, nearer Staffordshire, above Pilsbury, &c. Plot mentions as British works an extensive castramentation on the Salopian borders of the county, near Wrottesley, and other works on Abbots' Castle Hills, in the same neighbourhood, but, as we have not visited the spot, we refer the reader to his work. The former are supposed by Salmon and Gough to be the traces of the Roman Uriconium. Plot also adds the Boltstone standing in a field near Compton, in the parish of Kinfare, measuring above two yards high, and near four in circumference, having two chops in the top of it; other stones at Cannock, &c.

Lows, or *barrows*, appear to have been generally the work of the original inhabitants of the island. Of these some remarkable ones still exist, though others have disappeared, or are fast doing so by the progress of culture. There are three to be seen on the summit of the Wever Hills. Offlow gives name to the hundred; Barrow Copt Hill has a summer-house upon it, commanding a delightful view of the neighbouring city of Lichfield, and a wide extent of country. Other barrows, or ancient mounds of earth, exist, or did exist, at Elford Low, which has an oak on its summit; on the Cauldon and Ecton Hills, on Morredge, near Mayfield, &c.; some of those on the limestone hills may be the result of ancient mining operations. To these may be added others on Tixall Heath, at Wombourne, Kinfare, and Seisdon, where there is also a triangular stone called the War Stone; others on the Clent Hills, at Croxall, and Seckington, on Ogle Hay, &c. Some of the so-called lows, or barrows, are merely natural accumulations of gravel.

Remains of warlike weapons and other instruments, apparently originating with the primitive inhabitants of the island, have been found at Leek and on Morredge; and a rude stone hammer has been shewn to us, lately found near Alstonefield.

Staffordshire, with parts of the neighbouring counties of Warwick, Worcester, Salop, Chester, and Derby, constituted the territory of the *Cornavii*, before the arrival of the Romans.

ROMAN ANTIQUITIES.

The traces left by the Romans in the district next claim our attention. Several Roman or Romano-British roads passed through the county. The Streetway, or Watling

Street, traverses it from east to west, south of Penkridge, Cannock, Lichfield, and Tamworth, and is still one of the great roads of the county, exciting the traveller's notice in several places by its straightness and width. It passes over Calf Heath and Cannock Chase, and in this part of the island several Roman towns were situated upon it; Uxacona at Oakengate, near Wellington in Salop, Pennocrucium, probably near Penkridge or Stretton, and Etocetum, of which traces are still visible at Wall, south of Lichfield. The remains of Etocetum appear to have been first pointed out by Camden; at present they consist of raised rectangular terraces, and the foundations of walls; a pretty church has been built upon one of these terraces, not improbably once the site of a Roman temple. The two tumuli, Knaves Castle and Offlow, are situated upon this road.

The Roman way, called Icknield Street, passed through the south-east part of the county, in a north-easterly direction over Sutton Park, by Lichfield, and parallel to the latter part of the course of the Trent. The station *Ad Trivonam* of Richard of Cirencester has been placed at Braunston, and the ancient places King's-standing, Barrow Copt Hill, and Elford Low, are not distant from the tract of this road.

The *Via Devana*, or Rykenield Street, probably entered the county near Braunston, passing in a north-west direction through Chesterton, the ancient *Mediolanum*, where is now to be seen a perfect Roman camp, in the ditch of which some of the houses of the village are built, whilst its other entrenchments are now used as lanes. That the *Via Devana* was the true Rykenield Street, is, we think rendered probable by a modern antiquary; * and also that

* Mr. Ward, in the "History of the Borough of Stoke-upon-Trent."

the above was its course; for, in the foundation charter of the Abbey of Hulton, of the date 1223, in the Monast. Ang., Rykenield Street is mentioned by name, as running through Blythe Marsh and Mere. The road called Red Street was probably a Roman road from Mediolanum. Another Roman road passed through the south-west extremity of the county, which was probably continued from Uxacona or Oakengate. Roman coins have lately been found at Kynnersley, in Salop, near this tract. The very perfect remains of a camp, which existed on this road, are seen by the Smeslow, south of Swindon. Another Roman way appears to have passed through this corner of the county, and there is a square camp on its course in Areley Wood.

A Roman road has been supposed to have led from Etocetum, north-west through Chesterton, and another to have passed the Dove, running westwards towards Cheadle, and again another (some traces of which Plot saw at Woodton) has been thought to have passed through the north-west border of the county to Mediolanum: Rutunium, situated on this road, having been fixed at Broughton. Plot also mentions a Roman way at Edingale.

Other encampments, several of which appear to have been Roman, occur at Sharesill, Wall, near which place were discovered the remains of a vallum with a wooden barricade, Teddesley, Wichnor, and Essington Wood. The names of Aqualate, and Anc's Hill close by, would appear to be of Roman origin, and antiquities apparently Roman have been dug up in the neighbourhood.

Roman coins have been found at Rowley, many silver ones of Galba and other emperors; at Wall, of Nero and of Domitian, and a gold Otho; at Alton, of Domitian, Vespasian, and Titus; and others at High Offley, Ches-

terton, Wooton, Callingwood, Hanbury, Wichnor, Rocester, Mayfield, Rushall, and Breewood. At Little Madeley, not far from Chesterton, (Mediolanum,) in 1817, many copper coins were turned up by the plough, which proved to be Roman ones of Dioclesian and Maximian; Maximinus, Posthumus, Tetricus, and Victorinus; Licinius, Constantius, Constantine, and Crispus.*

Other antiquities of the time of the Romans have also been found; a pedestal, bricks, and pottery, at Wall; pottery at Tean, Tatenhill, Stone, Yoxall, Wolverhampton, Wrottesley, Lichfield, Byshbury, Breewood, Mayfield, and Handsworth. At Pattingham, 1700, a *torques* of gold, weighing three pounds two ounces was found,† and arms have been discovered, or turned up at Batchacre, Castle-old-Fort, Yarlett Hill, Bunbury, Ilam, Berry Bank, Brough, Wombourne, Teddesley, &c., probably of different origin. The foundations of Roman baths, it has been supposed, have been discovered at Rocester, and also at Buxton.

SAXON ANTIQUITIES.

During the dominion of the Saxons, Staffordshire formed part of the kingdom of Mercia, together with the other midland counties. The castles of Dudley, Wednesbury, Tamworth, Stafford, and Tutbury, were now founded; also the city of Lichfield. Ethelfleda, called the Lady of Mercia, the daughter of Alfred, built the castles of Tamworth, Stafford, and Wednesbury, as defences against the

* Some of them are figured in the work last cited.

† If this were gold it was melted by the brazier at Wolverhampton, to whom it was sold by the person who found it, and one of copper of his own make, afterwards produced instead of it:—See *Shaw's account of the affair, Antiq. of Staffordshire.*

Danes; and she died at the first mentioned place. Lichfield and Tamworth were the seats of some of the Mercian kings. To Saxon times we may probably refer many of the great encampments still visible in different parts of the county; unlike those of the Romans, they are generally more or less round or oval, and situated on eminences. Two of these entrenchments exist on the Brough, near Maer, and at Bunbury Hill near Alton; and there are remarkable ones at Berry, or Bury Bank, near Stone; Billington near Stafford, and on Kinfare Edge; to which we may probably add those in Beaudesert Park, and at Over Stonall.

Wulfere, or Wulphere, King of Mercia, is supposed to have resided at Berry Bank,—formerly, according to Erdeswick, called Wulferchester, who, having rendered Mercia independent of Northumbria, at first restored Paganism, and martyred his two Christian sons. His own conversion, however, followed through the agency of Ceadda, or Chad. The latter having settled himself at a hermitage at Stowe, near Lichfield, Wulfere's sons, Wulfade and Rufin, were accidentally led to his cell whilst hunting, and became his converts; by their entreaties Chad removed near to Wulferchester, probably to Stone, but the father, by means of his attendants, discovered the intercourse and put both his sons to death. Chad returned to his retreat, but was soon followed by the penitent Wulfere, at the persuasion of his Christian queen Ermenilda, and his remorse shortly led him to embrace the new doctrine himself. He and Coelred, another Mercian king, were both buried at Lichfield.

Berry Bank is a lofty hill, with an oval entrenchment, still very perfect, and an entrance to the west; to the south the *fosse* is double; in the middle of the en-

closure is a hillock, or low, and also a small square terrace, covered with ancient firs and elms. There are no vestiges of buildings here, but there are many wrought square stones in the banks in the neighbourhood, and an extensive ancient quarry hard by.

Kinfare camp is at the extremity of the fine ridge of hills called Kinfare Edge. It is surrounded by a ditch on two sides, the other side of the promontory being very steep. There is a fine prospect from this spot, and several pleasant walks are formed upon the hill side. Bishop Lyttelton considered Kinfare, or Kinver camp to be British, the name *kin* and *vaur* signifying the great ridge in old Welsh. It is in a similar situation, but more lofty than the one at Berry Bank; the entrenchment, however, forming an angle. From its vicinity to Wolverley it has also been referred to Wulfere.

Billington camp near Stafford is also in a commanding situation, and its deep entrenchments are very perfect; it must have been a work of great labour. Between the camp and Stafford Castle, in a field close to the road, may be noticed a small round mound, probably, however, the site of the ancient residence of the Barons Stafford. An ancient camp exists at the neighbouring village of Coppenhall.

Castle Hill, in Beaudesert Park, before alluded to, is a very remarkable fortification of a similar character. The situation is high and commanding, the view from the spot being very beautiful over Cannock Chase, the fine park, Hammerwich Reservoir, the vale of the Trent, &c. The entrenchments here are also deep, being treble towards the east, with other advanced works. The area, like that of Billington, is planted with firs, and laid out in walks, one of which extends all round it.

Bunbury, near Alton, had a double or treble ditch, and was raised by Coelred king of Mercia, as a defence against the king of Wessex, 715, whom he met in battle at Wodensbury.

Tirley Castle is now nothing more than a farm-house, situated on a pleasant bank on the river side, in a corner of the county, near Market Drayton. It appears to have been built on the foundations of an older edifice, but of what character we are ignorant.

The upright stones, frequently seen in churchyards, are generally considered to be of Danish erection, and such exist in those of Leek, Cheddleton, Ilam, Pattingham, Wolverhampton, Checkley, Chebsey, and Draycot (now overturned); some of them, as those of Wolverhampton, and two of those at Checkley, are elaborately carved, but none so beautifully as the one at Eyam in Derbyshire. The one at Chebsey has the upper carved tapering portion broken, this being also separated from the lower plain portion by a sculptured rim, as is common in others.

Battles between the Danes and Saxons took place at Tettenhall and Wednesfield; and, according to Wilkes, at Wombourne; at the former places the Danes received a defeat so great, "that it was long celebrated by the national poets."

That a rencontre in Saxon times occurred near Maer, is, we think probable; one of the high hills here being fortified with ancient entrenchments. These hills are called Berth, Berry, or Burgh Hills, War Hill, and Camp Hills. The Sugar-loaf Hill, or Coplow, has been erroneously considered to be an immense *tumulus*; it is, however, with other similar ones in this neighbourhood, of natural formation. We cannot think, as has been said, that Osred, king of Northumberland, was slain here, but

rather near Winandermere. It is more probable that Maser, or Maserfield, where Oswald, the Northumberland king was slain by Penda, king of Mercia, 642, was Maerfield, at the foot of these eminences.

Saxon and Danish coins have been found at Oulton, Stone, Stafford, and Mayfield.

In Plot's time the Cloggs, or wooden Almanacks, which were of Danish or Runic origin, were in use in Staffordshire and Derbyshire. They are now rarely seen, except in museums.

It is well known that Alfred the Great divided this island into counties, and the counties into hundreds. Staffordshire has five hundreds; Totmanslow, from the village of the same name, (where there is still a vestige of a low, or *tumulus*,) the most hilly and northern hundred. Pirehill, from an eminence near Stone, situated to the north-west of the county, and in part a coal and manufacturing, in part an agricultural, district. Cuddlestone, from a bridge near Penkridge, situated to the west, and entirely agricultural. Offlow, as observed above, from the tumulus of that name, to the east of the county, containing the city of Lichfield, agricultural to the north, but a mining district southwards; and lastly, the hundred of Seisdon, from the village of that name, principally agricultural, but containing the manufacturing towns of Wolverhampton and Bilston, and embracing the south-west of the county.

After the Norman Conquest William, with lavish hand, bestowed the newly acquired territory upon his followers. At that time the lands in this county came into the possession of Hugh de Montgomery, Earl of Shrewsbury; Robert de Toni, Baron Stafford; Henry de Ferrers, Earl of Derby; William Fitzanculph, Baron Dudley; the

Bishop of Chester; the Abbeyes of Burton and Westminster; the churches of Rheims, Stafford, and Wolverhampton; Earls Roger and Nigellus; Ricardus Forestarius; Sampson, Bishop of Worcester; Turstine; William Corbation; Rainoldus de Balgiolle; Radulphus fil. Huberti; with large reserves to the king; the Saxon thanes, with few exceptions, being dispossessed, and their estates given to the Normans.

The wars between the houses of York and Lancaster are the next event to be alluded to here. In a field to the left of the road from Newcastle to Drayton, about three miles from the latter, is a monument called Audley's Cross, erected on the spot where the Lancastrians were defeated, and Lord Audley, their leader, slain. The heroic Margaret, the consort of the weak Henry, in whose cause Audley fell, witnessed the battle from the steeple of a neighbouring church, and, after a flight, took refuge with John Halse, Bishop of Lichfield, at Eccleshall. More than two thousand soldiers fell on this spot, with their leaders, chiefly Cheshire and Shropshire men, each of the latter bearing for his badge a silver swan. The following inscription occurs on the pedestal of the cross:

On this spot
was fought the battle of
Blore Heath,
in 1459.

Lord Audley,
who commanded for the side of Lancaster,
was defeated and slain.

To perpetuate the memory
of the action and the place,
this ancient monument
was repaired in

1765,

at the charge of the Lord of the Manor,
CHARLES BOOTHBY SCRUMSHER.

During the wars between Charles I. and his parliament, Staffordshire became the scene of strife and bloodshed. Lichfield suffered much in these civil wars; many of the inhabitants of this city, and indeed of the county at large, with the exception of the Moorlanders, shewed their strong attachment to the cause of the unfortunate monarch. In the year 1643, Sir Richard Dyott and the Earl of Chesterfield garrisoned Lichfield Cathedral and Close for the king, and it was in an attempt to take it that the fanatical Lord Brook, who led the parliamentarians, lost his life. He was shot in the brain on the 2nd of March, (being St. Chad's day, to whom the Cathedral is dedicated,) by a ball from a drake, or long fowling-piece, discharged from the battlements of one of the steeples. It is related also that the unfortunate lord was shot by a deaf and dumb gentleman of the family of Dyott, though one account contradicts this. However, a fowling-piece is preserved at Freeford, which is said to have been the weapon so fatal to Lord Brook. On the side of the Royalists Captain Michael Dyott was killed at this period of the war.

When the close and cathedral were taken by Sir John Gell, and garrisoned against the king, the soldiers, according to Dugdale, were guilty of the most shameful excesses, by destroying the monuments and emblazoned windows of the venerable edifice; what the zeal of the first reformers spared, they, with relentless hand, destroyed. The splendid Paget monument and many others were ruined, and part of the city also burnt down; and at the close of the civil wars the great steeple of the cathedral was left knocked down, the body of the building unroofed, and the beautiful west front much injured. The cathedral was retaken by Prince Rupert, not, however, without bloodshed—Colonel Usher and Captain Corbet being slain;

and Lord Digby, Colonel Gerard, and Wagstaffe wounded; and Captain Leg and the prince's chaplain taken prisoners. Captain Bagot, the son of the governor, who was himself wounded, was slain at Naseby; his monument is in the cathedral. After the parliamentarians had taken Lichfield Close they marched to the siege of Stafford; Gell and Brereton joining forces, and the Earl of Northampton coming out to meet them. Sir John Gell, of Hopton, was a most active and brave general in the service of the parliament, whose displeasure, however, in a few years he incurred, his lands being forfeited, and he himself condemned to perpetual imprisonment. The two armies, under the leaders mentioned, met, March 19th, 1642, upon Hopton, or St. Amon's Heath. The battle was not decisive, but the Earl of Northampton was slain. His horse being killed under him, he was surrounded and fell sword in hand, refusing quarter, and having himself slain the colonel of foot who first attacked him. Captains Middleton, Baker, Leeming, Cressit, Bagot, and Biddulph, Mr. Spencer Lucie, &c., also fell in the fatal affray. The parliamentarians refused to deliver up the body of the earl for interment, and it was pillaged, stripped, and left naked on the ground; and afterwards carried away to Uttoxeter. In these wars Painsley House and Caverswall Castle were garrisoned by the parliamentarians. Dudley, Tutbury, Stourton, Rushall, and Stafford Castles all underwent siege. The former was held by Colonel Leveson for the king, and at the latter "Ould Lady Stafford" bravely withstood the parliamentarians, who possessed the town, emulating the courage of the Lady Ethelfleda, the supposed Saxon foundress of the castle. The houses of Patteshull, Keele, and Swinnerton, also suffered for the loyalty of their owners.

The parliamentary committee which sat at Stafford, consisted of Mr. Thomas Hammersley, Major of Stafford, Colonel Simon Rudgeley, Colonel Edward High, Colonel Lewis Chadwicke, Thomas Crompton, Esq., Captain Henry Stone, Captain William Foxall, Edward Broughton, Gent., John Swynfen, Gent., Robert Gregg, Gent., William Bendye, Gent., Henry Agarde, of Bruerton, Clerk.

The following are a few of their minutes:—May 1st, 1643. Soldiers to come to church every sabbath-day, and every sermon day.

Ordered, that Mr. Berry, parson of Norbury, for preaching malicious doctrine against the Parliament, calling them usurpers, be committed to prison. Richard Smith to seize upon the coal-works of John Lawton, Esquire.

The said Smith to seize upon the coal and cordwood belonging to Walter Chetwynd.

Ordered, that Lieutenant Young shall forthwith be cashiered out of the town for his offence, in that he was drunk and neglected his guard, and let down the draw-bridge at the gaol-gate at 10 of the clock in the night, and went to the further end of the fore-gate; and that he shall have punishment inflicted upon him by standing in the market-place with a paper in his hat upon the market day, wherein shall be wrote his offence.

The names of Giffard, Broughton, Bagott, Chetwynd, Draycott, Digby, Egerton, Goodall, Grosvenor, Hinton, Leveson, Littleton, Lee, Pime, Pagett, Sneyd, Wrottesley, Whorewood, Vyze, and many others are mentioned as suffering on account of their loyalty.

After the battle of Naseby the defeated monarch entered Lichfield on Sunday, June 15, 1645, when the civic authorities and inhabitants presented him with the following pathetic and loyal address:—

“ June, 15th, 1645.

“ MOST GRACIOUS SOVEREIGN,

“ Though the sad report of the late ill success hath so oppressed our souls with grief, that we are rendered more apt to expresse our loyall affections in tears than words, yet the safety and presence of your sacred person, (as dear to us as our lives,) hath so much revived and restored us, that we have taken the boldness, though suddenly and rudely, in a few words, to present to you the most zealous affections and loyall services that a most obliged and gratefull people can possibly bear to a most Gracious Sovereign.

“ And as we are not so stupid as not to be sensible of God's corrections, when he is pleased so sharply to punish us for our sins, so we are not so unchristianlike as to despair of God's final blessing upon a most just and righteous cause, nor so unmanly as to lay down our courage and confidence for one cross event, as knowing that man's necessity is God's opportunity, and that God's power is most glorified in man's weakness.

“ And albeit the sunne may be for a time eclipsed, even by that plannett which itself enlighteneth, and for a time be obscured even by those clouds which itself drew from the earth into an higher region, yet the light and virtue of the sunne is not thereby made lesse conspicuous; eclipses and clouds last not always. *Mendacia diu non fallunt*; men will not always be worked into this sin of rebellion. Truth at last prevails; right never dieth; but will shortly, by God's blessing (all clouds being dispelled) restore the sunne of this our firmament to his former splendour and glory, and therein his faithfull subjects to their former peace, plenty, and happiness, which is our daily prayer, and shall be our incessant endeavour to the

utmost expence of our estates and blood. *Nec plus obire possumus, nec fas est minus*—More we cannot undergoe, less we may not.

“ Sir, your most humble and loyall subjects, the bayliffs, sheriffe, and their mases, &c., citizens of this your citty of Lichfield, doe humbly, according to their duty, surrender into your Majesty’s hands these ensigns of their authority, which they are resolved to bear from you and under you, or not at all, and, whether they live or die, to live and die your Majestie’s most faithful and loyall subjects.”

“ His Majesty was pleased to answer that they were eminent for their loyalty, and required Richard Dyott to give them all thanks in his name.

“ Then he gave his hand to the head officers to kiss, and they with their chief gentlemen of the towne, waited upon his Majesty to his quarters.”

We may also add a few extracts from the records of the now quiet and peaceful little town of Uttoxeter, to illustrate the state of the county in these unhappy times.

1642. Charges when the country went against Stafford the first time, *3s. 4d.*

John Sherratt, for leading clods five days to the bulwarks, *16s.*

Bestowed on the countrymen when they came to guard the town, when the soldiers went to Lichfield, *2s. 3d.*

For watching Lord Stanhope and his son at the crown, *11s.*

To a prisoner who came from Hopton battle, *4d.* N.B. Fought near Stafford.

Bestowed on Loxley men when they came to trench, *4d.*

1643. Paid to the ringers when King Charles 1st was here, *5s.*

June. Paid to a townsman when he went to guard a field-piece to Tutbury, 8*d*.

Charges to Wootton Lodge with a horse-load of bread, 1*s*.

December. For 20 strikes of oats, which were sent for by warrant to Tutbury, 2*l*. 4*s*. 10*d*.

1644. April. For a rope to hang the man who killed John Scott, and for a cord to pinion the prisoner, 1*s*.

1645. For guides to go a scouting, three nights, 9*s*.

October. For a sheet, making the grave, ringing, beer, and for burying the soldier that was slain in the street, 4*s*.

1646. Oct. 6th. Paid to two men for blocking up the town ends with carts, 6*d*.

Feb. 22nd. For carrying two soldiers to Caverswall, who were maimed in the high wood beyond Uttoxeter, 2*s*. 6*d*.

Feb. 14th. For two horses and a man to carry bread and cheese to Tutbury in the night, being in great want, 3*s*. 4*d*.

1646. October 13th. For quartering Colonel Cromwell's soldiers, 20*l*.

December. Quartering Colonel Oakley's men, 13*l*. 2*s*. 6*d*.

1647. May 12th. To fifteen men for pulling down Tutbury Castle, 2*l*. 10*s*. 4*d*.

October. To forty-six travellers, or Egyptians, with a pass from Parliament, to travel by the space of six months together to get relief, 4*s*.

1648. May. For two men watching in the steeple when the town was fearful of an insurrection, 1*s*. 4*d*.

1651. August 20th. To ale, bread and pottage, to relieve the Scotch prisoners, taken by Lieutenant-Colonel Downes, whilst in custody, 2*l*. 8*s*.

To another body of Scotch prisoners, 1*l*. 10*s*.

1658. For proclaiming the Lord Protector, 1*s*.

1660. May. Paid the ringers when King Charles the Second was proclaimed, 5s.

For painting the king's arms, 19s. 2d.*

Many of the gentry of Staffordshire, having, as recorded above, shewn their attachment to the cause of royalty in the reign of Charles I., when his son Charles II. became a fugitive after the battle of Worcester, certain gentlemen of the county were principal agents in procuring his escape from the hands of his enemies. In his flight from Worcester he alighted at break of day at White Ladies, and was then conducted by Colonel Giffard in disguise towards Boscobel, a solitary house near White Ladies, on the Shropshire borders, inhabited by one Penderel, a farmer, a tenant of the Giffards'. This humble but noble-minded peasant, with several brothers, faithfully concealed and protected him; though the penalty for so doing was death; and a reward of a thousand pounds was offered for his apprehension. Here Charles put off his buff coat, blue ribbon, and other princely ornaments; his long hair was cut off, his skin stained with walnut leaves, and he was clothed in a noggen coarse shirt, and in Richard Penderel's green suit and leathern doublet, with an old grey greasy hat; he was furnished with old shoes, and the embroidery of his hose cut off. From White Ladies, previous to his being conveyed to Boscobel, Richard Penderel conducted "the king out at a back dore, unknown to most of the company, (except some of the lords and Colonel Roscarrock, who, with sad hearts, but hearty prayers, took leave of him,) and carried him into an adjacent wood belonging to Boscobel, called Spring Coppice, about half a mile from White Ladies. William, Humphrey, and George, scout-

* From Pitt's Staffordshire.

ing abroad, and bringing what news they could learn to his Majesty in the wood, as occasion required.

“By that time Richard Penderel had conveyed him into the obscurest part of it, it was about sun-rising on Thursday morning, and the heavens wept bitterly at these calamities, insomuch as the thickest tree in the wood was not able to keep his Majesty dry, nor was there anything to sit on. Wherefore Richard went to Francis Yates’ house, (a trusty neighbour who married his wife’s sister,) where he borrowed a blanket, which he folded and laid on the ground under a tree for his Majesty to sit on.

“At the same time Richard spoke to the goodwife Yates, to provide some victuals, and bring it into the wood at a place he appointed her; she presently made ready a mess of milk and some butter and eggs, and brought them to his Majesty in the wood; who, being a little surprised to see the woman, (no good concealer of a secret,) said cheerfully to her, ‘Good woman, can you be faithful to a distressed cavalier?’ She answered, ‘Yes, sir; I will die rather than discover you.’ With which answer his Majesty was well satisfied.

“Attended by Penderel, Charles made an attempt to escape into Wales, but found the Severn guarded, and he had to return to Boscobel on foot. Here Richard again left him in the wood whilst he reconnoitred the house. Here he found another fugitive royalist, Colonel Carlis. Richard having acquainted “the colonel that the king was in the wood, the colonel, with William and Richard, goe presently thither to give their attendance, where they found his Majesty sitting on the root of a tree, who was glad to see the colonel, and came with him into the house, and did there eat bread and cheese heartily, and (as an extraordinary) William Penderel’s wife made his Majesty a

posset of thin milk and smal beer, and got ready some warm water to wash his feet, not onely extreme dirty, but much galled with travail. The colonel pulled off his Majesty's shoos, which were full of gravel, and stockens, which were very wet, and there being no other shoos in the house that would fit his Majesty, the good wife put some hot embers in those to dry them, whilst his Majestie's feet were washing and his stockens shifted.

“ Being thus a little refreshed, the colonel persuaded his Majesty to go back into the wood, (supposing it safer than the house,) when the colonel made choice of a thick-leaved oak, into which William and Richard helped them both up, and brought them such provision as they could get, with a cushion for his Majesty to sit on. The colonel humbly desired his Majesty (who had taken little or no rest the two preceding nights) to seat himself as easily as he could in the tree, and rest his head on the colonel's lap, who was watchful that his Majesty might not fall. In this oak they continued most part of the day, and in that posture his Majesty slumbered away some part of the time, and bore all these hardships and afflictions with incomparable patience.

“ In the evening they returned to the house, where William Penderel acquainted his Majesty with the secret place wherein the Earl of Derby had been secured, which his Majesty liked so well that he resolved whilst he staid there, to trust only to that, and go no more into the Royal Oak, as from hence it must be called, where he could not so much as sit at ease.

“ His Majesty now finding himself in a hopeful security, permitted W. Penderel to shave him, and cut the hair of his head as short at top as the scissors would do it, but leaving some about the ears, according to the country

mode ; Colonel Carlis attending, told his Majesty, ‘ Will was but a mean barber ; ’ to which his Majesty answered ‘ He had never been shaved by any barber before. ’ The king bade Will burn the hair he cut off, but Will was only disobedient in that, for he kept a good part of it, where-with he hath since pleased some persons of honour, and is kept as a civil relique.

“ Humphrey Penderel was this Saturday designed to go to Shefnal, to pay some taxes to one Captain Broadway ; at whose house he met with a colonel of the rebels, who was newly come from Worcester in pursuit of the king, and who, being informed his Majesty had been at White-Ladies, and that Humphrey was a near neighbour to the place, examined him strictly, and laid before him, as well the penalty for concealing the king, which was death without mercy, as the reward for discovering him, which should be one thousand pounds certain pay ; but neither fear of punishment, nor hope of reward, was able to tempt Humphrey into any disloyalty. He pleaded ignorance, and was dismissed ; and on Saturday night related to his Majesty and the loyal Colonel at Boscobel, what had passed betwixt him and the rebel colonel at Shefnal.

“ This night, the good wife, (whom his Majesty was pleased to call my dame Joan,) provided some chickens for his Majestie’s supper, (a dainty he had not lately been acquainted with,) and a little pallet was put into the secret place for his Majesty to rest in, some of the brothers being continually upon duty, watching the avenues of the house and the roadway, to prevent the danger of a surprise.

“ After supper, colonel Carlis asked his Majesty what meat he would please to have provided for the morrow, being Sunday. His Majesty desired some mutton, if it

might be had ; but it was thought dangerous for William to go to any market to buy it, since his neighbours all knew he did not use to buy such for his own dyet, and so it might beget a suspicion of his having strangers at his house. But the colonel found another expedient to satisfie his Majestie's desires. Early on Sunday morning, he repairs to Mr. William Staunton's sheep-coat, who rented some of Boscobel grounds ; here he chose one of the best sheep, sticks him with his dagger, then sends Will. for the mutton, who brings him home on his back.

“ On Sunday morning, (September the 7th,) his Majesty got up early, (his dormitory being none of the best, nor his bed the easiest,) and here the secret place where he lay had the convenience of a gallery to walk in, where he was observed to spend some time at his devotions, and where he had the advantage of a window, which surveyed the road from Tong to Brewood. Soon after, his Majesty coming down into the parlor, his nose fell a bleeding, which put his poor faithful servants into a great fright, but his Majesty was pleased soon to remove it, by telling them it often did so.

“ As soon as the mutton was cold, William cut it up, and brought a leg of it into the parlor. His Majesty called for a knife and a trencher, and cut some of it into collops, and pricked them with the knife's point, then called for a frying-pan and butter, and fryed the collops himself, of which he ate heartily ; colonel Carlis the while being under cook, (and that honour enough too,) made the fire and turned the collops in the pan.”

With the aid of the brother Penderels, of Mr. Huddleston, of Mr. Whitgreave of Moseley, and of Mr. Lane of Bentley, gentlemen of ancient families, and eminent royalists, who, however, did not at first know the quality

of their guest, his Majesty was removed to Moseley* on Humphrey Penderel's mill-horse, he being miller of White-Ladies, and his Majesty too footsore to walk. Here was Lord Wilmot concealed, who had accompanied his Majesty, with other cavaliers, in his flight from Worcester, and who made known his Majesty: addressing Mr. Whitgreave and Mr. Huddleston, he said, "Though I have concealed my friend's name all this while, now I must tell you this is my master, your master, and the master of us all," not knowing that they understood it was the king. "Whereupon his Majesty was pleased to give his hand to Mr. Whitgreave and Mr. Huddleston to kiss, and told them he had received such an account from my lord Wilmot of their fidelity, that he should never forget it; and presently asked Mr. Whitgreave, 'Where is your secret place?' which being showed his Majesty, he was well pleased with, and returning into my lord's chamber, sate down on the bed-side, where his nose fell a bleeding, and then pulled out of his pocket a handkercher, suitable to the rest of his apparel, both coarse and dirty." Charles was afterwards safely removed to Bentley. Mr. Lane had obtained a pass for his sister Jane and a servant to visit her relative Mrs. Norton, beyond Bristol. The king rode before the loyal and heroic young lady dressed as a countryman.† After many more adventures and disguises, a vessel was at last obtained at Brighthelmstone, and the king was finally landed at Fecamp.

Charles was not unmindful, in this case, of his former friends after his restoration.

At Holbeach, half a mile from Himley, was formerly

* The old, half-timbered Hall of Moseley is still standing.

† She afterwards married Sir Clement Fisher, and died about forty years after her ride with the gallant prince.

an old house, once the property of the Lyttletons, in which several of those concerned in the Gunpowder Plot were taken. The two Wrights, Catesby, and Percy were killed on the spot. Robert Winter, with Stephen Lyttleton, escaped, for a time, but were taken afterwards at Hagley, the whole of the conspirators having had previously a narrow escape themselves at Holbeach, from the explosion of their own gunpowder. These last two went through a multitude of adventures before they were delivered up by the cook of Hagley, and several of their friends were afterwards executed for harbouring them.

CHAPTER IV.

TOPOGRAPHICAL ANTIQUITIES, CHURCHES, TOMBS, ETC.

The stately homes of England!
 How beautiful they stand
 Amidst their tall ancestral trees,
 O'er all the pleasant land!
 The deer across their green sward bound,
 Through shade and sunny gleam,
 And swan glides past them with the sound
 Of some rejoicing stream.

HUNDRED OF TOTMANSLOW.

UTTOXETER.

THIS town may probably lay claim to an ancient origin, and, from the construction of its name, it has even been inferred that it existed in the time of the Roman dominion in this island. It is a quiet and small, but prosperous town, in the midst of a rich grazing district; its site, too, is remarkably pleasant and salubrious, a little elevated from the fertile valley of the Dove. Sir Simon Degge, the antiquary, resided here in the seventeenth century; the vault of his family disappeared when the present church was built; he himself was buried at Kingston, having reached the age of 92. He considered longevity, of which he was so remarkable an example, as prevalent in the place. Allen, a mathematician and astrologer, was also born here, 1542, and founded a free school in his native place. The families of Kynnersley, Gardner, and Minors

have their tombs here; the two latter families have been remarkable for producing celebrated naval characters. Thomas Oldfield, Esq., major of marines, who fell at Acre, is also one, amongst other military and naval characters, who have memorials in the church, or who have been born at Uttoxeter.

In the porch of the present church are two beautiful altar-tombs of alabaster of the sixteenth century. One has only an engraved figure on the top, and is the tomb of Thomas Kynnersley de Loxley. The other has a pleasing sculptured female effigy lying upon it, in the habit of a *religieuse*, and from the escutcheon would seem to represent a lady of the same ancient house, who, at a very early date, appears, from her arms, to have come into the possession of Loxley by marriage with the noble family of Ferrers. These two tombs are so placed that the inscriptions can only be partially read; with bad taste they have been ousted from the church into the door-way, and are placed under the stair-case, one looking east, the other west, and the one to Mr. Kynnersley has been broken to get them into their present situation.* There is a mutilated skeleton effigy lying under the west window within. The ancient font has disappeared.

LEIGH.

This village is remarkable for its fine spacious church, built in the form of a cross. It appears to be of the fifteenth century: the tower rises from fine arches at the junction of the transepts with the nave and chancel: it may be seen from the groinings and windows that the building has been re-roofed, and that its original height

* M. Thomas.

has not been maintained. In the south transept is one ancient altar-tomb, of the fifteenth century; it is that of Sir John Aston, and the recumbent figures upon it are those of himself and the Lady Johanna his wife, daughter of Sir William Littleton, and granddaughter of the judge, and by her the manor of Tixall came to the Astons, Rose de Wasteneys having sold it to the Littletons. The stained glass of the windows has suffered much, little of it remaining. There is some carved wood.

DRAYCOTT-IN-THE-MOORS.

Painsley Hall, of which the moated site remained until a short time back, was the residence of the Draycotts, a family seated here from the conquest to the beginning of the eighteenth century; to whose estates the Lords Stourton succeeded by female descent. The cemetery of the family at Draycott church is interesting; it is a side chapel attached to the chancel. The most ancient monument is that of a crusader, without name or date, his legs crossed, in chain armour, with the hand grasping the hilt of his sword; it is mutilated to some extent, but elegant in its proportions, and situated in a niche under a round arch. Another is a stone, with the engraven figure of a Draycott, who was parson of the parish before the Reformation, having died 1500. A brass on the floor of the nave has the date 1512. Besides the above tombs there are—in the cemetery, an altar-tomb of the same family, without recumbent figures, but with emblazoned escutcheons, and of the date 1540; another altar-tomb, with a cross at the top, and coats-of-arms at the sides; another with a male and female effigy painted; another with only one effigy of the date 1662, later than the last two; and

in the chancel another alabaster altar-tomb, with two beautiful recumbent figures, finely carved, and arms at each end; in front a row of twelve children—eleven girls and one boy. Several of these tombs are of beautiful workmanship, and the hands, faces, hair, and plate armour of the figures, are delicately sculptured. There are the usual niches common in old churches in the south wall of the chancel. Near the communion table are likewise the tombs of several parsons of the place, the letters of some of the inscriptions being filled with pitch. A stone pyramid in the churchyard is thrown down, and overgrown with grass.

CHECKLEY.

This village also contains an ancient and fine church, probably of the fourteenth century; the east window is of the decorated Gothic architecture, but the tower has some rounded arches, now built up, which may be of Norman times. In the churchyard are the three stone pyramids figured by Plot; they are situated on the south side of the church; two are carved, the other plain. There is a figure from a tomb, lying under the wall of the church on the same side, which, though much mutilated, no doubt represents a warrior redoubtable in his day, in armour, unsheathing his sword, and, from the crossed legs, a crusader.* The church has a parapet which adds to its appearance, though it anciently had a high pitched roof. Within we find worthy of notice a ceiling of wood work in the nave, the windows, still ornamented with much of their ancient stained glass, and in the chancel an alabaster altar-tomb of the date 1524, being that of Godfrey Foljambe, sus-

* Is this the "fair monument of a Beke" mentioned by Erdeswicke?

taining his own and his lady's carved effigies. This family possessed Croxden Abbey after the dissolution. The font is ancient.

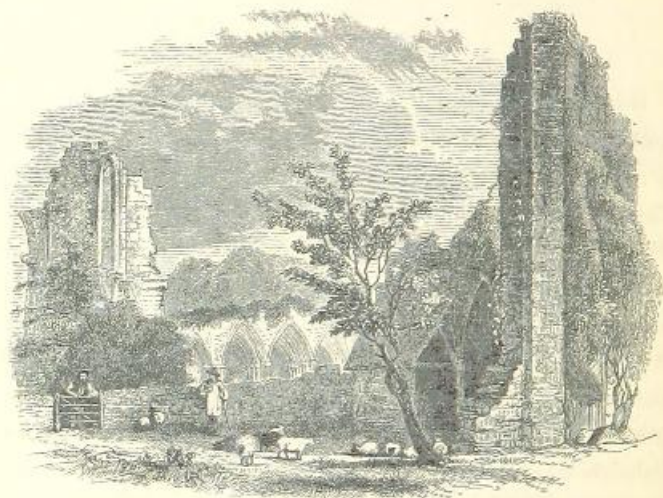
ROCESTER, ETC.

Rocester, Ellaston, and Mayfield, are all extremely pleasant villages. The first is a place of antiquity, and had a monastery founded by Richard Bacon, 1140, for Black Canons. Its antiquities have now almost disappeared. Moore, the modern lyric poet, resided some time at a little cottage in Upper Mayfield. His admirers may see a sketch of it in "Ashbourn and the Valley of the Dove, Ashbourn, 1839." Mayfield church is, for the most part, comparatively modern Gothic architecture; there are rounded arches between the aisles and the nave. At Calwich was a priory founded by Nich. de Gresley, 1148, some traces of which may be seen at the beautiful mansion of Calwich Abbey.

CROXDEN ABBEY.

This venerable ruin is situated in one of those fertile and pleasant spots so generally chosen by their founders for the erection of religious houses. A limpid stream runs by it, rendering singularly fertile the meadows through which it flows. This abbey was founded by Bertram de Verdun, 1176, whose wife Roise de Verdun, was the founder of Grace Dieu Abbey, and her tomb is, or was, in Belton church, co. Leicester. Croxden Abbey was dedicated to the Virgin. The founder himself died in the Holy Land, but Croxden was the burial place of his descendants, the patrons of the abbey. Its monks were

Cistercians. Thomas, the first abbot, bore the crozier for fifty-one years, and appears to have been a learned and pious individual; he wrote a commentary on the bible,



CROXDEN ABBEY.

and was interred in the chapter-house. The heart of the unfortunate king John was deposited here, having been embalmed by his physician, the abbot of Croxden. Thomas Chawner was abbot at the dissolution. The ruins are still extensive, yet evidently occupying but a small portion of the space which the venerable edifice formerly covered. As we might expect from the date of the erection, they present us with traces of the Norman architecture, as well as the early Gothic: the long lancet-shaped windows must have been particularly fine. Portions of the west entrance, of the transept, tower, and cloisters remain, with part of the chapter-house, likewise another large room, unroofed, but having the walls entire. Several stone coffins are visible amongst the ruins, also a crucifix with the

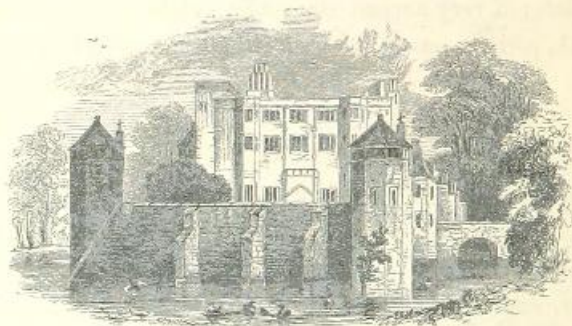
image of the Saviour, and a carving of the Virgin and child on the reverse, probably, therefore, from a screen or rood-loft; a very ancient effigy of a knight in armour, from a tomb, perhaps one of the De Verduns, may also be noticed.

ALTON, OR ALVETON.

Here are the remains of an ancient feudal fortress, built upon a lofty sandstone rock, overhanging the Churnet. It was also built by Bertram de Verdun, and, with the manor, came into possession of the Talbots by marriage with the heiress.

Alton Towers, or Abbey, is on the hill on the opposite side of the deep valley of the Churnet, and was erected by the late Earl of Shrewsbury. In some respects the mansion may be much surpassed; but it must be conceded, that, both externally and internally, great magnificence is displayed. Within is an armoury, one hundred feet in length, adorned with offensive and defensive armour, hunting weapons, &c; an extensive picture-gallery, containing several hundreds of the works of the continental schools; saloons, conservatory, &c. The chapel has more than the usual decoration of the Romish church. The gardens and grounds are extremely curious and beautiful, probably unequalled in their style: they are formed in the bottom and on the slopes of a deep rocky valley, richly planted, particularly with a variety of the fir tribe, which here grow with great luxuriance, and all that could be made of the spot by exuberant fancy and outlay has been done: terraces, temples, grottos, conservatories, pagodas, lakes, fountains, Swiss scenery, and statuary, add to the effect; and, though good taste may disapprove of a few of the details, the *tout-ensemble* is extremely pleasing.

CAVERSWALL.



CAVERSWALL CASTLE.

Caverswall Castle is built on a terrace raised high above the moat which surrounds it, and is enclosed with a buttressed wall, having an octagon tower at each corner of the enclosure, and two at the gateway. The present edifice was designed, it is said, by Inigo Jones; but there is little remarkable in its architecture. The former "Castel or prati-pile of Caverswall," was built by William de Caverswall, in the reign of Edward II. The Latin inscription, on the tomb of the founder, may be seen in Erdeswick, who describes (1600) the first castle as then existing in a ruinous state.

This tomb still exists in the middle aisle of the church, with the inscription around it, and an ornamental cross and two escutcheons in the middle, from which the brass formerly present has been taken. It is similar to the stone once found at the Grey Friars at Lichfield; and presents us with a specimen of a sepulchral memorial of the beginning or middle of the fourteenth century. Caverswall church has the arches between the nave and aisles semi-circular, as is the east window, but most

of the edifice is, comparatively speaking, quite modern. In the chancel exists an exquisite monument in pure white marble, by Chantrey, to the memory of Lady St. Vincent; the deceased is represented kneeling, with her arms crossed upon her breast, and her coronet laid aside. She was of the family of Parker. The monument to Sir T. Parker, Lord Chief Baron of the Exchequer, is also a fine mural one, with an elegant figure and urn. The Cradocks have likewise their memorials; and we noticed an engraven alabaster slab, with a male and female figure, but broken and half destroyed, under the font.

Caverswall Castle is now a nunnery, and a little plot of land, adjoining the churchyard, is the burial-place of the sisterhood. The gravestones bear only the initials of the departed, with the date of their death, and a cross. Two tombstones of abbesses are, in addition, headed with the pastoral staff. There is a large painted cross in the centre of this retired little enclosure.

WOOTTON LODGE.

Wootton Lodge is a venerable old house, built on a raised mound, in a beautiful situation, at the foot of the Wever Hills. The woods here are very fine and extensive. This mansion was also designed, it is said, by the English Palladio; its site is, perhaps, more striking than the building itself, which is rather Elizabethan than Italian, with square or bowed transomed windows. The scenery is delightful. We have mentioned Wootton Hall before.

OKEOVER HALL.

This is the beautiful residence of the very ancient family of the same name: its situation is retired and pleasing, at the edge of a fine park, and at some little distance from the Dove. Several pictures in the hall, which have been long in the possession of the family, are of deserved celebrity; they are a Holy Family by Raffaele, of fine colouring, and others by Carlo Dolce, Rubens, Titian, Vanderveldt, &c. The first, however, is the only one particularly striking to the general observer. The pretty church near the house, overgrown with ivy, increases the beauty of this spot: it contains several old tombs to the memory of ancient members of the family.

BLORE.

Here the ancient family of the Bassetts had a mansion, but it is now gone, and their only memorials are the tombs in the church. This family came in with the Conquest; originally, however, of Drayton Bassett, and descended from the Norman Turstine. The church is of a similar style to that of the village of Mayfield, before mentioned, and is now under repair; the superintendents appearing desirous to restore the beautiful ancient woodwork as much as may be. In a chapel, north of the chancel, is a large tomb, with canopy, to the memory of William Bassett; the effigies are of alabaster, the pillars, &c., of marble of different kinds. "Extended on a mattress are two effigies, one representing a gentleman in complete armour, another, at his side, a lady in the costume of the times; and a third figure, of an old man in armour, is elevated on a slab about a foot higher than

North Supplement





Rochester



Drayton



Dieulouart



Stone Abbey



Armitage



Armitage



Madeley

these. At the heads of the two lower figures, are two females, in a kneeling attitude, both habited in a beautiful flowing costume, with girdles, pointed handkerchiefs, and easy veils over their faces. One of these ladies appears to be in the bloom of youth and beauty, but the other is considerably older. There is a chastened freedom of execution in these figures, by no means usual in the age of Elizabeth, when we may presume the monument was erected. On the pillars and sides of the canopy are disposed numerous shields of arms and heraldic devices, fully blazoned.* The prevalent taste in this monument is like others of the same period, rather Grecian than Gothic.

STANTON, ETC.

The remote hamlet of Stanton was the birth-place of Sheldon, made Archbishop of Canterbury in 1663. Plot says, in the room in which he first drew his breath, Hacket, the excellent Bishop of Lichfield, left the following verses :—

Sheldonus ille Præsulum primus Pater,
Hos inter ortus aspicit lucem Lares,
O ter beatam Stantonis villæ casam !
Cui cuncta possunt invidere Marmora.

Sheldon was the child of a poor man, and received his education by the kindness of the Earl of Shrewsbury. He was a high churchman of great acquirements, a firm adherent to the cause of royalty, and a patron of learning.

The villages and churches of Kingsley, Alstonefield, Wetton, &c., do not appear to claim any particular notice.

* Ashbourn, and the Valley of the Dove.

ILAM.

This place was formerly in the possession of the family of Port. A fine mansion, in the Tudor style, has now been built here, and is the residence of the Russells, situated amidst beautiful scenery of almost an Alpine character. The building has a flag tower, oriel windows, arched entrance, &c. Paintings by the best of the modern school, ancient armour, marbles, models, &c., adorn the interior. The gardens are delightful; and here Congreve* is said to have written his "Mourning Bride;" this retired spot has also been said to have suggested to Johnson the idea of his "Happy Valley." In a chapel attached to the ancient church is a monument, from the chisel of Chantrey, to the memory of the late Mr. Watts. It represents him on the bed of death, giving his parting blessing to his daughter and her children, who have been summoned in haste to take their last farewell; the Bible is open before him, and the effect of the whole is extremely touching. Other and ancient tombs exist in the church, to the memory of the Meverells of Throwley, a fine old house on the hills above Ilam; and which, more recently, the Lords Cromwell inherited by marriage. A very beautiful cross has been recently erected by Mr. Russell, in the centre of the village, of the richest Decorated Gothic architecture, probably after the model of the Eleanor crosses.

LONGNOR.

This is a small town in a remote, hilly, and rather barren district. That the air of these mountainous tracts

* He was of the family of Congreve of Congreve, not, however, born, as has been stated, in Staffordshire.

is salubrious, and favourable to long life, is shewn by the numerous instances of longevity which occur here, and at Flash, a village in a still higher situation,—its site being probably as elevated as that of any other in England. We subjoin the epitaph of one individual, remarkable for his longevity and career, which occurs in the churchyard of Longnor.

“In memory of William Billinge, who was born in a cornfield at Fairfield-head, in this parish, 1679. At the age of twenty-three years he enlisted into his Majesty’s service, under Sir George Rooke, and was at the taking of the fortress of Gibraltar in 1704. He afterwards served under the late Duke of Marlbro’ at the ever-memorable battle of Ramillies, fought on the 23rd of May, 1706, where he was wounded by a musket shot in the thigh; afterwards returned to his native country, and, with manly courage, defended his Sovereign’s rights at the rebellion in 1715 and 1745. He died within the space of one hundred and fifty yards of the place where he was born; and was interred here the 30th of January, 1791, aged one hundred and twelve years.

“Billeted by Death, I quarter’d here remain;
When the trumpet sounds, I’ll rise and march again.”

CHEDDLETON, ETC.

Cheddleton, Horton, and Endon, are pleasant villages, formerly in the moorlands, but now surrounded with well cultivated land. The former is pleasantly situated on a hill above the Churnet. The family of Fenis, de Fiennes, or Fynney, had an estate here for many centuries, but has now disappeared from the parish.

The chancel of the church is ancient, and retains its high roof, higher than that of the nave; the windows, of which the east one is fine, are of the Decorated Gothic style; the south door is particularly elegant, with an ogee dripstone. There are a *piscina* and *sedilia* ornamented in the same style, but in one of the latter the font has been placed. The nave within is open to the rafters; there are only a few fragments of stained glass remaining in the windows. There is the shaft of a cross in the churchyard.

LEEK, ETC.

Leek is a retired town, with a large church. From the churchyard is a most beautiful and imposing view of rocky and hilly scenery. The tower of the church is of a fine appearance, with projecting grotesque heads, ornamental band, and double windows; the church generally has been much altered; it has a clerestory, and two large circular windows in the aisles.

Dieu-le-cresse, or Dieulacres, now called the Abbey, was a Cistercian monastery, situated in a fertile valley, near Leek, on the banks of the Churnet. It was founded 1214, by Ranulph Blundevill, Earl of Chester. There are still some remains, consisting of two clustered pillars, one partly overthrown; the capitals of pillars, corbels, bosses of gothic groining, circles including trefoils, the lids of coffins, &c., built into the walls of the outbuildings of the old farmhouse; together with an old gateway, in part composed of the remains of the abbey. No doubt the edifice was of beautiful architecture; this may be inferred from its remains, and from the period of its foundation. After the Dissolution, the Baganalls and Rudyards possessed it.

HUNDRED OF PIREHILL.

STAFFORD.

Stafford is built in a fertile but rather marshy plain on the river Sow, notwithstanding which, its situation appears to be favourable to longevity. It is one hundred and twenty-five miles north-west of the General Post Office, in a direct line, or one hundred and forty-three miles by the Grand Junction, and London and Birmingham Railways. The town is of antiquity; and, according to Camden, was originally called Bethany. It was formerly fortified, and had four gates; the walls were circular, and may be easily traced, some parts still remaining, together with portions of the east-gate, in which the groove for the portcullis still exists. The ditch also still remains. The demolition of these fortifications was completed during the civil wars. Stafford was certainly in existence during the Heptarchy; its first castle was built by Ethelfleda, in 918, and this probably stood on the spot called Castle Hill, or on that near it, called Bully Hill, on the north bank of the river. The present castle is on quite a different site, a mile from the town; on which spot one was built, or rebuilt, by the first Earl of Stafford, and this was demolished in the civil wars; whilst the present proprietor built the edifice now standing on the foundations of the former, but has not completed it. Stafford with its castle was frequently lost to the ancient house to which it belonged, and which took its name from it, by reverses, attainders, &c. Latterly the Jerningham family have established their right to the ancient barony, and are the representatives of this noble house; the reversal of the attainder of Sir William Howard, the first Viscount Stafford, being obtained in 1824.

The town first sent members to parliament in 1295. It has a fine county hall, a county infirmary, handsomely supported, a lunatic asylum, a gaol,* a grammar-school, alms-houses, and other public buildings and institutions; but which, as observed before, it is not in our plan to describe. Near the market-square is a very fine specimen of the old gabled and timbered houses, with overhanging windows and stories, now becoming rather rare; there are other similar buildings in the town, and, in fact, it may be seen that most of the houses are built on the foundations of older ones.

St. Mary's church is a venerable and beautiful cruciform edifice, but in a very dilapidated state. It is now, however, undergoing restoration; towards defraying the expenses of which one private gentleman, with a noble munificence, has contributed the sum of five thousand pounds. The only traces of Norman architecture in this edifice are a round arch or two at the west end, with some corresponding mouldings, the former being built up; the piers also of the nave are massy and of an early style. There are lancet shaped windows, also built up, in the south transept, at the west end of the nave, and at the east end of the chancel, where the south window consists of three lancet lights under one drip-stone, separated by finely moulded mullions. The middle window of this eastern side of the chancel is of a Perpendicular character. At this end, to the south, is an elegant pyramidal turret; but the whole is dilapidated, and concealed by buildings. The door-way and windows of the north transept are fine, and for the most part of the Decorated Gothic style, rich in their mouldings and tracery: of a similar architecture are the three doors of the nave, and its west

* Weeping Cross, on the edge of Cannock Chase, was the ancient place of execution.

window. The north porch has been removed from the nave, and the south has been rebuilt in an incongruous Grecian style. The tower, even without the spire that once graced it, and which was blown down in a hurricane in 1593,* is of noble proportions, and of considerable height; its base being wide and resting on fine piers, but its pinnacles are gone; the lantern, with its pierced parapet, is modern. The floor of the chancel is raised much above that of the nave and transept, the arches separating it from its aisles being fine, but the bases of the pillars very irregular in their height. Much of the remainder of the building is in the later Perpendicular style, the windows having frequently obtuse, or square, or even rounded heads, which is the case with the window of the south transept, nevertheless of large and imposing proportions; here the door is ornamental, with a square top. The whole church has a parapet and is panelled, particularly to the north: the pinnacles and other ornaments are in great measure gone. The ceiling of the nave is of beautiful wood-work: here is also a curious carved pew of wood-work erected in 1708.

The stained glass of the windows has almost disappeared. The church contains tombs of the families of Aston, Clifford, &c., but which, unfortunately, at the time of our visits, have not been visible, owing to the repairs going on; also many mural monuments likewise removed: we noticed one remaining in the south transept to the memory of the wife of Dr. Fowler,† formerly resident in Stafford, a physician, and the inventor of a powerful medical formula, which sometimes bears his name.

* This hurricane also threw down the spires of St. Michael and St. Mary's at Lichfield, besides many thousand oaks in Bewdley Forest and in Horton and Cank woods.

† Dr. James, the introducer of the celebrated fever-powder, was also a native of the county, 1703.

In the following account, which we have borrowed from a writer unknown to us, some further particulars are given of this venerable building :

“ The Church of St. Mary, Stafford, is a fine specimen of that class of ecclesiastical edifices which were used for the joint purposes of parochial and collegiate churches. It is built in the form of a cross ; and consists of a nave, which was probably used exclusively for parochial purposes, transepts and central tower, and a choir or chancel nearly equal in size with the nave, and which was, in all probability, appropriated to the collegiate establishment. There are entrances at the western end, in the sides of the nave, and in each transept ; but two of those in the nave have been blocked up. Those in the sides were originally screened by porches, one of which has been destroyed, and the other rebuilt in the worst style of modern Roman architecture.

“ It appears from some indications in the western end, that the original church must have been in the Anglo-Norman style. It must, however, have been rebuilt at an early date, as nearly the whole of the present building is in what is termed the early English style, or in the earliest variety of Pointed architecture.

“ The oldest portions are the noble piers and arches, which support the central tower, and those of the nave, with the side doorways of the same. They indicate, by their style, that the nave must have been rebuilt during the latter part of the 12th century, at the period when the use of the pointed arch was first fully established in England. The square abacus, and the peculiar character of the capitals and mouldings, identify this part of the church with the works of William of Sens, and William the Englishman, who rebuilt the eastern portions of Can-

terbury Cathedral between the years 1174 and 1220 ; and also with the earlier parts of the Temple church, which was finished in 1185, though it is free from those indications of a lingering taste for Norman detail which is to be observed in those buildings. To this period may be referred the singular font which has attracted so much the attention of antiquaries.

“The south transept appears to have been the next work, and was probably proceeded with soon after the completion of the nave : its style, so far as the barbarous mutilations it has suffered permit us to judge, is of the period when the early English or Lancet style had been brought to perfection, and may be placed between 1220 and 1240. The chancel might have been commenced at about the same time, as its lower mouldings appear to range with those of the south transept ; but the superstructure must have been of a somewhat later date, as it shews a leaning towards the succeeding style, some of the windows having plain geometrical tracery instead of the simple lancet, which would connect it with the style of the choir of Westminster Abbey, which was erected between 1245 and 1269 ; with St. Mary’s Abbey, at York, which was built in 1270 ; the Presbytery, at Lincoln ; the Chapter-house, at Salisbury ; the Monument of Bishop Bridport (A.D. 1262) ; and other splendid works of the latter half of the 13th century. The details of the internal pillars and arches also display a decided tendency towards a later style. The chancel was originally covered with a high-pitched roof of three spans, like those of the Temple church, the lady chapel of St. Mary Overie, and many other beautiful specimens. The north wall of the chancel, from the window sills upwards, appears to be of later date, and the west doorway and window of the nave appear

to have been inserted soon after the erection of the chancel ; after which the works were probably discontinued for a few years, as was frequently the case with the great works of the middle ages.

“The next work in succession is the north transept, which, when perfect, must have been a splendid specimen of the architecture of the 14th century, commonly called the ‘Decorative style.’ The peculiar form and character of the crocketing and foliage, the style of the mouldings, and the absence of flowing lines as the *leading* forms of the tracery, shew it to belong to the earlier division of the style, of which the Eleanor crosses, erected about 1295, are among the most perfect types ; while its occasional departure from geometrical severity, and the free play of its tracery, shew a slight tendency towards the later and more sumptuous variety ; and on the whole, it may with tolerable certainty be attributed to the earlier part of the reign of Edward the Second. This transept had, like the other parts of the church, a highly-pitched gable.

“Shortly after the completion of the last-mentioned work, the tower seems to have been either finished, or rebuilt, with its octagonal lantern and spire ; thus completing a work which comprised a progressive series of architectural variety from the days of Richard Cœur de Lion to those of Edward the Third, all so happily blended as to constitute one harmonious design. The interior, graced as it doubtless was with appropriate fittings and decorations, and enriched with painted glass and enamelled tiling, must have presented an appearance in some degree worthy of the sacred uses to which it was dedicated.

“Nearly in this state the church must have continued for a very considerable time ; but towards the close of

the 15th, or early in the 16th century, it seems to have undergone many serious alterations, particularly by the addition of clerestories to the nave and north transept; and, subsequently, by corresponding alterations, in a very debased style, to the chancel and the north transept: so that no idea can now be formed of the harmonious character of the church on its first completion. The fall of the spire, the gradual decay of the stone-work, and the neglect of the three last centuries, has since reduced this noble edifice to a deplorable condition, disgraceful at once to the town and county, and unworthy of its sacred purposes."

Another old church in this town is that of St. Chad, a miserable structure at the present time, but evidently of Saxon or Norman origin, there being two arches in that style in the north wall of the chancel, with corresponding buttresses or projections, and a large semicircular arch between the nave and chancel.

The ancient priory of St. Thomas, founded in the 12th century, by Bishop Peche and Gerard de Stafford, was situated in a pleasant and fertile spot, where the mill and farmhouse so called now stand on the banks of the river, about a mile below the town; and some remains of it are still visible in the walls, mill, and outhouses. The area of the monastery extended over several acres, inclosed by a stone wall of great strength. It is now the residence of a farmer. A flower garden occupies the site of the great hall. The lands of this priory, after the dissolution, came into possession of the ancient family of the Fowlers; to whom there is a table tomb in Baswick church. There were two other religious houses,—that of the Augustines, founded by Ralph, Lord Stafford, 1344, to the south of the town, and the church of which contained the tombs

of the family, after their removal from the priory of Stone at the dissolution; and the priory of the Franciscans, or Grey Friars, which existed at the north extremity of the town, where its site may be now seen: it was founded by Sir James Stafford of Sandon.*

CRESSWELL.

Here are the ruins of a little chapel, roofless and solitary, and near it are the foundations of a larger building. The place after the conquest belonged to the De Creswells, and afterwards to the Breretons. A large mound of earth may be noticed, not far distant, on the banks of the river, perhaps artificial.

TIXALL.

The ancient family of Aston of Heywood got Tixall by marriage with the Lyttletons, who were preceded by the Wastneys, and in the same way it passed from the Lyttletons to the Cliffords. The ancient poet Drayton, who was patronized by Sir Walter Aston, memorializes the spot in his lines—

“The Trent by Tixall graced, the Astons’ ancient seat,
Which oft the Muse hath found her safe and sweet retreat.”

The ancient house figured by Plot has given way to a more modern one. The remarkable gatehouse, built by Sir Walter Aston in the sixteenth century, still exists, partly overgrown with ivy, and somewhat dilapidated. It is a large quadrilateral structure, with turrets at the

* Besides other distinguished characters, particularly of the family of Stafford, this place gave birth to Thomas Fitzherbert, a learned jesuit, 1568. Wollaston the author of the “Religion of Nature delineated,” was born at Coton Clanford, 1650.

angles, and Elizabethan windows, separated by four sets of double pillars in three tiers, the upper ones Corinthian, the middle Ionic, and the lower Tuscan. There are *bizarre* figures over the arch. An elegant chapel stands by, with an open turret, ornamented with projecting heads; the roof with a parapet, and the sides with shields situated in niches: the chancel at the east end is half hexagonal, with a transomed window, filled with stained glass, and adorned with horizontal bands of quatrefoils within circles, a parapet, &c. The little church has no antiquities; there is a cross or obelisk in the village, apparently likewise not very ancient. It is recorded that on Tixall Heath, in the reign of Henry VII., Sir William Chetwynd was barbarously murdered, at the instigation of Sir Humphrey Stanley of Pipe, and that a court jealousy occasioned the deed.

INGESTRE.

Ingestre came into the possession of the Chetwynds by the marriage of Sir John Chetwynd with the heiress, in the reign of Henry III. His descendants were created barons of Ingestre and Talbot, Catharine Chetwynd, the heiress of the estates, being married, 1748, to the Honourable John Talbot, and in the year 1784, John Chetwynd Talbot was created Earl Talbot of Ingestre. The present earl is distinguished for his successful attentions to the improvement of agriculture. The mansion is a remarkable edifice, in part of brick, and in part of stone, in the Elizabethan style, surmounted by a tower and turret. The portrait of Walter Chetwynd, Esq., the antiquary, and the builder of Ingestre church, is engraved in Harwood's edition of Erdeswick, from a painting by Lely. The

church is a handsome Grecian structure, in which has been placed an interesting mural monument to the memory of the unfortunate Lord Ingestre, on which is represented his removal from the morass in which he was lost.

SANDON.

The little church here is remarkable for the curious monument of Erdeswick, alluded to in a preceding page, whose family formerly possessed Sandon; his ancestor, Thomas Erdeswick, having married the heiress of Sir James Stafford in the fourteenth century. After the Erdeswicks, the Digbys, Gerards of Bromley, and Dukes of Hamilton, possessed it, and it was the occasion of the fatal duel, 1712, between the Duke of Hamilton and Lord Mohun. The old timbered and moated house stood near the present one, which is the residence of the Earl of Harrowby. In the park is an elegant obelisk dedicated to Pitt, and also a pleasant grotto cut in the rock, with an inscription on its wall in memory of the unfortunate Perceval. In the church, besides the monument of Erdeswick, there is an altar-tomb in honour of George Digby, Esq., of chivalrous memory, and also four table-tombs to the Erdeswicks, with figures in black line upon them, and another to Maybow Walkeden. There is also some very ancient stained glass in the east window. The church is of as early origin as the reign of Henry I. or Stephen.*

GAYTON.

This village has a church with a very ancient chancel. "The nave has been partly rebuilt, the north and south

* Mr. Thomas.

aisles being now thrown into the churchyard, the pillars and arches being built up in the wall."* A monumental effigy, said to be, on what authority we know not, of the family of Ferrers, has been taken from a low recess in the north wall of the chancel. It is habited much like one at Aldridge, in an ecclesiastical robe, though, in the latter case, the effigy is undoubtedly that of a warrior.

STOWE.

Here there is a handsome tomb to Walter Devereux, Earl of Essex, and his two wives, who all lie in effigy upon it, the whole covered by a canopy of oak. There is another alabaster tomb, and also a handsome Saxon arch, in this church.

CHARTLEY.

The castle has been for ages in ruins, and is now nearly demolished to the foundations. It was surrounded by a deep fosse, and was built in the reign of Henry III. Chartley was given by the Conqueror to Hugh, Earl of Chester, and it came into possession of the family of Ferrers by marriage with the co-heiress of the preceding most ancient house, shortly after the erection of this castle. It then came to the families of Devereux, Shirley, and Townshend. The park contains a thousand acres, which have never been submitted to the plough, and is an ancient enclosure from the forest of Needwood. It abounds with red and fallow deer, and has also a herd of wild cattle.

* Mr. Thomas.

ABBOT'S BROMLEY, ETC.

This little town is situated upon Needwood Forest, amidst sylvan scenery, many of the adjacent woods being still extensive. Blithfield and Bagot's Park are the ancient possessions of the Bagots, whose family is one of the few which date from the conquest; their ancient mansion contains many fine family and other portraits, and the church their tombs. There is a very old effigy, under an arch on the south side of the exterior of the chancel, for Alfredus de Blythfield, dressed as an ecclesiastic.

SHUGBOROUGH.

Here is the seat of the Earl of Lichfield, whose family, the Ansons, were originally of Dunstan, Shugborough having been purchased by them in the time of Queen Elizabeth. The mansion is situated in a rich domain, on the low ground where the Trent and Sow unite; below the confluence of which is a very ancient, picturesque foot and horse bridge, of many arches, with projecting angular abutments. The celebrated naval commander was born here. The grounds were laid out in a beautiful manner by his brother, who adorned them with numerous objects of classical architecture, closely copied from the Athenian originals. The Arch of Adrian, embellished with naval decorations in honour of his brother, and the Choragic monument of Lysicrates, or Lantern of Demosthenes, are in the southern part of the park. There may be noticed, also, a Chinese house, with its ornaments and furniture quite in character; a lofty conservatory, &c. Near the mansion, in the garden, is likewise the representation of the portals of a funereal cavern, the rustic pillars supporting a frieze,

ornamented with heads of satyrs, wreaths, &c., and enclosing a beautifully sculptured tablet, with a tomb in relief, and four figures surveying the inscription, "Et in Arcadiâ Ego." The house has an Ionic portico, with side domes: in its original state it was one of the residences of the Bishops of Lichfield and Coventry. At the present time, the library,—the gallery of sculpture, embracing numerous fine antiquities, together with some of the productions of Roubiliac and Nollekens, the latter of whom, in conjunction with Scheemakers, was particularly employed on the monumental decorations of the house and grounds, and also the picture gallery, containing numerous specimens, particularly by Vandervelt, Guido, Berghem, Claude, Cuyp, Rembrandt, Backhuysen, &c., are to be submitted to the hammer. There are some ivy-mantled remains of the older mansion, which have a picturesque appearance, augmented as they are by many pillars and fragments of ancient architecture. To this beautiful domain the sloping hills of Cannock Chase,—here covered with trees in the ancient parks of Wolseley and Oakedge, there in all their native wildness of brake and heath,—are a great ornament. We noticed a cedar of Lebanon, and many other fine trees in the grounds.

COLWICH, ETC.

Colwich for ages belonged to a family of the same name. The handsome church, (though it has not escaped injudicious repair,) is the burying-place of the Ansons and Wolseleys, the former family having a mausoleum here, where the great naval commander is buried. A monument commemorates the death of Sir William Wolseley, who was drowned in his carriage by the bursting of a pool-dam,

in the year 1628, his recumbent effigy being in the dress of the reign of Charles II. : the tomb is somewhat injured. There is a mural monument by Westmacott, to Thomas, Viscount Anson, with several others.

Heywood had formerly an abbey, of which there are still the remains at the mansion bearing the name.

Of Colton church the tower and double chancel only are ancient. At Fradswell, in the chancel, is a stone for Dame Cromwell.

STONE.

This is a town of great antiquity, and was the burial-place of the two martyred sons of Wulfere, king of Mercia, Wulfald and Rufin. It had formerly a priory, re-founded by Lord Stafford, 1100, some remains of which are still visible. A Saxon arch may be seen adjoining the vicarage on the south side, and there are also some groined ceilings to be seen in the kitchen and cellars ; several rudely formed stone coffins have likewise been found, and many other fragments of the abbey may be noticed in the walls and houses of what is called the Abbey Court. This religious house was undoubtedly first founded in Saxon times, on the spot where Rufin was slain by his unnatural father. At Burston was also a chapel, built by Ermenilda on the spot where her other son, Wulfald, met his death. This was standing in the time of Erdeswick. The brave Earl St. Vincent, born at Meaford, 1734, was interred in Stone churchyard in the family mausoleum.

ASTON HALL.

This old mansion is surrounded by a fine moat; the estate originally belonged to the Heveninghams. A mausoleum exists in a secluded spot before the house, embosomed in trees; this was built by Sir James Simeon.

RANTON.

Some remains of the abbey still exist,—the walls of the church, part of the cloisters, and a high tower, presenting a fine appearance in this thinly peopled district. The abbey was built by Robert Fitz-Noel, in the reign of Henry I., but the tower must be of later date. The Harcourts succeeded the Noels in the possession of this place. In the seventeenth century, Sir Robert Harcourt lost his fortune, life, and estates in the voyage to Guiana; the latter had been possessed by his family for nearly twenty generations; his son, Sir Simon, also lost his life before Carrick Mayne in Ireland.

ECCLESHALL.

Langton, Bishop of Lichfield, rebuilt the castle here in 1290, but of his edifice only a small portion remains; a view of it is preserved in the north aisle of the church. Eccleshall castle is the episcopal residence of the see. The church is handsome, but of the late corrupt Gothic architecture, with low-arched windows, that of the chancel being filled with stained glass. It contains mural monuments of the Bosvilles of Biana, also several others more ancient. One altar-tomb is that of a bishop with his figure engraven above, and escutcheons, and effigies of his

family at the sides; it is that of Thomas Bentham, who died in 1578. Another similar one, also of a bishop, is much broken; probably this is the tomb of Bishop Sampson, to whom there is also a tablet above. There is a large mural monument of Bishop Overton, with his recumbent effigy, and the kneeling figures of his two wives, under arches, the whole painted and gilt; he died in 1609. The woods in this neighbourhood, belonging to the bishops, are extensive.

STANDON.

Here the church is of similar architecture to that of Eccleshall, but is probably more ancient; it appears to have formerly had a transept. In the chancel are two tombs of alabaster, of which one is to the memory of Francis Roos, or Rose, and his wife.

HIGH OFFLEY.

This manor formerly belonged to the Skrymsher family. It has been conjectured, from Roman remains found here, that it was the site of the ancient Mediolanum, which, however, was more probably situated at Chesterton. Broughton has been considered to be the site of Rutunium. The old hall of Broughton is figured by Plot.

SWINNERTON.

This ancient village is situated on high ground, and is the seat of the Fitz-herberts of Staffordshire, who obtained it by marriage with the Swinnertons, the owners of it soon after the conquest. The church appears, from its

architecture, to be of the fourteenth century; the tower is low and ornamented in its style, with a round-arched window to the west, the other windows being rudely pointed. The chapel attached to the south of the chancel is of later architecture, and contains a colossal figure, found under the soil hereabouts, and of which one arm is broken off; and in the south wall of this chapel are four of the niches so frequently seen in ancient churches, and probably formerly used for sacramental purposes, as well as for seats, confessionals, &c.; one has an aperture at the bottom, the *piscina*, or *lavacrum*; the other three have round arches, and decrease in length and height from the ground eastward, being probably sedilia for bishop, priest, and deacon or servitor. There are two niches, also, in the chancel, one large, the other smaller, and on the south side is a very ancient tomb in a niche. The effigy has its legs crossed, a shield on the left arm, the right grasping the hilt of a sword, and the head and neck enveloped in chain mail. No doubt this is the tomb of one of the Swinnertons, of about the reign of Edward II.

ASHLEY.

The church consists of a nave and aisles; a large porch or south transept, tower, and chancel, with two cemeteries or side chapels. The north chapel contains the fine alabaster altar, or rather canopied table-tomb of the Gerards, to be described; the south one is modern, but built in a style corresponding with the rest of the fabric, and is the burying-place of the Kinnersleys, containing a fine modern monument by Chantrey, to the memory of the late Mr. Kinnersley, presenting a reclining figure of that individual; also a chaste tablet to Mrs. Attwood. The north

chapel contains monuments to Thomas Fletewood, Esq., and to Hugo Meynell, Esq., by Nollekens, the marble figures on which were, when we saw them, whitewashed. The monument to William Lord Viscount Chetwynd exhibits, in a niche, a fine black funereal urn, from the Etruria Pottery. Upon a brass plate, in the nave, it is recorded, that David Kenricus, a native of Ashley, and a soldier under the Black Prince, built this church from spoils taken from the enemy. The inscription on this plate is modern, but the church may be about as old as is represented on it. Of the very large and fine monu-



GERARD TOMB.



ment in the north chapel, we add the following description: it is of the seventeenth century, and, consequently, the style is somewhat stiff and formal. It is to the memory of the Gerards. Sir Gilbert Gerard built the man-

sion at Gerards' Bromley, figured by Plot, but which now, excepting the gateway, has disappeared.

“On an altar-tomb are placed two recumbent effigies, a male and female, the male in armour, and the female in the dress of the times; his head rests on a helmet, hers on a cushion; at the feet of the male is a lion couchant, and between them, near their heads, is fixed a talbot; that part of the top of the altar-tomb whereupon the male recumbent effigy is placed, is supported on the south, or front side, by five small square pillars, within which on the floor, and immediately under the male effigy, is the image or effigy of a corpse in a winding sheet. Against the north wall, and perpendicular to the altar-tomb, are two niches with semicircular heads, and about four inches deep, within which are four half-length female figures in relievo; they appear in the same kind of dress as the female recumbent effigy, have a ruff, &c., the dresses of the times. Two of these half-length figures are in each niche, and at the upper part of each niche is an escalop. Over the whole of the above-described parts is erected a canopy, supported on four Ionian fluted columns, about two yards high, each standing on a pedestal about three quarters of a yard in height. Above these columns is an entablature, about half a yard in height, which is continued over each arch, that is, on the east and west end, and the south side, and is surmounted by other ornaments; upon the corners of the entablature, over each of the four columns, is a square pyramid or pinnacle, each side of which is adorned with four roundles; these pyramidal ornaments are about one yard high and nine inches square at the base. Above the entablature, on the front side, or over the south arch, is a shield. Below the canopy, within the west arch thereof, at the head of the recumbent effigies,

is a male effigy kneeling on a pedestal, and as large as life, in armour, excepting a helmet; opposite this, at the feet of the said effigy, and within the east arch, is also a male effigy in armour, excepting a helmet; this is much smaller than that at the head, but is in the attitude of kneeling and prayer. These two last have their faces towards the recumbent effigies, and opposite to each other: on the front, or south side, of this monument, are two small images kneeling, a male and female, and a helmet between them on the floor. This monument occupies a space on the floor of about four, by two and a half yards, and may be four yards in height or more."

MAER.

Here the little church is picturesquely situated on a steep declivity, the churchyard being embowered in a wood. The tower and north aisle alone are at all ancient. Within, there is a mural tablet to a Macclesfield, and an altar-tomb, of the date 1604, to Sir John Bowyer and his wife Catharine. It is of sandstone, and has been painted and gilt. The arms of Bowyer and Biddulph are in the wall of the north aisle, and probably this more ancient part of the church may be of about the sixteenth century. The sheet of water here, which gives name to the village, is embosomed in hills, finely planted by Mr. Wedgwood. A variety of aquatic birds, and numerous yellow and white water lilies, may be seen on the surface of this pleasant little lake.

MADELEY.

The church has a nave, aisles, chancel, side chapel, porch, and tower, and is a very fine and perfect specimen

of the Perpendicular Gothic architecture. The monuments are, an altar-tomb of Randolph Egerton, who died in 1525, and his wife Isabella, with figures of angels and monks on its sides, the former holding shields, also other images of children; the plinth has figures of animals carved in relief; a fine brass to John Egerton and his wife, with their sons, of the date 1568; another to Robert Hawkins of Ridge Hill, "Scoller," who died in 1586, aged fourteen years; also other slabs of alabaster, with inscriptions now illegible, and mural monuments of later date. About a mile southward of Madeley are some ruins of the old manor house, surrounded by a moat, in a pleasant and fertile spot; a view of the fine old mansion is preserved in Plot.

KEEL.

Keel Hall is the seat of the Sneyds, originally of Bradwell, lords of an extensive district. Their cemetery is in the old church of Wolstanton, where there is an alabaster altar-tomb of the 17th century, to one of the heads of the family, supporting his recumbent effigy and having at one end escutcheons; and at the other, and in front, the effigies of the deceased's five daughters and ten sons. The church just mentioned has a very beautiful spire, and its situation being elevated renders it a conspicuous object in the neighbourhood.

AUDLEY.

This village gives name to a once celebrated house, which had it from the Verduns in the year 1223, and from whom the Audleys perhaps, maternally originated.

They built Heyley Castle about this time, two portions of the walls of which still remain, on an elevated and beautifully wooded hill; the well and deep *fosse*, and some sunk arches, are still to be seen. The Audleys likewise founded Abbey Hulton about this time. Audley church is interesting; the tower and chancel are of beautiful Decorated Gothic architecture. Unfortunately the stone is the soft red conglomerate of the neighbourhood, probably from the large quarries near Heyley castle; the east window is of beautiful and simple tracery, but has been shamefully plastered up; the architecture of the aisles and nave has also been spoiled by the modern bricklayer. There is a niche outside adorned with a border and finial for an effigy, which has disappeared. Between the piers, on the north side of the nave, is the recumbent effigy of a knight in armour, sculptured in marble, but defaced, and having lost both arms; his feet rest on a lion, his head and neck are defended by chain mail, and the rest of the body by plate armour. This is the figure of a Delves, one of the four esquires of James Lord Audley, whose brother's tomb is on the opposite side of the church; and whom, according to Froissart, he accompanied at the battle of Poitiers, &c. The tomb of the knight has his figure in inlaid brass, with that of his wife, the armour being of the same style as that of the other effigy; but some of the brass has disappeared from one of the heads, and the escutcheons; an emblazoned crest is suspended from the pier above this tomb. The inscription on it is interesting; it is as follows:—

Ici gist Mons. Thom's d'Audley, chivaler, fra' mons. James d'Audele seigno' de helegh de rouge chastell qui morust le xxiv de Januar, l'an de gré M^{CCCLXXXV} qui vit: de q'i alme Dieu p' sa pite eit merci. Amen.

Under a canopy, between the piers of the north aisle, is the tomb of Jno. Cradock, and his wife Anastasia, of the last century, with a coat of arms finely worked *in relievo*. In the chancel is the tomb of Ed. Vernon, "Divinarum Literarum Professor," 1622, with his recumbent figure in cap and gown, in a handsome niche, cinquefoiled and with crocketed finial and pinnacles. On the opposite side of the chancel are four elegant Gothic niches, in the same style, of different heights, one or two of which seem adapted to the service of the altar, the others as seats. A small effigy in armour occupies a niche below the east window of the north aisle, and has probably been taken from the side of a tomb; there are also some fragments of painted glass in the windows. There is a modern tablet to Dr. Henshall. Admiral Child was born at Audley, 1764.

BETLEY.

This place was formerly a market town. The church is of late Gothic architecture, the pillars and arches being of wood. At the present time it is undergoing repair, but the wood-work is to remain. Here is the pleasant seat of Mr. Tollet.

ABBEY HULTON.

Abbey Hulton was founded, 1223, by Henry de Audley, for Cistercians or White Friars. Elizabeth, widow of Nicholas Lord Audley, was by her will, 1400, a great benefactress to it, and her body was interred in the choir with that of her husband. Some vestiges of the abbey, and of several fish-ponds, are still visible here. "From the

little village of Stanley do all the great houses of Stanley take their name.”*

NEWCHAPEL.

Here, in the churchyard, is the tomb of the remarkable self-taught engineer, Brindley, a name intimately connected with mechanical improvement, particularly in this county; who, though his education had been so neglected, raised himself to eminence by his genius and industry. He introduced improvements in mines, in mills for grinding potters' materials, &c., and was the engineer of many of our canals, roads, and other public works. On his tomb is the inscription —

“In memory of James Brindley of Turnhurst, Engineer, who was interred here, September 30th 1772, aged fifty-six.” The poet Darwin thus elegantly commemorates this useful man :

So, with strong arm, immortal Brindley leads
His long canals, and parts the velvet meads,
Winding in lucid lines, the watery mass ;
Mines the firm rock, or loads the deep morass ;
With rising locks a thousand hills alarms,
Flings o'er a thousand streams its silver arms ;
Feeds the long vale, the nodding woodland laves,
And Plenty, Arts, and Commerce freight the waves.

Nymphs, who crewhile on Brindley's early bier,
On snow-white bosoms shower'd the incessant tear,
Adorn his tomb!—Oh, raise the marble bust,
Proclaim his honours and protect his dust !
With urns inverted, round the sacred shrine
Their ozier wreaths let weeping Naiads twine,
While on the top mechanic Genius stands,
Counts the fleet waves and balances the sands !

In the chapel is a pathetic tablet, with a figure, to

* Erdeswick.

the memory of a young gentleman of the family of the Williamsons, who was drowned whilst bathing in a neighbouring sheet of water.

BIDDULPH.



BIDDULPH HALL.

Biddulph is situated at the foot of high rocky hills, which here terminate Staffordshire to the north. It was bestowed by the conqueror upon Ormus le Guidon. The church has been lately rebuilt; it contains the altar-tomb of Sir William Bowyer. Biddulph Hall was built by Francis Biddulphe, in the 16th century; it is now a venerable ruin. The family dates from about the conquest, and has possessed property here up to the present century. From the same ancestry the Knypersleys sprung, the heiress of which family married Bowyer, temp. Richard II., and the female descendants, and co-heiresses of the latter, married with the Gresleys and Adderleys; and from females of this house, at an early date, descended co-heiresses who were united to the Verduns, Whitmores, and Mainwarings.

KNYPERSLEY.

This is now the seat of the Batemans. James Bateman, Esq., F.R.S., is an eminent collector and cultivator of Epiphytes, or the Orchideous plants of tropical climates. These most curious and lovely productions of Flora, he has obtained at great cost and trouble from their native *habitats*, particularly the forests of the New World, where they grow in rich luxuriance, frequently on the bare trunks of trees, rocks, stones, &c. And in his hot-houses we may imagine ourselves transported from the bleak district around into the luxuriant wilds of a tropical forest, so naturally are the plants disposed. Many of these are beautifully figured in the "Orchidaceous Plants of Mexico and Guatemala," a work in the course of publication, on the most costly scale. We noticed in the stoves many other beautiful plants: particularly, Cactuses, a tribe almost as curious as the Orchideæ; *Cephalotus follicularis*, one of the Pitcher-plants; the Wourali-creeper, &c.

NEWCASTLE-UNDER-LYME.

This is a borough sending two members to parliament. A castle was built or rebuilt here by the Earl of Lancaster in the reign of Henry III. In Camden's time a few ruins of the edifice were standing; at present its site only is visible—a mound surmounted by a tree or two in the midst of what was till lately an impassable morass. The tower of the old church is ancient; the archway, probably little later than the conquest, having numerous mouldings, and being scarcely pointed. We have been shewn, lying in a garden, the effigy of a tomb dug

from beneath the floor of the present church, the nave of which is of brick, in the worst style of modern architecture, and evidently on a site raised much higher than the building which it succeeded. The figure alluded to represents a man with the left hand holding a sword, and the right a glove; the hair is curled up at the lower part and there is no appearance of armour on the body, but it is clothed in a long robe. There was here, according to Leland, a monastery of Augustines, the foundations of which appear to exist in the Friars' Lane. Newcastle gave birth to two rather noted characters, Harrison, the parliamentarian general in the civil wars, and Goodwin the Nonconformist divine, 1593.

TRENTHAM.

Here is the noble seat of the Duke of Sutherland. The village existed during the Heptarchy, when it had a small oratory, dedicated to St. Werburga, who was its first abbess, and who died here in 683, being buried at Hanbury, and her body afterwards removed by the nuns of that place, flying from the Danes, to Chester, in which cathedral part of her shrine now forms the bishop's throne. This religious house was refounded in the reign of Henry I., by the Earl of Chester for Augustines. The small church, which is now being restored, was, perhaps, in part attached to the monastery; the inner door of the porch, and other portions being apparently of Saxon architecture. The Hall, from its size and fine Corinthian architecture, is worthy to be a ducal residence; the situation is rather low, being near the river. The present proprietor has added a fine Italian open tower and otherwise much enlarged the building. The gardens are also

laid out in the Italian style, in terraces overlooking the charming sheet of water, and, with their temples, fountains, statues, and vases of marble and bronze, have an agreeable effect. Over a narrow part of the water is a light and elegant iron bridge, of a single span: while conservatories, varied walks, and a fine park, with hanging woods, add to the beauty of the place. In the garden may be noticed an Arboretum laid out by the late Duke, who had considerable botanical knowledge; the collection of *Cratægi* and allied plants is numerous in species and interesting to the botanist. There are several fine Cedars of Lebanon, large trees of the Stone and Weymouth pines, of the Spruce fir, *Araucaria imbricata*, *Yucca gloriosa* in flower, &c. The stoves contain many Orchidaceous, and other interesting plants. The mausoleum, the burial-place of the family, is of massive architecture, suitable to its solemn and melancholy purpose; and the grove of sombre trees, in which it is situated, adds to the effect. The Trentham family is descended from the Levesons and Gowers; the former, a Staffordshire family of remote date, originally of Willenhall and Wolverhampton,—the latter more ancient still.

The late Marquis of Stafford married the heiress of the great house of Sutherland, and was created Duke of Sutherland. On an elevated spot, near the park, a monument was erected by his tenants to his memory. It consists of his colossal statue, on a pillar of granite.

THE POTTERIES.

The Potteries consist of the following towns,—Tunstall, Burslem, Hanley, Stoke-upon-Trent, and Longton. Stoke-

upon-Trent is the centre of the Borough constituted by the Pottery towns, under the Reform Act, and gives name to it. It is a place of antiquity; and the parish church, taken down a few years since to give place to that now standing, was of early date, bearing resemblance to several other very ancient ones in the county—as that of Hanbury. Its patron saint was St. Peter *ad Vincula*, a frequent dedication in the 12th century. It had a nave with circular clerestory windows, and formerly a high-pitched roof, aisles, porches, and a chancel, with a low tower. It was built of red sandstone of the neighbourhood, but evidently had undergone frequent alterations. The present church, built of the fine whitish veined freestone of Hollington, is of beautiful Gothic architecture, but without transept or separate roofed aisles. The windows have Perpendicular tracery, and are transomed. The ceiling of the chancel is groined, that of the nave of very wide span and ribbed in squares and bossed. The building has a parapet with crocketed pinnacles on the nave, and handsome ones upon octagonal buttresses on the tower, and others upon the chancel. The stained glass in the chancel is fine; this part of the church contains three beautiful monuments to eminent potters, Josiah Wedgwood, Esq., Josiah Spode, Esq., and John Bourne, Esq.; others to John Robinson, M.D., John Tomlinson, Esq., the Fentons,* &c., and a cenotaph to Dean Woodhouse. In the churchyard is the following inscription on an ancient grave-stone, a remarkable instance of longevity, and shewing the healthiness of the parish before it was overrun with manufactories. The old couple interred were probably moorlanders, as the parish embraces part of

* The poet Fenton was born in the old farm-house still standing at Shelton, 1683.

that district, and the stone, different from all around it, is the grit of that neighbourhood.

Sibil Clarke

1684

Aged 112.

Henry Clarke

Aged 112.

Lightfoot, the celebrated Hebrew scholar, was born at Stoke-upon-Trent, 1602. His brother was also an eminent physician of Lichfield.

At different periods the parishes and rectories of Whitmore, Newcastle, Norton, Bucknall and Bagnall, Longton and Shelton, have been dismembered from Stoke-upon-Trent. Burslem, Shelton, and Tunstall, are likewise places of remote origin. Besides the towns above mentioned, the Potteries comprise the villages or rather towns of Golden Hill, Longport, Cobridge, Etruria, Lower Lane, Lane Delph, and Hartshill.

The church lately built at the last named place, is a near approach, and apparently, indeed, a studied return, to the purity, grace, proportion, and propriety, of the Pointed Church architecture, for which England was famed in the days of the Plantagenets. It is a beautiful specimen of early Decorated Gothic: consisting of a nave and aisles with clerestory, and a well proportioned chancel, porch, and western tower and spire. The interior is further remarkable for its beautiful floor, formed of encaustic tiles, manufactured in the immediate neighbourhood. The ceiling too of the chancel is lined with richly emblazoned tiles, and its windows filled with stained glass of a superior execution. We may add, that the church was built and endowed, and a parsonage added, at the cost of one individual.

At Bury Hill and Fenton Low were lately vestiges of barrows; at Goms-mill near Longton is the quadrangular moated site of some building of which we know no tradition remaining. Prior's fields in the same township, probably formerly belonged to the priory of Trentham.

HUNDRED OF CUTTLESTONE.

BREWOOD.

Brewood is a small but ancient town, in a pleasant and fertile district. It had formerly two religious houses near, called the Black and White Ladies. The church has a fine spire, and the chancel lancet-shaped windows, except to the east, where an ugly modern one has been inserted. The door between the vestry and chancel is ancient, as are the communion table and chairs. In the chancel are four finely preserved altar-tombs of the Giffards, richly painted and gilt; to the south-east that of John Giffard, 1556, with his own effigy and that of his two wives, and on its sides and front the figures of his eighteen children, and the shields of himself and consorts; to the south-west that of Walter Giffard, 1632, and Philippa his wife, daughter of Richard White; north-west a tomb to John Giffard and Jesse his wife, 1668, with the effigies of themselves and fourteen children, with armorial bearings; north-east another to Thomas Giffard and his two wives, 1559, with their effigies and those of seventeen children, escutcheons, &c.

CHILLINGTON.

This is the seat of the ancient family of Giffard, who possessed the place as early as the reign of Stephen. They have generally been adherents to the Romish faith, and Giffard, Archbishop of Rheims, who died in 1692, belonged to this house. The mansion is ancient, with a fine park and large sheet of water, and the former is approached from the east by an avenue of trees of great length; there is an old moss-covered cross at one part.

STRETTON.

Here is only a small chapel, prettily situated, however, with an east window in the Decorated style, which contains a few fragments of stained glass.

PENKRIDGE.

Camden considers this place to be the Roman Penno-crucium, which, however, is generally supposed to have been at Stretton, as the former is two miles from the Watling Street. In the church, which is of fine Perpendicular architecture, and kept in the best repair, having aisles to the nave and chancel, clerestory, and south transept, or porch with *Galilee*, are the following tombs of the Littletons:—at the east extremity of the north aisle of the chancel a fine tomb with a male effigy in plate armour, and that of a female with a book between her hands, under a low canopy, the knight's feet resting on his gauntlets, and his head on a helmet; the pillars on each side are in the Corinthian order, and on the front of the tomb are the figures of the six sons and eight daughters of the

deceased pair; there are also upon the canopy the recumbent figures of another gentleman and lady, with the figures of four sons and four daughters on the frieze below, and the tomb is ornamented with shields of armoury; the inscription is

Reader 'twas thought enough upon $\frac{e}{y}$ tombe
 Of that great Captane, th' enemy of Rome,
 To write no more but (here lyes Hannibal),
 Let this suffice thee then instead of all,
 Here lye two knights $\frac{e}{y}$ father and $\frac{e}{y}$ sonne,
 Sir Edward and Sir Edward Littleton.

There are two other altar-tombs in the chancel under the arches, one of the sixteenth century, of Sir E. Lyttelton, with the figures of himself and his two wives, Helen Swynnerton and Isabella Wood; the gentleman's head rests on a helmet and his feet on a dog, the sides adorned as those just described. Another equally fine tomb of "Sir E. Lyttelton, the seventh son of Sir Edward of Pyllyton Hall,* and dame Alyce his wyffe, one of the daughters of Sir Francis Cockayne of Asheborne, in the countye of Darbye," of the date 1574, ornamented as before. There is a more ancient slab of alabaster under an arch in the south wall of the nave to the same family, with figures in black line. The aisles have fine ceilings of wood, and there are ancient screens in the chancel. There is some rich Gothic work below the east window, which is of the Decorated style, and winged figures with shields between the clerestory windows.

SHARESHILL.

Here the church is in the Grecian taste, but the tower ancient. We noticed a kind of *post mortem* divorce at

* Pilaton is not now the seat of the Littletons, but Teddesley.

this church; the alabaster figures of a husband and wife formerly belonging to an altar-tomb, have been separated at the rebuilding of the church, the one being placed in the north, the other in the south window-sill; the inscription is gone, but we presume the tomb was that of one of the Vernon family, whose ancient moated seat is Hilton Hall, rebuilt in 1700.

RADMORE.

Here, upon Cannock Chase, was an abbey of Cistercians. The monks removed to Stoneleigh in 1154, on account of the molestations they had received from the foresters, who "riding frequently that way much disturbed their devotions." There are still some vestiges of this religious house.

RUGELEY.

The tower of the old church here remains, and also the east end, which is converted into a school-house; besides several of the pillars and arches, having a picturesque appearance. The new church is built on a different site. It contains monuments of the families of Chetwynd, Landor, and Sneyd. In the beautiful vale of the Trent, near Rugeley, are the mansions and domains of Hagley, Wolseley, Bishton, and Bellamore. At Wolseley, the family of the same name have been located since the Conquest, and are not more remarkable for the antiquity of their house, than for the longevity which many of the individual members of it have seemed to inherit.* Colton and Morton were formerly possessed by the Gresleys.

* Mrs. Somerville, the mother of the poet, who was born at Wolseley, 1675, was one of the examples of this longevity; she survived to the age of ninety-eight. Dr. Harwood's Erdeswick.

CHURCH EATON.

We confess we did not see any sign of great antiquity in the present church at this village, though it is said to be in part a Norman building. It has a spire, and contains but one monument at all remarkable—a pleasing marble bass-relief to the memory of the wife of ——— Crocket, Esq.

GNOSALL.

The church of this ancient village is large, and was formerly collegiate; it is in the form of a cross, being in the late Gothic style, but the south transept presents some Saxon architecture, and there is a fine rounded arch of zigzag, and other corresponding ornaments, between the nave and the chancel. The interior is neat, and the windows contain some fragments of ancient glass. There is but one ancient tomb in the church, having a recumbent alabaster figure in armour, the head on a helmet, the feet on a lion; the head and neck are in chain mail.

AQUALATE.

Aqualate Hall was built in 1633 by the Skrymshers, which ancient house, now not known amongst the county gentry, also possessed Forton, Norbury, and High Offley; at the two former of which places are their tombs. Aqualate has been almost rebuilt by Sir John Fenton Boughey, in the Tudor style of building. We have noticed the Mere elsewhere.

LAPLEY.

This village was formerly a place of importance, and had a priory, founded, 1146, by Algar, a Saxon. The church,

which was part of this abbey, is large, and was garrisoned during the Civil Wars. It is now in a very ruinous state, and the transepts are gone. The nave and chancel are here, as in Lichfield Cathedral, not in the same exact line. The tower cannot be as ancient as the foundation of the abbey, and, like those of several other churches in its vicinity, it has a band of cross-work moulding. At the south entrance into the chancel we, however, noticed a true Norman arch and buttress, and there is a round arch at the junction of the nave and towers. The *piscina* and *sedilia* are walled up. There is in the chancel a slab with the figure of a priest robed and with tonsure, shewn in black line; it appears to be of the fifteenth century. There are likewise some remains of the abbey in a farm-house on the north-east side of the church.

WESTON-UNDER-LIZARD.

This village is so called from a hill near in Shropshire. Here is the seat and fine park of the Earl of Bradford.

Blymhill has an ancient church, partially rebuilt. It contains a tomb in an arched recess, probably of a very ancient date.

HUNDRED OF OFFLOW.

BURTON-UPON-TRENT.

This town is situated in the rich valley of the Trent, over which is an ancient stone bridge of thirty-six arches, probably one of the longest in Great Britain, being 515 yards in length; this bridge appears to have been in existence before the Conquest, but was partly rebuilt about the year 1175; it had formerly a chapel upon it; the

parapets being low and the bridge narrow many accidents have occurred upon it, and it has several times been the scene of military rencontres. The town itself is of great antiquity,—in the time of the Saxons Byretun being a considerable place. A more ancient church dedicated to St. Modwen, the titular saint of Burton, who was, according to Hollinshed, buried in an island of the Trent, called Andresey, or St. Andrew's Isle, stood upon the site of the present one by the river; this situation is pleasing, the verdant churchyard sloping down to the water's edge, which passes in a clear and rapid stream. One part of the river is still called after the saint. The abbey, of which there are still traces, some of the arches being Gothic or pointed, but one or two more ancient and semi-circular stand hard by; it was founded as far back as 1002 by the Earl of Mercia, in the reign of Ethelred, and enjoyed a richer revenue than any other religious house in the county. A defaced monument, erroneously reported to be that of the founder, who was slain by the Danes in battle, exists, or did exist, in the belfry of the church; but it must, from its description, be comparatively a modern one. The list of the abbots from the Monasticon with engravings of many of their seals, also a ground-plan of the abbey, which was no doubt a magnificent pile, with much other information relating to it, compiled from ancient documents of the Paget collection, may be seen in Shaw.*

It was formerly the custom for religious communities to have minor retreats, or hermitages, in their neighbourhood, and to give such spots scriptural names. Sinai Park was such a place of the monks of Burton, being mentioned under that name prior to the Reformation.

* Isaac Hawkins Browne a writer of Latin poetry of some note was of Burton, and born in 1706.

ROLLESTON.

Here is the seat of Sir Oswald Mosley, the author of the interesting "History of the Castle, &c., of Tutbury." The church is an ancient Gothic building, with a spire, chancel, aisles, and a burying-chapel, containing altar and other tombs of alabaster and marble, to the Rollestons, Mosleys, &c. The former were the ancient possessors of the manor, and both the Mosleys and Curzons trace their descent on one part from them.

TUTBURY.

This large village is pleasant, and the soil around fertile; it is situated at the foot of the hill on which the castle is built. From this last is a delightful view over the beautiful valley of the Dove, here a fine river, Needwood, the Derbyshire hills, the valley of the Trent, &c. The *donjon*, or *Julius'* tower, stood where a more modern tower now does; the great gateway was probably, as may be concluded from its style, the work of the second Earl of Lancaster; the arches below are slightly pointed, the windows of the Decorated Gothic, and the masonry very massive; on the opposite side of the enclosure are some fine remains of apartments in the Perpendicular style—some groining and a few beautiful fragments of sculpture, particularly some figures of animals around a square window; but there is on this side some much more modern architecture in the Italian style: the high turret to the left of the great gateway is of late Gothic architecture, though the base seems more ancient. There is a well in the middle

of the court; and the remains are surrounded by a deep ditch. At this castle some of the Mercian kings probably resided; at the Conquest its Saxon proprietor was dispossessed, and it was given to Henry de Ferrers. In the year 1250 it was bestowed on the Earl of Lancaster, Ferrers, Earl of Derby having been attainted of treason. Thomas, the second Earl of Lancaster, repaired the castle, and made it his principal residence; rebelling against Edward II. he lost his life as a traitor, having had previously to fly before the monarch from the castle, in 1320. It was in crossing the river that his chest of money was lost; and lately, June 1st 1831, some workmen employed in removing the sand out of the bed of the river met with this lost treasure, or a portion of it. "In the following week a further search was made by a number of persons, two of whom found upwards of five thousand coins, which they sold to the spectators at from 6s. to 8s. 6d. per hundred. This splendid success attracted a great number of money searchers to the spot, and such quarrels and disturbances arose, that the magistrates were obliged to interfere for the restoration of peace, which was not fully established till the crown officers asserted the right of his Majesty to all coins that might be subsequently discovered. The search was continued several days, and the total quantity found was about one hundred thousand, of which only about fifteen hundred were forwarded to his Majesty." The whole of them were silver, and "having been for such a succession of years lying amidst the soil which once formed the bed of the stream, the mass had become a hard substance, scarcely yielding in solidity to stone itself, in which coin upon coin appeared to form some of the original component parts." These coins were a number of sterlings of the empire, Brabant, Lorraine, and Hainault, and the

Scotch coins of Alexander III., John Baliol, and Robert Bruce; a complete English series of those of the first Edward struck at London, York, Canterbury, Chester, Durham, Lincoln, Bristol, Exeter, Berwick, St. Edmund's, Kingston, and Newcastle, Dublin, Waterford, and Cork; specimens of all the prelatical coins of Edward I. and Edward II., as of Bishops Beck, Kellar, and Beaumont, Bishops of Durham; others bearing the name of "Rob. de Hadley;" a few of the See of York; many of Henry III., and a few of the most early of Edward II. All the coins with one exception were about the size of sixpences; this was a beautiful silver coin of the size of a half-crown, and of the reign of Edward I.*

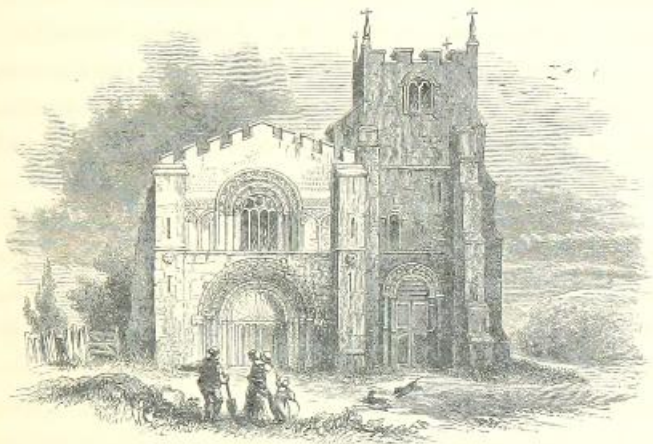
A century afterwards John of Gaunt rebuilt the castle in the Perpendicular style of architecture, and it now became the seat of great splendour and carousal; till, with the Duchy of Lancaster, it was united to the crown. John of Gaunt appointed a king of the minstrels, and is also supposed to have imitated the bull-fights of Spain (being in right of his wife, King of Castile and Leon) in the Tutbury bull-running, which he introduced.

The unfortunate Mary, Queen of Scots, has, amongst so many other fortresses, associated Tutbury castle with her captivity. She was brought here several times, whence she was at last removed to Chartley, and then to Fotheringay, where, as is well-known, her career terminated. It was during her residence at Chartley, that Babington's conspiracy was concocted. Whilst at Tutbury, before she was submitted to closer confinement and sterner keepers than Sir Ralph Sadler, she was allowed to partake of the pastime of hawking along the river, and in the neighbouring forest of Needwood; and at one time being

* Several are figured in the "Hist. of Tutbury," &c.

nearly crippled with rheumatism she was permitted to visit the baths of Buxton.

Tutbury church is remarkable, as it is part of the old priory; the west entrance having some unrivalled arches of Norman architecture. The doorway, in the west façade, has about seven principal mouldings, of which the inner-



TUTBURY ABBEY.

most but one is of alabaster, all most richly adorned with zigzag, beak-head, flowered, and other devices; the pillars have been restored. The window is almost equally rich, with three similar mouldings, and there is a band of rich device between the doorway and window, with smaller crossed arches, &c. The church is the nave of the abbey, "the north arches are walled up, and the south aisle is mostly of a later date with Perpendicular windows: the present east end is the arch of the central tower walled up, and part of the transept pier remains." The pillars between the nave and the aisles are massive, six feet

at the least in diameter, and several of them are four-clustered and longer in one diameter than in the other: the clerestory is also Norman, and there are crossed arches at the west end within: the east window is Perpendicular Gothic, but the windows of the south aisle have zigzag ornament internally, and there are arches in the same style in the belfry; on the south side of the tower is the representation of a boar-hunt: the south door has an arch of zigzag, and pillars with ornamental capitals, of which the middle one to the east has three curious human figures. The oldest tomb is of the date 1655 to Anthon. Horridg, Parson. The low tower is at the south end of the beautiful west front. This fine priory was founded, 1080, by Henry de Ferrers, and the monks were of the Benedictine order; the founder was interred in it. At the dissolution, Arthur Meverel alias Throwley surrendered it, and the abbey seal appended to the deed is engraved in Shaw.

NEEDWOOD FOREST.

We are here still presented occasionally with some remains of sylvan scenery; and in some places very pleasing spots of wooded hill and valley occur. Needwood was inclosed by act of parliament at the beginning of the present century. In its pristine state it abounded with huge oaks, limes, maple, wych-elms, hollies and luxuriant underwood, covering many square miles. In 1656 it covered 9229 acres of land, and contained 47,150 trees and 10,000 cord of hollies and underwood. Before it was disforested 20,000 head of deer inhabited it, and originally wild cattle roamed at large in its glades. Like other forests, Needwood has its officers,—lieutenant, rangers, axe-bearers, keepers, and woodmote court. It is divided into

five wards—Tutbury, Marchington, Yoxall, Uttoxeter, and Barton wards, and has also four lodges held under lease from the crown,—Berkley Lodge, Yoxall Lodge, the seat of the Rev. T. Gisborne, Sherholt Lodge, and Ealand Lodge, where formerly resided F. N. C. Mundy, Esq., the poetical historian of Needwood.

HANBURY.

Hanbury possessed a nunnery during the Heptarchy, of which St. Werburgh was the first abbess; she was the daughter of Wulphere, and was also abbess of Trent-ham, where she died. She was buried here, but her body was removed afterwards, as already observed. The ancient church is dedicated to her: it appears to be in part of early date, with alterations in the Late Gothic style. It is now being partially rebuilt. It is rich with several altar-tombs and other monumental memorials of the families of Hanbury, Egerton, Adderly, &c. During the present repairs the supposed tomb of John de Hanbury, with its cross-legged alabaster effigy in chain armour, has been opened by the authorities, and some bones were found. There is part of an ancient gravestone, very ornamental, in the exterior wall of the north side; and in taking down the south wall some Saxon carvings were found, now placed within the church near the Norman font: these fragments prove the church to have been built from the material of the nunnery. The monuments, to Carolus Egertonus (1624) and Ralph Adderly, are altar-tombs, the former with a carved effigy. "There are also in the chancel some half-length figures, with dress and visage that bear evident marks of the puritanism of olden times." There is a large modern monument, with a

female figure, to Mr. Wilson. A silver groat, of the reign of Edward III., was found in the late alterations.

Burton the antiquary, and brother of the author of the "Anatomy of Melancholy," was interred at Hanbury; the manor of Fauld belonged to him, his father having inherited it at an early date by marriage with the Curzons. Astle, another antiquary, was born at Hanbury in 1734.

DRAYCOTT, YOXALL, ETC.

The manor of Draycott belongs to the Vernons, and the site of the ancient manor-house, probably the residence of the Pipes, the predecessors of the former, is still visible. To Walter Vernon of Houndhill there is an altar-tomb in Marchington chapel, of the date 1592. The south door of the church of Yoxall has a semi-circular arch; the edifice generally is of the Decorated, and in part of the Perpendicular, style of architecture; it contains some ancient tombs to the family of Wellys, &c. Newborough and Tatenhill are pleasant villages on Needwood; the church, at the latter place, is in the Perpendicular style.

BARTON AND ALREWAS.

The fine church of Barton-under-Needwood was built in the reign of Henry VIII., by Doctor Taylor, a native of the place: he was one of three sons, which the wife of a peasant had at a birth, and owed his advancement to the notice of Henry VII., who when hunting in Needwood Forest was on one occasion lost, and met with entertainment in the cottage of the humble forester, all of whose sons, by the liberality of the monarch, received their education, and rose to eminence. Alrewas has an

ancient church, of which the west arch in the tower is rounded. The place was formerly held by the Somervilles, to whom the family of Griffiths succeeded: it now belongs to the Ansons.

CALLINGWOOD.

Robert de Ferrers, at the battle of the Standard, 1107, animated the forces under his command by the promise of "a grant of land on the most frequented side of his forest of Needwood, to that man who should perform the greatest feats of valour." One Ralph made the claim, and to him and to his heirs the grant was confirmed under the name of *Boscum Calumniatum*—the Claimed Wood, Chalengwode, or Callingwood.

WHICHNOR.



Sir Philip de Somerville held this place, with Alrewas, under John of Gaunt, who in the year 1347 instituted the custom of *the fitch of bacon*; a condition of the tenure of the estate being to keep that article "at all times of the year but in Lent," in his hall at Whichnor to be delivered to any man or woman who would claim the same, having been married a year and a day, and who could take the oath undermentioned. The claimant had first to come "to the bailiff or to the porter of the lordship of Whichnor," saying, "Bailiff or Porter, I do you to know, that I come to demand one bacon flyke, hanging in the hall of the Lord of Whichnor, after the form thereunto belonging." After which and other preliminaries, the attendance of Knyghtley, lord of Rudlow, the procession to the hall, of the claimant, accompanied by min-

strels, the appearance on his part of "twain of his neighbours" to swear to his having been wedded a year and a day, whether he be "a freeman or a villain," &c., the fortunate claimant had to make oath in the following words —

"Hear ye, Sir Philip de Somerville, Lord of Whichenovre mayntener and gyver of this baconne; that I, A, sithe I wedded B, my wife, and sithe I had hyr in my keypyng, and at my wylle, by a year and a day after our marriage, I would not have chaunged for none other, farer ne fowler; richer ne powrer; ne for none other descended of greater lynage; slepyng ne waking at no time. And if the seyde B were sole, and I sole, I would take her to be my wife before all the wymen of the world, of what condicones soever they be, good or evylle: as help me God and all fleshes."

After which oath and the confirmation of it by that of his neighbours, the claimant received, if a freeman, half a quarter of wheat and a cheese; if a villain, half a quarter of rye without cheese; and, to conclude the ceremony, the party was conducted on horseback by "the free tenants of Whichenovre out of that township with trumpets, tabrets and other minstrelsy, and the Lord Knyghtley was to be ready with his carriage, "that is to say, a horse and a saddle, a sack and a pryke," to carry the said bacon and corn a journey out of the county of Stafford.

The family of Griffith or ap Griffith succeeded the Somervilles in the manor, and are said by Shaw to have been originally of Clayton.

BROMLEY REGIS.

Here the fine church contains monuments to the families of Agard and Newton, with some older ones, but now illegible.

THE RIDWARES.

These are ancient manors. The large manor-house of Hamstall Ridware is now a farmhouse; here originally resided the *de* Ridwares, supposed by Shaw to be descended from the Saxon occupiers of the place; to them the Cottons and Fitzherberts succeeded by female descent. An ancient and curious watch-tower exists here. The church contains brasses, &c., of the Cottons, Fitzherberts, &c. The site of a more ancient building than the present manor-house, is also apparent.

Pipe Ridware had also a manor-house at Linacre: its church contains some tombs of the Whitehalls.

Mavesyn Ridware was held, after the Conquest, by Azeline, of whom little seems known: it soon came into the possession of the Mavesyns, a family originating from the Norman house of Rosny, a name distinguished in the annals of French history and chivalry; and benefited prelates and *puissant* warriors have occurred in the house of Malvoisin or Mavesyn, in this and other branches of it; and often the individuals have borne the names of Robert or Hugo, as we see they did here. The only trace of their mansion is the old gateway, the site being occupied by a modern house. The Trent here is a fine river, abounding in the finny tribe, and having also many swans. To the manor of Mavesyn Ridware the Chadwicks succeeded in the beginning of the 17th century by female descent.

In the year 1782, the old church was taken down, with the exception of the steeple and Trinity chapel, the latter of which has been the burial-place of the family from its erection in the twelfth century. The most ancient tomb in this venerable mausoleum, is that of its founder, Hugo Malveysin, who lived in the reign of Henry I. and Stephen; his figure lies beneath an arch in the north wall, and represents the warrior in chain armour, with a surcoat, truncated helmet, and Norman shield. The coffin was opened in 1785, and the skeleton within was found entire. The tomb of Sir Henry Malveysin, the crusader, which is a similar one, was also examined; his remains were found enclosed in a rude case of sheet lead. There is an altar-tomb of Sir Robert Malveysin, with his figure in black line on the lid; he was slain, 1403, fighting by the side of his sovereign at Shrewsbury. There are also altar and other tombs of the Cawardens, Davenports, and Chadwickes.

This cemetery has been repaired, and is now preserved with care. Besides the tombs mentioned above, there are slabs of alabaster around the apartment, with the engraved figures of warriors and dames of the house, from the Conquest, in their different costumes, and at the foot of each is a verse commemorative of their characters, deeds, and alliances. Above are suspended escutcheons and hatchments, some armour, &c. In a corner is a niche for the service of the altar which formerly existed in the chapel. The west wall displays three alabaster tablets of relief, of which one commemorates the death of John Malveysin of Berewicke, slain at a hunting on the Wrekin, in the reign of Henry IV.; another, the death of Sir William Handsacre; and the third, that of Sir Robert Malveysin, himself the conqueror of Handsacre, and slain, as mentioned above, in his turn, near Shrewsbury, on St.

Magdalen's eve. "A jealousy subsisting between the families of Mauvesyn and Handsacre it so happened, when Henry IV. had obtained the crown of England from Richard II., and it was rumoured the Percy was in arms against the king, Mauvesyn had ridden forth with six or seven of his vassals, on the part of king Henry; it chanced also that Handsacre, who espoused the opposite cause, had left home the same day, with an equal number of attendants, to join Percy. These rivals met, and, inflamed with rage, rushed furiously to battle. Handsacre was slain, and the victorious Mauvesyn, proud of his conquest, marched forward to Shrewsbury, and there lost his life, fighting valiantly for the king. Thus fell Sir Robert Mauvesyn, breathing in his last moments the undaunted spirit of his Norman ancestors; thus conquering fell the last and gallant representative of an ancient, valiant race, which first entered England in arms, ranged under the Conqueror's banners, and, after toiling in the paths of glory more than three centuries, honourably finished its career on the field of victory." Margaret, his younger daughter, became the wife of his rival's son, Sir William Handsacre, to whom she brought her property, as a recompense for the death of his father, slain by hers. The following verses, which occur under the second alabaster basso-relievo mentioned above, may be a fair specimen of the poetical illustrations of the ancient memorials of this chapel; they are evidently a late addition:

"He rush'd from yonder moat-girt wall,
With lance and bill and bow;
Down, down! he cried with Bolingbroke,
Dares Malveysin say no?
Sir Robert, spurring, said, rash knight,
King Henry bids thee die!
Like lightning on Sir William came,
And Percy was the cry.

Soon Malveysin his prowess proved,
 Pierced with his spear the foe,
 Both steed and baffled knight o'erthrew,
 And laid his honours low ;
 Yet not till valour's brightest mead
 Bold Handsacre had won ;
 This earth which bore that rival dead,
 Bore not alive a braver son."

The pavement of the cemetery, where unoccupied by monumental slabs and tombs, is emblazoned with arms, and there are some very ancient floor tiles, with heraldic devices relating to the family, originally from Normandy.

BLYTHBURY.

Here Hugo Malveysin founded a priory in the reign of Henry I., afterwards removed to Breewood. It was dedicated to St. Giles, and possessed "rich lands, good fisheries, fair gardens, and orchards," &c. The monks were Benedictines, but part of the priory was appropriated to nuns. Handsacre was, for several centuries, the possession of the Handsacres above alluded to; an ancient moated farmhouse stands on the site of their residence.

LONGDON.

This is a pleasant village of some extent. The church presents us with some fine Norman architecture, in a beautiful rounded arch of rich zigzag ornament, between the chancel and nave; the north and south entrances are also Norman, but much of the external architecture of the building has been altered. The font is probably of the same date, obliquely scalloped above, and ribbed or fluted below, and like that at Armitage has no stem or pedestal, the one it stands upon having been brought from Lichfield

cathedral. There is still much stained glass in the east window, but a portion of it is said to adorn a summer-house in the neighbourhood. There is likewise some ancient wood-work. Stoniwell chapel is attached to the south side of the church; it was built by bishop Stoniwell of Stoniwell, in this neighbourhood. An alabaster slab, engraven with his arms and mitre, points out where he is interred, and there is another ancient slab of his family alongside. There are some illegible slabs of the fifteenth and sixteenth century in the chancel of the church. The chapel is in the Perpendicular style; its ceiling of crossed wood-work with bosses. There is a rounded arch in the south side of the church, probably for the founder's tomb. Fairwell had formerly a religious house. At Hawkesyard the family of Rugeley resided; the last one who possessed the estates being Simon Rugeley, the active and brave Parliamentary commander.

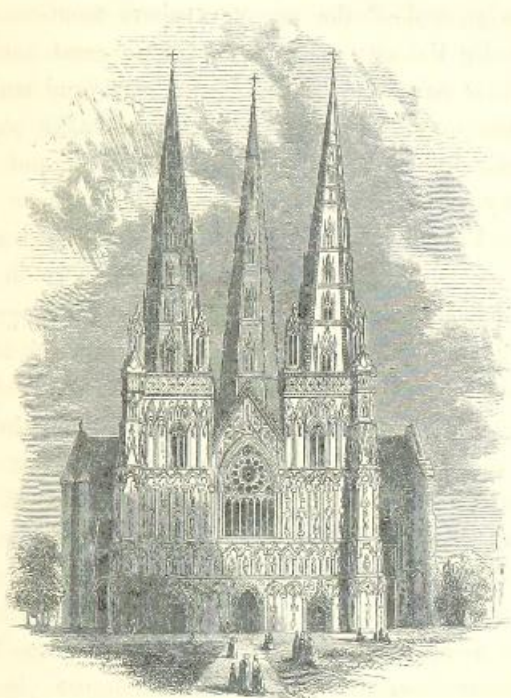
ARMITAGE.

The church is very beautifully situated on a sandstone rock, overhanging the Trent, and it presents us likewise with some interesting architecture of a very early date: the south door has twisted pillars and zigzag mouldings to its round arch; "the sides of the doorway itself, within this arch, are fancifully ornamented with grotesque heads of animals and roundels of knot-work, from the ground up to the crown of the arch, where is the appearance of a ram, or holy lamb, in rude relief." The pillars and arches between the nave and north aisle are rather massy, and in corresponding style, as is the very curious font. "On the capital of the pillar over the font are two human heads, one of them bare, but the other, (probably a female,)

having seemingly a head-dress of the reticulated form." A zigzag arch also separates the chancel from the nave; there is also a door remaining over the chancel entrance arch, which may have belonged to a rood-loft, and there is a similar appearance at Longdon church. There are also here some ancient tiles, carved oak, armour, and tombstones,—but the latter are illegible.

BEAUDESERT.

Here is the beautiful seat of the Marquis of Anglesey. The house was rebuilt by Thomas Lord Paget, in the reign of Elizabeth; his capital portrait by Holbein is to be seen within. The park is the finest in the county, being singularly varied with hill and dale, well wooded with noble trees, several of which are very ancient, and watered by various streams, though some might desire a larger sheet of water in the scene. From the ancient spot, Castle Hill, there is a most commanding view. The Pagets were raised to the peerage in 1549; the family has produced several brave soldiers, accomplished statesmen, and men of learning; but all his ancestors have been surpassed by the present Marquis, who has bled and conquered for his country, and of whom Staffordshire may be justly proud. Many pictures, particularly portraits of members of the family, and of celebrated historical characters by Holbein, Vandyke, Reynolds, &c., with some excellent hunting and battle scenes, adorn the interior of the mansion. The gardens are also fine.



LICHFIELD CATHEDRAL.

This city is situated in a dry, healthy, beautiful, and moderately elevated tract of country, to which, from the noble spires of its cathedral, it is a great ornament. It is a hundred and nineteen miles from London. The name is probably derived from the circumstance, that a thousand British Christians, with Amphibalus, their leader, were here martyred in the persecution under Dioclesian, *lich* being from the Saxon *lice*, a carcass, whence also *lich-gate*. Some, who would give little heed to early history, have derived the name from the marshy land about it, the Saxon word *leccian* signifying, to cover with water. There seems

to be some evidence to induce belief in the existence of Amphibalus, and of the massacre above mentioned, and consequently the city escutcheon, (of no great antiquity, however,) is painted with the figures of several martyred men. The massacre is supposed to have taken place at Christianfield, near Stitchbrook, and vessels and arms, apparently very ancient, with human bones, have lately been found at this spot.* Whether Lichfield was a place of note, or not, before the Heptarchy, may be doubted, but at that time it was made a bishopric by Oswy, 656, the king of Northumberland, who had invaded Mercia, or by his son-in-law, Penda, the son of Peada king of Mercia. Dwina was the first bishop, St. Chad the fifth, and it was he who converted Wulphere, the Mercian king, to Christianity. In 787, the Mercian monarch, Offa, procured archiepiscopal honours for the see; and Lichfield was the burial-place of some of the Mercian princes, though not of the great Offa himself. The see was, shortly after the Conquest, removed to Coventry, having, a few years before, been conferred on Chester. With the former place the see was then conjoined, and so continued until within the last few years. The city itself was never large, and at first but a village; successive bishops improved it, particularly bishops Clinton and Langton, the former of whom having an inclination "rather to shine in armour than lawn," perished in the crusades. He partly rebuilt the cathedral, in the middle of the twelfth century;† but this beautiful building, like most other cathedrals, confers honour on no particular individual, the name not having been preserved, either of its first founder or its principal builder. Langton commenced the ladye-chapel at the beginning of

* See "Account of Lichfield," Lomax, where these articles are figured.

† He also founded the religious house at Fairwell.

the fourteenth century, and Bishop Heyworth completed it in the fifteenth. In 1547, Lichfield was made a chartered city by Edward VI., with the privilege of sending members to parliament, of which the place had been previously deprived. In 1593, it suffered severely from the plague, more than eleven hundred, or one quarter of its population, being cut off by it. Lichfield is divided into three parishes, St. Chad's, or Stowe parish, St. Mary's, and St. Michael's. The church of St. Mary is comparatively modern; Sir Richard Dyott, of loyal memory, was interred here. St. Michael's church has a fine spire; the nave is not older than the reign of Henry VII. St. Chad's is of greater antiquity, and is an interesting edifice; the once celebrated well of St. Chad is in a garden by the churchyard. The city had formerly a monastery, erected in 1229, by Bishop Stavenby. St. John's hospital affords a specimen of the domestic building of the fifteenth century; the chapel attached seems to have been founded at an earlier date, but has undergone changes. At the grammar school, Ashmole, Johnson, and Addison, received part of their education. Stowe church contains a tablet in memory of Lucy Porter, Johnson's daughter-in-law, and his favourite, Molly Aston, also resided at Stowe Hill. Latterly a rustic monument, in memory of this great man, a native of Lichfield, has been erected by Mr. Law in the market-place; the sides of the pedestal, bearing his statue, are ornamented with bass-reliefs, representing different events of his early life,—his listening to the preaching of Sacheverell, his being carried home from school on the shoulders of his school fellows, and his voluntary penance in Uttoxeter market. There are many well endowed charities, and other institutions, in this little city. It was formerly fortified with walls, and had a castle besides; both have

quite disappeared. The close in which the cathedral stands is separated from the city by a fine pool of pellucid water, called the minster-pool, and the majestic building rises nobly above the houses, trees, and gardens, which intervene between it and this sheet of water. The gate at the west end of the close, built by Bishop Langton, was taken down in 1800, and its old walls and ditch have also, in great part, disappeared. The ancient episcopal palace, built by Langton, was also taken down about the time of the civil wars.

The cathedral itself consists of a nave with aisles; a chancel also with aisles, and a ladye-chapel; a transept with an aisle on the east side; and a chapter-house, with its vestibule, vestries, &c.; but it has no cloisters nor crypt: it, however, exceeds all British cathedrals in possessing three beautiful spires.

The extreme length is four hundred and three feet.

The height of the central tower and spire four hundred and fifty-two.

The height of the side spires one hundred and eighty-three.

The edifice is not directed east and west, but north-east, and south-west; and the nave and chancel are not exactly in the same line. But little of the present building could have existed in Bishop Clinton's time, from 1127 to 1149; though there are some appearances of Anglo-Norman masonry, particularly about the north transept, &c. There are some lancet-shaped windows in the south transept, a style of architecture which prevailed a little later than Bishop Clinton's time; but, as is often the case in old buildings, many of the windows, and other parts of the architecture, have been much altered. It does not appear probable that the nave could have been built much prior to the commencement of the 14th century, the archi-

ecture being pure Gothic, a transition from the lancet-arched to the Decorated Gothic. The ladye-chapel, and other parts of the structure, built in the Decorated style, were added a little later by Langton. Much of the more florid architecture of the west-end was added in Bishop Heyworth's time, from 1420 to 1447. There are many additions in the Perpendicular or Transomed style. The stone is a softish red sandstone procured from Hopwas, and it unfortunately suffers considerably from the weather. The beautiful west front of the cathedral has suffered much from this effect of the atmosphere, but still more from the sieges which the cathedral underwent during the civil wars: it was renovated with cement by Wyatt, at the end of the last century. To a spectator, in the area before this front, its appearance, with its two towers and spires and the larger central one, is very imposing. All the spires have horizontal and longitudinal crocketted bands, and tiers of ornamental spire-lights: the towers have beautiful octagonal buttresses and rich pinnacles; and the whole front is ornamented with bands and tiers of arcades, one above another, trefoiled and canopied, all containing on graceful pedestals, figures of prophets, apostles, and kings; these were removed in 1749 by the then Dean, but are now restored. The centre has a rich gable, with a very large and ornamental window, having a fine Catherine-wheel at its upper part: above which is a statue of Charles II. The central of the three doors has a rich recess, and is divided by a clustered column supporting a statue of the virgin and child; there are several other statues of scripture characters in the recess, which were formerly painted and gilt.

The remainder of the exterior of Lichfield Cathedral is of plainer architecture, and will not generally interest

the beholder ; although both the north and south entrances (particularly the former) are rich, especially in the door mouldings. The clerestory windows of the nave are triangular, with three circles in each ; the mullions and tracery in many of the others are comparatively modern and bad ; and the upright and flying buttresses are unadorned and heavy. The chapter-house is also plain externally, being oblong in form with the four corners cut off. The external architecture of the ladye-chapel is more beautiful than that of the nave, transept, and chancel ; and its windows are particularly elegant, being long, with ogee canopies, each having two mullions, and their heads filled with trefoil tracery. It has a hexagonal termination.

We will add the description of the interior as we find it in another work.*

“ Though the Cathedral may be entered by the north or south end of the transept, we will conduct the reader, as usual, into the interior by the middle door of the west front. On first entering, he will again perceive and regret the want of due elevation ; in every other respect he will be charmed with the prospect before him. He will be particularly struck with the air of extreme neatness, good preservation, and cheerfulness, for which the interior of this cathedral is justly renowned ; and although the choir is not in a right line with the nave, the eye cannot detect the small inclination to the north-east which the former has, and, therefore, the long and beautiful perspective of the two together is not at all injured. The clustered columns, with their elegantly varied and exquisitely carved capitals of leaves and flowers ; the well-proportioned arches, with their numerous mouldings ; the peculiarly elegant triforium and light clerestory ; and, above

* Winkles's Cathedrals.

all, the graceful form of the vaulting, and groining of the roof, cannot fail to delight the eye of every visitor of taste, however uninstructed in the still unsettled phraseology of the Pointed style. The professional and amateur architect will do well to observe the detail of the nave, the engaged and detached shafts, with deep mouldings between, into which the solid piers are worked, the bases of many mouldings on which they rest; the spandrils of the arches filled up with trefoil panelling, between the arches, the cluster of three slender shafts engaged in the wall, rising from the base, and continued to the springing of the vaulting, there supporting fine ribs, which diverge to a central rib, and to a short transverse one, both of which are adorned with foliage and bold rich bosses at every junction. Each compartment of the triforium, or open gallery above the arches of the nave, is composed of two arches, each one of which is subdivided into two by a slender column, and adorned with a quatrefoil. The clerestory windows above the triforium are of unusual size and form; they are triangles, made by lines curved outwards, and were originally filled with three circles, which have since been trefoiled. A double row of the dog-toothed moulding round every greater arch of the triforium, another round their architraves, another on the strong course under the clerestory, and another round the windows of it, give to the nave a richly decorated character, without appearing to be overloaded with ornament.

“We come now to the transept, the vaulting of which is nearly the same with that of the nave, but it has no triforium, and the windows are all of Perpendicular character. Those to the north and south very large, but, like all the others in this portion of the cathedral, ill-shaped, disproportioned, and filled with very ordinary tracery.

The four large piers which support the central tower, with their numerous slender shafts, adorned with leafy capitals, and bound with three rows of fillets, have here a fine effect.

“The choir is entered under the organ loft,” (a portion of the shrine of St. Chad built by Langton,) “and is remarkable for its great length and narrowness, and this original defect has been since increased by throwing the Lady Chapel into it; of this all antiquaries and architects loudly complain. When this was done, the arches of the choir were built up with plain walls, flush with the inner face of the arches, making the choir a flat surface on each side, which made it appear still narrower, but this great disfigurement has been removed, and the wall re-erected farther back, by which the columns and arches of the choir are again visible within it. The aisles of the choir are similar to those of the nave, adorned with an arcade of pointed arches, resting on slender columns beneath the windows, which are of good Decorated character. The clerestory windows are of later date, and of Perpendicular character, except two, which are of Late Decorated. Here is no triforium, but in the place of it, the wall under the windows is panelled with an arcade of pointed and feathered arches, corresponding with the number of lights in the window above it, and an open ornamental parapet runs along above the arches. The windows of the choir are, as it were, set in a frame, formed of a continuous chain of quatrefoils, which has a light and rich effect. The vaulting of the choir is nearly the same with that of the nave and transept. On the whole, this choir resembles that of Norwich Cathedral.

“We come next to the Lady Chapel, which was once a separate building, though now, alas! a continuation of

the choir, which was before too long. By this junction of the two, the effect of both has been much injured. But to do the architect of the chapel justice, it must still be viewed as a separate edifice, and then as to its form, decorations, and proportions, it will be regarded as one of the most elegant examples of the Pointed style of architecture now existing in England. Its apsidal termination, forming a half hexagon, has the happiest effect, showing off to the best advantage the stained glass in the windows, and the numerous rich sculptured details of the chapel: the whole is calculated to fascinate the beholder, and to induce feelings of the most exalted devotion. The windows are nine in number, three in the apse, and three in each side; their forms, proportions, and tracery, have been already described; but, it should be here added, that the effect of them is even better within than without. Between every two windows all round the chapel are niches, with tall foliated canopies, resting on brackets of the most delicate, rich, and elaborate sculpture. The statues, which doubtless once adorned these niches, have long ago disappeared. Beneath the windows all round the chapel runs a richly decorated arcade of stall work, resting on a plain stone plinth, which serves as a seat, and surmounted by an open embattled parapet. The vaulting and groining of the roof are something like that of the nave and choir, but with higher pitch, and more graceful form. The floor is paved lozengewise with black and white marble. This cathedral, like that of Salisbury, has no crypt, or underground church, and the whole pavement from west to east is on one level within a few feet of the altar, now moved to the east end of the Lady Chapel, where there are three steps to ascend.

“The chapter house is a beautiful room, though it wants elevation. Its unusual form has been already described.

In the centre of it is a fine clustered column, with delicately wrought capital, from which the ribs of the vaulting diverge, and meet other ribs springing from the side walls."

The injury done to this cathedral, during the civil wars, was, to a great extent, irremediable; but, upon the restoration, Bishop Hacket set about its repair with much earnestness, and with great solemnity reopened it. He paid a considerable portion of the cost from his own purse, and his zeal on this occasion merited the commendation bestowed upon him in the inscription of his fine monument, which exists, with a recumbent figure, in the south aisle of the chancel: upon this, in addition to the long epitaph in Latin, is engraven, at the head of the effigy, the appropriate text, "I will not suffer mine eyes to sleep till I have found out a place for the temple of the Lord."—Ps. 132. The cathedral contained, previously to the civil wars, as before observed, many beautiful ancient monuments, and much stained glass, which then disappeared, and of which we have now the drawings alone preserved, by the older antiquaries: the monuments of the families of Bassett and Paget disappeared at this time; also that of Bishop Scroop, in which was found a silver crosier, afterwards sold to Ashmole, the antiquary, a native of Lichfield. Other ancient monuments, formerly existing, to Bishops Patteshull and Langton, to Dean Heywood, and to Sir John Stanley—some of which were of very beautiful design—are engraven in Shaw's Antiquities. The fragments only of some of these tombs are still visible. A view of the ancient gate of the choristers' house, which was taken down in 1773, is also to be seen in Shaw. Outside the south portal of the cathedral is an ancient monument, with the recumbent figure of a dean or canon, in the style of

the 14th century. The modern monuments are numerous, and their inspection must afford a melancholy pleasure. Amongst others there is a handsome one to the father of Addison, and another to Lady Mary Wortley Montague; also a beautiful one by Westmacott, to Andrew Newton, Esq., the founder of the noble Institution for the relief of the widows and orphans of clergymen; another to the Sewards by Bacon; one by Westmacott to the Buckenridges; memorials of David Garrick and Dr. Johnson; and an exquisite and celebrated monument by Chantrey, placed at the extremity of the south aisle of the chancel, to the memory of the two children of Mr. Robinson: another, by the same sculptor (and almost his last production) exhibits to us the kneeling figure of the late excellent Bishop Ryder.*

The ancient stained glass of the cathedral, as before observed, likewise disappeared during the civil wars. The great window at the west end was given by James II., and is filled with stained glass, the gift of Dean Addenbrook, and the work of Brookes: that which adorns the great north transept window, representing the founders and benefactors of the cathedral, was the gift of Dean Woodhouse: that in the opposite transept representing scripture characters, was chiefly the gift of the late dean and canons, and this, as well as that of the north transept, was stained by Betton and Evans: the painted glass in seven of the windows of the lady-chapel was originally in the convent of Herckenrode near Liege, and was executed in the 16th century, when the art was at its greatest perfection; this glass is very fine, many of the colours being richer than in

* Newton, the author of the Dissertation on the Prophecies, was born at Lichfield, 1707, likewise Smallridge the divine 1663, Rowley the mathematician, and King the herald, 1648.

modern specimens ; five of the windows containing it, represent scripture subjects, and two portraits, events, and arms, relating to individuals connected with Herckenrode : the two remaining windows of the chapel are filled with the arms of the different bishops and prebends. The glass at the end of the chancel-aisles, and also in the dean's consistory court, are from the same abbey. In the windows of the chapter-house are the arms of the ancient nobility and gentry of the county, from Dugdale and Ashmole.

Over the chapter house is a library, containing portraits of benefactors to it, books on theology, and several valuable manuscripts, amongst others a very ancient Saxon one of the Gospels, &c. Haywood and Shugborough were ancient seats of the bishops ; afterwards Eccleshall Castle became their residence. The palace in the close is not occupied by them now.

FREEFORD.

Freeford was formerly held by the family of the same name. It devolved on the Dyotts, distinguished for their adherence to the cause of royalty, by marriage with the Harcourts.

FISHERWICK.

Fisherwick Hall, figured by Dr. Plot, was a fine old timbered and gabled building, but was taken down in the year 1766. The Marquis of Donegal afterwards built the noble mansion, of which there is a view in Shaw, but this has shared the fate of the preceding one, having been sold for its materials.

ELFORD.

This place was formerly possessed by the Stanleys, who married the heiress of the Ardernes, the original possessors of it. In 1683 it came into the possession of the Honorable Craven Howard, to which family the Bagots succeeded by marriage, taking the name of Howard; and finally the son of Viscount Templeton obtained it in the same way, by marriage and change of name. The church stands in a pleasant situation near the hall, and is in the Decorated style of Gothic building, with a high-pitched roof, and the ceiling of the aisle or side-chapel open to the rafters. There is some beautiful stained glass in this church; that in the east window of the side-chapel is ancient, and was brought from the continent; the figures and colour are very rich; there is also some ancient glass in the windows of the nave; that in the west window has been lately inserted and is modern, but of a superior description, the figures represented are from antiquarian records; Sir R. Stafford, Sir T. Stanley, Maud Camville, Isabel Vernon, Maud de Arderne, and Cecilia de Arderne, all in tabards, on which their arms are depicted, before faldstools, and under canopies copied from St. Martin's cum Gregory at York. In the quatrefoils of this window are likewise the arms attributed to Wulfric Earl of Mercia, who left his lands, in Elleford and Aclea, to Burton Abbey, and those of William the Conqueror. The effigy of Sir John Stanley is in a niche, between the side-chapel and chancel in the characteristic armour of the time; the head and neck in chain mail, and the body in plate armour, covered with a surcoat; his feet on a lion, and his head on a helmet, with an eagle and child, the cognizance of the Stanleys; a dagger on one side, and a sword on the

other, and the hands supplicatory. Under an arch in the nave is that of Sir John's son, a youth in a long garment and curled hair, more pleasingly sculptured than is represented in Shaw: he was killed by a tennis-ball, the representation of which he holds in one hand, whilst the other is raised to his head, the seat of injury. The altar-tomb of Sir W. Smythe is very fine; he lies between the figures of his two wives, one a Nevil with her coronet, the other a Stanley. The altar-tomb of an Arderne is ancient, the armour of the male effigy being in the same style as that of Sir John Stanley. There is also an ancient effigy in the north wall of the nave.

CLIFTON CAMVILLE.

Clifton Camville, Edingale, Haselor, Harlaston and Thorp Constantine, are situated in the east corner of the county in a fine agricultural district. The first named village has a church with an elegant spire, supported by flying buttresses at its base, and two chancels separated within by a carved screen: there are some ancient tombs, brasses, tiles, and decorated glass; one tomb in particular, of grotesque ornament, to the memory of Sir John Vernon and his lady. The founder appears to be buried under an arch in the south wall. The following is the inscription on that of Sir John—

Pray ye for the solle of Sir John Vernon, knyght,
 Who in justice was a spectale to syght
 And spared not himself day nor nyght,
 For the pore comonalty helpg y'm to y'r ryght,
 In hospitytey name here he had
 With his meate and his drynk he them so fed,
 What they pore hearts he evermore had,
 And for his dep'ture were hevly and sad.

Pray ye for the solle, whose bones here do rest,
 W'on p'r n'r as ye think best
 That he may be receyv'd unto the Dyvine brest
 Of th' eternall God, qui in cœlis est. Amen.

STATFOLD.

This place came into the possession of the Wolferstons by marriage with the heiress of the Stanleys. Their monuments are in the small church, and in the chancel are two very ancient ones with female effigies, in freestone, under arches.

TAMWORTH.

This town is of Saxon origin, and the great Offa, according to Dugdale, dated one of his charters from his palace here; and coins struck at Tamworth, in the reign of Canute, are still existing in collections. It was formerly surrounded by a ditch, called the king's-dyke, of which some trace, as well as the name, remains; it was burnt at one time by the Danes, and rebuilt and fortified by the heroic Ethelfleda, the daughter of Alfred. Afterwards Sightric the Dane was baptized at Tamworth, and received in marriage Editha the sister of Athelstan. The castle, which, however, is not situated in Staffordshire, is less imposing in its appearance than many such edifices, but the situation is very beautiful, the foot of the hill on which it is situated being washed by the Tame and Anker, and it commands a fine view over a rich district. The ancient edifice was of considerable extent; the present one, with the exception of the hall and some other portions, is comparatively modern. Tamworth has been in the possession of the Marmions, Frevilles, Ferrerses, Comptons,

and Townsends, in succession. Queen Elizabeth renewed the ancient charter of the town. Thomas Guy the bookseller, the founder of the hospital in Southwark bearing his name, was born here, where he likewise founded an institution of the same kind. The church, dedicated to St. Editha, has a fine tower, with four small spires at the corners; there is a niche above the belfry door, and one on each side the east window; the staircase of the tower is of curious masonry, being double, one from the inside and one from without, each communicating with a different set of floors. There is a finely proportioned, but much injured, Gothic arch to the south of the nave. The church has transepts, not, however, projecting beyond the aisles; a north porch, and clerestory. There are two Saxon arches between the transepts and chancel, and three feathered Gothic arches between the latter and its north side aisle. The tower appears to be in the Decorated style of Gothic architecture, the windows of the rest of the building later.

Within is a fine mural tomb to a Ferrers, and under the arches alluded to several very ancient tombs of freestone, but much defaced; one a figure of a man in chain armour, and his wife by his side, and at his feet a dog; another with an ancient female figure having a curious head-dress; in the north side of the north transept, under an arch, is the ancient recumbent effigy of a female with supplicating hands, and at her feet a dog. This church has also other monumental remains and brasses, but most of them much defaced and at present illegible, so that we can only refer the reader to Dugdale and Shaw for a more correct description: several of them belong to the Frevilles, and others to those of Ferrers, Repyngton, Breton, Comberford of Moats-House, Swynfen, &c. There

are still a few fragments of stained glass remaining in the east window. There are also some ancient walls to the east of the church adjoining the churchyard, probably Saxon or Norman.

DRAYTON BASSET.

This manor anciently belonged to the Bassetts, descended from Thurstine, the Norman: many of which family were of renown. The last of this branch of the race died in 1390, and was buried in Lichfield Cathedral. The mother of Essex, the favourite of Elizabeth, resided here; she was remarkable for the great age to which she attained, living to see her great-great-grandchildren. She was grandmother to the famous Parliamentary general. The old church, which contained the monuments of the Bassetts, and of the windows of which the tracery, as represented by Shaw, must have been rich, is now taken down. Sir Robert Peel, who has been returned member for Tamworth in several successive parliaments has his seat at Drayton Manor, purchased from the Marquis of Bute, and the ancient manor-house has given way to his modern mansion.

RUSHALL.

The Saxon family of the Noels retained Rushall even after the Conquest, and it has since been in the possession of the families of Bowles, Grobere, Harpur, Leigh, &c. The church is ancient, but has been modernized inside, and has monuments of the last family, &c., also an ancient stone with an ornamental cross in the south chapel. Leigh, the author of the "Critica Sacra," is buried in the

chancel. Of Rushall Castle only a portion remains, being the external wall, and a small building within.

DARLASTON, WEDNESBURY, ETC.

Darlaston, Willenhall, Westbromwich, Wednesfield, and Wednesbury, are populous places, situated in a busy mining and manufacturing district; but it does not enter into our plan to give commercial and manufacturing information. The last two towns are, as may be inferred from their names, places of antiquity, having probably their designation from the Saxon deity Woden. Wednesbury, anciently the property of the Heronvilles, Beaumonts and Comberfords, had a castle during the Heptarchy, which stood near where the church now does. This fine edifice has latterly been repaired and enlarged with a south transept; it has also aisles, a porch, and spire. Its style of architecture is the Perpendicular Gothic, with a parapet throughout. The altar-tomb to Richard Parkes and his wife is of alabaster, with coloured recumbent effigies of the date 1618; it is not in such good taste as other tombs more ancient. There is a mural monument with kneeling figures of a rather earlier date, to the same family; some monumental slabs on the floor are more ancient. An elegant modern monument, with a graceful female figure, is erected to the Addisons, and there are others of the Harcourts, Comberfords, Wortleys, &c. The glass in the east window is by Pemberton, and displays a figure of St. Bartholomew.

SANDWELL.

Sandwell Park is the seat of the Earl of Dartmouth, secluded amidst a busy population. It was the site of a holy well, from which it derives its name, and had also a monastery founded in 1155 by William Offney, and its lands were granted, at the dissolution, to the Whorwoods. Hamstead was the ancient seat of the Wyrleys, and afterwards of the Birches, which family and the Lanes intermarried with the former.

WALSALL.

This town is situated on a limestone hill, and is a spirited and prosperous place. The position of the parish church, on the top of one of the principal streets, is fine. This church, except the chancel, tower, and spire, was lately rebuilt, and the old structure, of great antiquity, was found to be so firmly built, as to be with difficulty razed to the ground. It contained tombs and stained glass, relating to the families of Hillary (of the Moat), Beauchamp, &c., which have disappeared. The present church is cruciform, with the tower at the south-west angle. There is an archway leading under the chancel, which is ancient though "sheathed" in bad taste. The west front is of very rich modern Gothic architecture, with a painted window: the pillars of the nave are very slender, being of cast-iron; its ceiling is rich with pendent ornaments, that of the transepts as plain. This church is dedicated to St. Michael, whose figure is painted on the glass of the west window just alluded to.

ALDRIDGE.

The body of the church has been in part rebuilt, but the tower remains in its ancient state. The west door has deep mouldings, but is a little pointed, and it has an ogee canopy, with a finial. The venerable monument of the founder, Robert Stappelton, still exists in a niche in the south wall of the chancel, outside the building; and under the tower is another cross-legged effigy in chain armour, with helmet and sword, probably of an Alrewiche. There are modern memorials of the Scotts, Dolmans, &c.

SHENSTONE.

Portions of the church of this pleasant village appear to be of more ancient date than that of Aldridge, there being some rounded arches in the tower, which are built up. There is a stone with some odd sculpture at the north door, which perhaps may have been an inlaid monument.

HANDSWORTH.

The church here has been partially rebuilt. The inscriptions on several ancient tombs of the families of Wyrley and Stanford are given in Shaw. Aston Hall, in this neighbourhood, is an extremely beautiful mansion, but is situated without the limit of the county: the Grand Junction Railway now runs through this pleasant district, frequently in the course of the little river Tame; and the short glance which the quick transit affords the traveller of the front of the mansion alluded to, must excite his notice. It is now the seat of Mr. Watt, the son of the

celebrated engineer, to whom there is a fine monument by Chantrey in Handsworth church. The manufactory of Soho is in this neighbourhood.

HUNDRED OF SEISDON.

WOLVERHAMPTON.

This is the largest town in Staffordshire, and by the Reform Act sends two Members to Parliament. Its situation is high and healthy. It was originally called Hampton, till the Saxon Lady Wulfruna built a monastery here, in the reign of Ethelred, when it was named after her. The old church has a fine tower, one hundred and twenty feet high, ornamented with panels, rows of quatrefoils, battlement, and pinnacles; the nave and transepts are ancient, and perhaps the chancel, though it has modern windows of unsuitable style, as is the one inserted into the fine opening on the east side of the south transept; there is also a handsome window at the west end of the building filled with stained glass. Dr. Oliver thinks the tower and nave were built in the fourteenth century; the nave has a clerestory, and the ceiling of the south aisle is groined. One of the chapels or transepts attached to the tower was anciently called St. Catharine's, now Lane's chapel; it contains a fine altar—and other tombs to the Lanes, particularly one to the faithful and loyal Colonel Lane; the former has the recumbent statues of a warrior and his lady; the male figure is “in plate harness, with an apron of chain mail, the head bare, and round his neck a well-starched ruff; his clasped gauntlets are placed at his feet;” the lady has a lap-dog at her feet; this is the

monument of Thomas Lane, who died in 1582. The latter is a remarkable mural tablet, the front below embellished with carvings of body armour, matchlocks, pikes, pennons, swords, &c., and on the side is a representation of the oak tree in which Charles II. was preserved at Boscobel. In the other chapel, called Leveson's, is an altar-tomb to John Leveson and Joyce his wife, 1575; the remarkable statue in bronze of Admiral Leveson, who served against the Spanish Armada, was the work of Le Sueur (who also founded that of Charles I. at Charing Cross): this, like that of Charles, was taken away in the Civil Wars, but was fortunately secured by Lady Leveson, of Trent-ham. In fact this church, like Lichfield Cathedral, suffered much in these times of fanatical violence. There is a beautiful stone pulpit, and also a font in the same style in this church, both of which as well as the remarkable cross in the churchyard are engraved in Shaw's Antiquities. There are also ancient oak screens between the transepts and chancel; the organ gallery is of wood-work of the date 1610; the north transept has also an ornamental ceiling of timber, and there are ancient stalls in the nave and chancel. This church is a deanery attached to that of Windsor. The monastery alluded to above was near the church, and its vaults were, till Elizabeth's reign, used as a prison, but are now built over.

From the inventory of the church property in 33 Henry VIII., amongst many other curious items are the following belonging to this church—

It. Amonge the relicks, of one image of sylver, and overgilt, with a glass therein, and a thorn, weying five ounces and a quarter.

It. A cross of wood, with sylver therabout, not weyed, which was called parcel of the wholly cross.

It. One round thing like a box of sylver, and gilt, wherin it is said should be enclosed a piece of the wholly candle, not weyed.

It. Another box of sylver like a salt with birrall, not weyed.

It. Our Ladye's shoes were sold for 8s. 4*d.*

The Levesons resided at Turton's Hall, an ancient moated house still standing, built of brick, but apparently on more ancient foundations, and having turrets at each angle of the enclosure. Another old mansion here is Giffard's house; this was the residence of the late Romish Bishop Dr. Milner, whose antiquarian and controversial writings are well known. Other old families here were those of Molineux, Guest, and Gough; Richard Gough the antiquary was of the latter family, though not born in the county. Bird the celebrated painter and Royal Academician was born here in 1772.

BYSHBURY.

Byshbury church is very ancient, with some Norman architecture, the Norman door to the south of the nave being, however, now concealed by a new aisle. The chancel is open to the fine wooden roof. The east window is in the Decorated style; there is a little of the ancient stained glass in the three north windows; a piscina and sedilia in the chancel, and an ancient font. Without the church, lying south of the chancel, there is the effigy of a monk or priest, and a very old tomb with a cross on the lid. A chalice used in the communion service was taken from the tomb of Hugh Byshbury. There are more modern tombs to the families of Allcocke, Moseley, Huntbach, Colley, Austyn, Hellier, Seacroft, Whitgreave, Gough, and Huskisson.

CODSALL.

Codsall church is of early architecture, with a carved ceiling of wood; the door to the south is Saxon, with two rows of zigzag ornament, and one of flowers, the capitals having heads with entwined fillets. It contains a fine monument in honour of Walter Wrottesley, whose effigy is recumbent, his head resting on his helmet, and a gauntlet at his feet, the date is 1630.

TETTENHALL.

This church has been recently enlarged. It contains several altar and mural monuments of the Wrottesleys, and other families. The green is noted for its fine elms, and the neighbourhood is celebrated for a pear, which bears its name, of a small kind, but growing on a large tree. The family of Wrottesley, of Wrottesley, is descended from Sir Hugo de Wrottyslegh, who lived in the reign of Henry III. and who was probably not the first of the name.

PATTESHULL.

Here is the seat of the Pigots; it is situated in a large and beautiful park on the edge of the county. The mansion and estate were formerly the property of the Astleys. The church, which contains the fine monuments of the latter family, is in the Grecian style of architecture.

HIMLEY.

Here is the seat of Lord Dudley and Ward. The park is pleasant, and the woods of Himley, Baggeridge, and

Gornall, are extensive, secluded, and beautiful. The ancient spires of Wombourne and Sedgley are pleasing objects in this district.

DUDLEY CASTLE.

This ancient fortress is said by Camden to have been founded about the year 700 by Dudo, a Saxon. It was probably enlarged at the Conquest, and afterwards rebuilt in the reign of Henry III. by Roger de Somery. Some of the ruins are evidently of great antiquity, probably parts of the first castle, or at the latest of the one built shortly after the Conquest. The more ancient portions are the *donjon* tower, which frowns over the town; the great gateway; then the outer gateway, or wardour's tower; and next the chapel. The *donjon*, or keep, was originally composed of four towers, connected by a curtain wall, and portions of two towers with the foundations of the other two remain; the walls are of enormous thickness: the view hence is commanding. The great gateway had an inner and an outer portcullis, with a tower on each side the outer arch. There are rounded arches both in the keep and above the inner door of the entrance; but several of the doorways which appear very old have depressed pointed arches, as is also seen at Tutbury Castle. The buildings on the eastern side of the court are of as late a date as the 16th century; the chapel, however, is more ancient, and one of its windows is of an elegant ogee form. The castle was built of rough limestone, quarried from the hill on which it stands; the facings, however, are of free-stone. Numerous delightful glades and ravines, bordered by luxuriant turf, and shaded with fine trees, form pleasant walks around the ruins. Dudley Castle passed from its

Saxon possessor Edwinus *comes*, to Fitz-Anculph who flourished in the Conqueror's time, through the families of Paganel, Somery, and Sutton, to the Dudleys. It seems, as observed before, to have been rebuilt by its first Norman possessors; fortified by Gervase Paganel, who also founded Dudley Priory; and again partly rebuilt by Roger de Somery. Dudley, Duke of Northumberland, obtained possession of the castle and estate by purchase, or other means, the rightful heir being of weak intellect; the infamous Dudley, the minister of Henry VII. and father of the duke, was according to some accounts but an adventurer of mean origin, though Dugdale says his father was a gentleman, and even, according to some, of the House of Sutton. Both the Duke of Northumberland and his father are said by Fuller to be of Staffordshire, or according to others of the town of Dudley; however this may be, they, as well as their descendants, were, as is well known, most remarkable characters in English history. At the duke's death the castle, &c. again came into the possession of the true heir of the Dudley family, and the present Lord Dudley and Ward is descended in the female line from this latter house. The castle during the civil wars held out for Charles under Colonel Leveson.

The priory was founded 1161, for Cluniac monks, and was a cell of Wenlock. Of this priory there are some remains, the walls of several of the apartments being still standing. At the entrance there is an appearance of having been a porch, with a window in the Decorated style above; and within the quadrangle lie one or two stone coffins, and the figure of a monk with tonsure and hands supplicatory, on a flowered pedestal. Another window to the east would appear to have been of a later style.

KING'S SWINFORD.

The church, which has latterly been rebuilt, contains monuments of the families of Corbyn of Corbyn's Hall, Hodgetts, and Bendy of Shutt End.

Bradley Hall is an ancient timbered mansion, with gable ends to the front, of the date 1596.

Pensnett Chase has for centuries been covered with coal and iron works.

Prestwood House, anciently possessed by the Lytteltons, is the seat of the Foleys. The gateway of the more ancient mansion still remains.

KINFARE, OR KINVER.

Kinfare is situated at the foot of Kinfare Edge, and the church is high above the town on that hill; it is of early date, in part Norman. It contains monuments of the families of Grey, Hampton, Hodgett, Foley, &c. One tomb is that of Sir Edward Grey, temp. Henry VIII., and another mutilated alabaster monument to John Hampton, temp. Edward IV. Kinfare was formerly situated in a forest district, it can now be scarcely called a market-town.

STOURTON CASTLE.

This was the ancient seat of the Hamptons, and afterwards, temp. Edward VI. of the Whorwoods. Cardinal Pole, made Archbishop of Canterbury in Mary's reign, was born here in 1500.

ENVILLE, OR ENFIELD.

Enville is the seat of the Greys, Earls of Stamford and Warrington, whose illustrious pedigree is given in Erdeswick, Shaw, &c. They inherited it by marriage with the Lowes of Enfield, and Whittington. It is one of the most beautiful spots in the county. It was the resort of the pleasing poet Shenstone, who designed many of the embellishments. The park is delightful; there is an elegant classical temple, with pillars and a rotunda, on the brow of a hill, backed by fine woods, and the latter have many agreeable and secluded walks. The church contains some old monuments of the Greys, particularly one of Thomas Grey, 1559, with numerous figures, the Moseleys, &c., and one very ancient one, under an arch of zigzag, without any inscription. There are also several ancient stones with crosses.

OVER ARELEY.

Over Areley, more anciently belonging to the family of Mortimer, and then to that of Burley, passed from the Lytteltons to Viscount Valentia in 1779. The church is of the reign of Edward I., and contains ancient and modern monuments of the Lytteltons, &c. One, supposed by Shaw to be that of a Heckstone, is very ancient, the effigy being armed *cap-a-piè*, and from the crossed legs would appear to represent a crusader. The Severn is here a fine river, with shelving and well-wooded banks, and it has a ferry. Small boats called coracles, like those of the ancient Britons, made of osiers, and covered with canvass or flannel, tarred or painted, are here used occasionally by fishermen on the river; they are about six feet long, and are impelled by a paddle with a square blade.

ROWLEY.

This village is situated on high ground; Turner's Hill is the highest spot in this part of the county.

CLENT.

Clent is in an insulated part of the county, surrounded by Shropshire and Worcestershire. Here St. Kenelm, the young king of Mercia, was murdered, about the year 820, by the order of his elder sister Quendreda, or more probably by Ascobert her lover, who was also the young king's tutor, "who took him into Clent wood under pretence of hunting, and there cut off his head and buried him under a thorn tree." The sister then seized the kingdom; but the murder was, according to the monkish historians, miraculously revealed at Rome, where a white dove let fall upon an altar a scroll of parchment, on which was written in Saxon letters of gold. "In Clent Cowbatche, Kenelme King bearne, lyeth under a thorn, heaved and bereaved."

Clent church is covered with wooden shingles and is of great antiquity, as is the pretty little chapel of St. Kenelm, dedicated to the boy-saint, having a Saxon arch with some rude sculpture. The latter church is without the limits of the county, though part of the churchyard is said to be within it; a spring exists, or did exist in it, which was formerly supposed to possess miraculous virtues, it having sprung up from the saint's blood; his body was afterwards translated to Winchcomb.

BROME.

This village has been celebrated by the poet Shenstone in his lines addressed to Miss Dolman, of Aldridge, beginning—

In Brome so neat, in Brome so clean,
In Brome all on the green ;
Oh there did I see as bright a lass,
As bright as ever was seen.

As is well known Shenstone's pretty residence was the Leasowes near Hales Owen, not far from this spot.*

* Some of the above notices may appear too brief to the reader, and we refer him to the *Appendix* for some additional topographical and antiquarian information.



CHAPTER V.

GEOLOGY—TABLE OF STRATA—INTRODUCTION—NEW RED SANDSTONE.

To our account of the geology of Staffordshire, we prefix a table of English strata, that the relative position, in the series of geological formations, of those beds to be particularly described may be seen, without entering into a general view of the science. In the table, the strata are placed in the descending series, the uppermost being first; but it must not be supposed that all the series exists in any particular place; the upper beds may have been swept off by the violent action of water, called denudation, or may never have existed at all; and the same observation may apply to other beds. Thus in Staffordshire we have no trace of chalk, crag, or oolite. Some of the middle beds may be absent, thus in some countries no coal strata exist, though the beds above and below that formation may be present. In some districts, composed of primitive rocks, we have no reason to suppose that more recent formations ever existed. Each system of rocks is composed of strata, hundreds or thousands of feet in thickness, and varying infinitely in appearance with regard to each other, and to their component or subordinate portions.

A TABLE OF ENGLISH STRATA.

SUPERFICIAL ACCUMULATIONS.

Alluvial depositions. The soil; sandy, and other deposits, &c., in the present, or ancient course of rivers; peat; stalactital and tufaceous formations.

These occur from the ordinary action of water, and are more or less general.

Diluvial depositions. Boulders, sand, gravel, &c., with shells, such as now exist in the sea, and the horns and bones of animals, some extinct.

From the violent and unusual operation of water, &c.

The drift in the plain of Staffordshire, Shropshire, and Cheshire, is classed here, and the deposit found in caverns containing bones.

STRATIFIED ROCKS.

TERTIARY STRATA.

Crag.
Freshwater
marls.
London clay.

These beds consist of clay, sand, limestone, gypsum, pebbles, &c., of various ages, and formed under different circumstances, marine or fluvial.

The fossils are shells, quadrupeds, fruits, &c., &c., many of which are of extinct species, but some such as at present exist.

These strata occur around London, in Norfolk, Hampshire, &c.

SECONDARY STRATA.

CETACEOUS SYSTEM.

- Chalk.
Green sand. { Consisting of chalk, flints, clay, sand and limestone.
The fossil plants and animals are marine, consisting of reptiles, fish, shells, &c., but no quadrupeds, and nearly all the genera are extinct. S. and S.E. of England, Yorkshire, &c.

OOLITIC SYSTEM.

- Wealden.
Upper oolite.
Middle ditto.
Lower ditto.
Lias. { Consisting of clay, sand, limestone, grit, shale, &c.
The fossils are land and water genera of most of the classes of plants and animals, fishes, reptiles, and quadrupeds. The reptiles are very extraordinary in form, as the Pterodactyl, Ichthyosaurus, &c. All, or nearly all, the species are extinct.
A broad band of this system stretches through the centre of England, from Whitby to Portland Island. The lias also occurs in Cheshire and Shropshire, near the Staffordshire border.

SALIFEROUS, OR RED SANDSTONE SYSTEM.

- New red sandstone. { Variegated clays, and red and white sandstones, and conglomerates, &c.

- New red sandstone. { Extensively developed in Staffordshire, and consequently it, with its fossils, which, however, are not numerous, will be described hereafter.
- Magnesian limestone. { Its fossils are reptiles, fish, shells, and plants, &c.
Only a trace of this formation is found in Staffordshire.

CARBONIFEROUS SYSTEM.

- Coal series. { Extensively developed in Staffordshire.
Millstone grit. { The land and freshwater fossils, &c., of these strata will be described hereafter.
- Carboniferous, or mountain limestone, and limestone shale.) Occurring in North Staffordshire, and abounding in marine fossils.
- Old red sandstone. { Clays and concretionary limestone, flagstone, &c.
Cornstone, Tilestone, &c.) The fossils are marine fish, shells, &c.
Extensively developed in South Wales, &c., the cornstone also occurs near Upper Areley, in Staffordshire.

SILURIAN SYSTEM.

- Ludlow rocks. { Upper Ludlow rock. Laminated sandstone.
Aymestry limestone. Subcrystallized, argillaceous limestone.
Lower Ludlow rock. Argillaceous.

- Wenlock rocks. { Wenlock limestone. Grey and blue subcrystalline limestone, with shale and argillaceous matter.
- Wenlock shale. Shale and earthy limestone.
- These strata, to be hereafter described, with their numerous fossils, occur at Walsall, Dudley, Sedgley, &c., in Staffordshire. Also in Wales and Salop.
- Caradoc rock. Wales, Salop, Worcestershire.
- Llandeilo rocks. Wales.

GRAUWACKE SYSTEM, AND THE CLAY SLATE SYSTEM.

These are the oldest fossiliferous rocks, containing shells and corals.

IGNEOUS AND PRIMITIVE ROCKS.

Trap, basalt, porphyry, sienite, mica-slate, quartz rock, gneiss, granite.

These are frequently massive or columnar, not stratified, and contain no fossils.

Igneous rocks, trap dykes, &c., occur in south and north Staffordshire in several places, Rowley, Clent Hills; —Charnwood Forest; Cumberland, Cornwall, Wales, &c.

Roughly estimating the map of Staffordshire to represent a superficies of 1130 square miles, the different geological formations would pretty nearly occupy its surface in the following proportions :

	Square miles.
The Pottery coal-field is	51
The south Staffordshire ditto (excluding about eleven miles of it situated in other counties) }	65
The Silurian limestone, &c., in the south of the county }	16
The Rowley basalt	1
The Clent ditto	2
The Areley coal-field, basalt, cornstone, &c.	7
The Mountain limestone	40
The Cheadle coal-field	18
The Cheddleton ditto	1
The Meerbrook ditto	4
The Millstone grit	100
The new red sandstone (marl, gravel, rock, sand, and peat) }	825
Total	1130

INTRODUCTORY OBSERVATIONS.

“ Surely there is a vein for the silver, and a place for gold where they find it. Iron is taken out of the earth, and brass is molten out of the stone. He setteth an end to darkness, and searcheth out all perfection: the stones of darkness, and the shadow of death. The flood breaketh out from the inhabitant, even the waters forgotten of the foot: they are dried up, they are gone away from man. As for the earth, out of it cometh bread: and under it is turned up as it were fire. The stones of it are the place of sapphires: and it hath dust of gold. There is a path which no fowl knoweth, and which the vulture’s eye hath not seen: the lion’s whelps have not trodden it, nor the fierce lion passed by it. He putteth forth his hand upon the rock; he overturneth the mountains by the roots. He cutteth out rivers among the rocks; and his eye seeth every precious thing.”

The study of Geology has been looked upon with suspicion by many pious men, from the idea that some of the principles of the science are incompatible with the truths of Revelation. The reasonings of geologists would seem to show that the earth is much older than has been

supposed by divines, forming their opinions of its antiquity upon the account furnished in Genesis—that there have been several creations of plants and animals, at long intervals of time, and that the earth must have undergone more catastrophes by deluge, than the one described as occurring in the days of Noah. We are cautioned against setting up the conclusions of our own reason against the Word of God, in geology as in other branches of natural science, and against the danger of philosophical speculation; and the caution is grounded upon certain passages of Scripture, having reference, perhaps, more to the corruptions of Christianity in the first century by the infusion of Platonic and other heathen principles, or to the undue estimation of intellectual attainment. Believing that every verse of Scripture is inspired by God, we must yet maintain that it can never have its authority impaired by any discovery of man in geology, or in any natural science; and after the Book of God, but by no means to be compared together, we can in nothing more see the operation of his power and goodness than in the study of the book of Nature. Some writers, contrary, we think, to the evidence furnished by our senses and unprejudiced reason, have insisted that all the changes which the crust of the earth has undergone have been the results of the Deluge of Noah, and that all fossil remains discovered in its strata were deposited at that period, and have also hence derived an argument which they think applicable to prove the truth of Scripture history; but there are too many good and conclusive arguments on these subjects to need the use of doubtful ones. It should be recollected, that in the early days of astronomy, its discoveries were equally mistrusted by individuals, acting from mistaken religious motives; and, indeed, the severity

of the laws was put in force against Galileo, for inculcating what all now believe. And what has been the result of astronomical discovery? It ought not to be said that a more enlarged sense and knowledge of the Divinity has been obtained by the discovery of an infinity of worlds and the great laws which regulate their movements—that sense and knowledge is the gift of Divinity itself to the believer;—but certainly our astonishment and reverence are awakened by that noblest of sciences, and if any individual must be impelled to reverence his Creator by a knowledge of his works, it must be the astronomer; the follower of that science which was thought, in the darker ages, to be hostile to religion.

Granting, then, that it is inculcated by geologists that the earth is many thousand years old, that there have been several distinct creations of plants and animals, and that all fossils were not deposited by the Deluge mentioned in Genesis, or in the two thousand years preceding it, it remains for the opponents of geologists to shew that the Creation of the world, as mentioned in the first verse of Genesis, must be understood as having taken place about six thousand years back, or whether we may not suppose the time of it to be undefined in that verse, and, therefore, that it is allowable for the geologist to consider that verse as alluding to an event which took place twenty thousand years back. Next, they should show that the six days of the Creation ought to be understood literally as *days*, and not *periods* of time which are not defined as to duration; and it must be recollected, as has often been observed, that till the fourth day, or period, no sun existed in the firmament, and, consequently, that the terms day, as well as morning and evening, may not be of the same meaning as we at first sight attach to them. Either of

these two things granted, we are at no loss to reconcile geological discovery and the different creations with the Bible. If neither can be legitimately admitted, then the Christian geologist, in the little advanced state of the science, will cease to theorize for the present ; but it cannot be required that he should desist from observation, convinced as he is that the Bible is full of the inspiration of the Divinity, but also that, if he observes in an unsectical spirit, no doubts of the saving and important doctrines of religion, (and all are important,) will arise in his mind.

But we may discuss the same subject in another light, and a more pleasing one. What does geology show as confirmatory of the doctrines of revelation, and demonstrative of the great attributes of God? It shows us that the creation of man took place, as observed by Cuvier, about the time fixed in the Bible ; that mighty deluges of water have indeed passed over the earth, as described in the most recent case by Moses ; that, from the traces of central igneous and of volcanic action, and of earthquakes, which have existed at periods gone by, and still, though now confined to fewer districts and diminished in intensity, are at work, we can see reason to anticipate the dissolution of all things by a "fervent heat," and the renovation of this earth. May we not go still further, and do we not see, in the different successive creations described in the beginning of Genesis, the same course and series of organic beings as are presented to us in the descending strata of the earth? In Genesis we read that plants were first created, next aquatic animals, and flying things, and great whales ; then cattle, the beast of the earth, and the creeping thing. We shall see that innumerable vegetable fossils abound in the lowest and oldest

strata, far more so than in any succeeding ; but it has been considered a fatal objection to our mode of reasoning, that there also occur animal remains in these rocks. It may be observed, however, that these animals of the older fossiliferous beds were quite of the lower kinds, corals, shells, some crustacea, and fishes, all lower and aquatic creatures, and many of them branched in form and attached to rocks like plants, and which are not included at all, perhaps, in the Mosaic account of the creation, and which, as less important, might probably be omitted. It, perhaps, requires no stretch of imagination to infer that in the creatures of the waters, and flying things, and great whales, are allusions to the next great creation of beings, such as occur in the magnesian limestone, lias, oolites, &c., not precisely fishes, and birds, and whales, but the gigantic fish-lizards, the ichthyosaurus and plesiosaurus, swimming about in the waters at this epoch, and the remarkable flying-lizards, the pterodactyls, which flitted in the air like a bat or bird, though of a different structure. After this, as described in Genesis, we find the bones of quadrupeds, but still not of man, of whom, as observed before, no remains, either of his body or his works, are found which can be of a very remote date, beyond the time of our sacred history. We also find, as we ascend, the vegetable fossils to be of a totally different nature to those of the coal—far more perfect ; is there any explanation of this in the succeeding chapter of Genesis ?*

Even in the limited geological field, to be described in our local sketch, we may see instances of design in the Creator—important in result. We see veins of useful metal brought within the reach of man by a very remarkable cause, we allude to the veins of lead and copper

* Verse 8.

ore of the limestone. Also great beds far extended, and one below the other, of the most useful of metals, iron in the state of ore; and, by the same shafts by which it is extracted, are drawn up the coals necessary to smelt it, and never far from it is the flux, limestone, also required for its reduction to the metallic state; as well as the infusible materials for the formation of the furnace in which it is smelted. In Staffordshire, at the present time, there must be obtained at least a quarter of a million of tons of iron annually, and more than a million of tons of coal must go to produce this from the ore, whilst the consumption of the latter article for other purposes, the forging and manufacture of iron, the firing of pottery, for steam engines, and for household uses, must also be immense.

Here then, in the forests or marshes of the ancient earth, in the luxuriant and peculiar vegetation therein abounding, we have a provision for the wants of the important and *future* being—man. Those dark and silent marshes or forests, which existed on the ancient earth, though untenanted then, save by a few insects or scorpions, were designed by the Creator for a future use—they were a provision for us. Coal renders delightful the dark and cold season of winter, in the form of gas furnishes us with a brilliant light, impels our vessels across the Atlantic, draws along with imposing effect the heavy trains of carriages, and works a variety of machinery; a few shovels of it doing the work of several men or horses. “It rows, it pumps, it excavates, it carries, it draws, it lifts, it hammers, it spins, it weaves, it prints!” More than this—it and iron are great sources and causes of our commerce; without them we should not have carried our merchandize into all parts of the world, and had

that not been the case civilization would not have extended as it has done: nay more, the extension of our commerce into all lands has given us influence in those countries, and our pure light of the Gospel has also been diffused, and is, no doubt, as everything tells us, to be yet far more generally spread.

We might dwell, in a similar way, upon other topics presented by our subject—upon fresh and saline springs and their origins—upon faults and their uses, &c.; but we have already stopped here longer than we ought, in a work like the present.

The lowest rocks which form, as it is supposed, the nucleus of the globe, such as granite, present us with no traces of organic life in the form of fossils; and evidently do not owe their origin to deposition from water, but have the appearance of having been at one time in a state of fusion. Slate, grauwacke, and the Silurian system follow, presenting the remains of shells, fishes, plants, &c.; the latter having accumulated, in what are now our coalfields, probably on the sides and in the hollows of mountains and high tracts, previously produced by the uplifting at different times of the spots in question, by the action of volcanic or igneous forces; or in turbaries or marshy plains, liable to occasional inundations, and since subject to elevation, or depression, from the cause alluded to. The coalfields were deposited, at an earlier or later period, upon older or newer rocks, as late as the formation of the mountain limestone and millstone grit. The beds of coal in a coalfield, it will be seen, are very numerous, one above the other, and separated by strata of clay, stone, shale, &c. Coal is undoubtedly of vegetable origin, for it may be seen under the microscope to be composed of vegetable tissue, and some of the Staffordshire coal is

evidently little different from charcoal in some of its layers: both these circumstances are less visible in the more crystalline varieties. We may also see the effects of the heat and pressure, to which it has been subjected, in the structure and disposition of coal and coal-fossils. These plants found in the fossil state in the coal measures, and also forming the coal itself, it has often been observed, offer most resemblance to those of moist, insular, and tropical countries, though they are commonly of the most simple organization; and to account for these characters of the vegetation, it has been inferred that when the coal was deposited the climate was hotter than the same latitude at the present time; and it has also been supposed that the disposition and situation of the proportions of land and water were then such as would give rise to a mean of tropical heat in the latitude of England. It has been further supposed that the coalfields were formed on islands, from the insular character of the Flora, but such an opinion is far from general.

The question has been agitated whether the vegetables from which coal was formed were drifted from a distance, from a large tract of land, by a river or estuary into a sea or lake, and the beds covered occasionally with mud, sand or clay, forming the intervening strata of the coal measures; or whether coalfields are the result of something analogous to our present bogs or mosses, occasionally inundated by fresh water; or, perhaps, elevated and depressed from the frequent upliftings and lowerings which are attendant on volcanic action and earthquakes even at the present day, and thus submitted to the flooding of, and deposit from the ocean, or other waters. The first opinion is adopted by many celebrated modern geologists; for the latter doctrine, however, there may, perhaps, be

some good arguments brought forward—the regularity of the beds; the basin or trough-like form of coal-fields, and their situation on the sides of mountains; the existence commonly of beds of clay below the layers of coal, as if they had prevented the drainage of moisture, and so given rise to a superincumbent turbary; the nature of the vegetables, too, more that of those of marshes and bogs than of forests, and not of the most likely kinds to be washed down a river;—their gigantic size and rapid habit of growth, too, would make us believe that, in the hot and humid climates in which they grew, this latter doctrine supposes a more competent cause for the formation of coal strata than the drifting of rivers.

It is remarkable that the animal fossils of the coal measures, at least with the exception of the fishes, are few and diminutive; and it has been inferred that the state of the atmosphere, at the time when the coal strata were deposited, was unfavourable to aerial animal life, Brongniart supposes from the existence of an undue proportion of carbonic acid in it. Though the sea swarmed, at this epoch, with fishes, mollusca, trilobites, and corals, we only find in the coal measures a few small shells, insects, and crustacea. It has also been remarked as singular that the fossil ferns are seldom found in a state of fructification.

Volcanic action (or somewhat analogous) disturbed, elevated, and depressed the coal strata after their formation, and at different subsequent periods; and they were also subjected to the irruption of floods, the deposit of other strata upon them, and then to denudation or the washing away of the superincumbent beds, or even of the coal strata themselves. At the period at which the coal formation was deposited probably no reptiles, birds, or quadrupeds, were in existence; but their remains gradually

begin to appear as we ascend through more recent rocks, the new red sandstone, lias, oolite, wealden, chalk, London clay, crag, &c., quadrupeds last, but not man in any place. In the lias we begin to discover the remains of those curious and frequently enormous reptiles, such as the fish-lizards, Ichthyosauri; fish-serpent-lizards, Plesiosauri; and bird-lizards, Pterodactyls; whilst mammalia either do not exist or are of the lower marsupial order. Another order of vegetation, as observed before, appears as we ascend, containing plants of a higher grade than those of the coal measures. In the tertiary strata alone do quadrupeds abound, and still we have no trace of man or of his works.

Upon the district embraced by our map none of the formations above the lias exist, and this is only visible on one spot in the Cheshire and Shropshire plain. It is a problem what have been the different states of the district to be described after the formation of the coal measures? Probably it was first covered with an immense deposit of clays, sands, &c., of the new red sandstone, having, perhaps, been depressed before it received this deposit. That the counties of Stafford, Chester, and Salop received a covering of lias, may also be inferred from the existence of the portion of that formation above mentioned. The district must again have been exposed to the action of denuding floods, sweeping away immense masses of sandstone, lias, and, it may be, of other strata, and laying bare the coal strata; in proof of this surmise we may see traces of such a rush of waters in some of our valleys. Lastly it appears from the *detritus* of another description, found upon the plains of these counties, with fragments of shells, much the same as those existing in the present ocean; from the existence, in the caverns of the

limestone of diluvial clay with boulders and fragments of bones of animals similar to existing ones, though not occurring in our island at present; and from the existence of similar bones in beds of gravel upon the surface; that our district has been submitted to a much more recent inroad of waters, though Mr. Murchison attributes the detritus above mentioned, with fragments of shells, granite, and other boulders, to the descent from the north of ice into an arm of the sea, formerly occupying the place of the present plain of Cheshire, Salop, and the western part of Staffordshire.

ALLUVIUM.

On the course of our rivers occur many flat plains, which have, probably at no remote date, been extremely marshy, or overflowed with water, and been drained by the barriers at their lowest point being worn down or carried away; or they may have been more gradually dried in recent historical times. Thus along the Trent and Dove flats exist of great extent, covered to the depth of some feet with alluvial sand, occasionally containing quantities of vegetable matter, such as the common hazel-nut, hawthorn berries, acorns, timber, &c.; and along the rivers Dove and Rea near Birmingham, the horns of stags have been found in this deposit; those discovered in the latter spot have been described by Mr. Ick, who has also obtained the large horn of an ox, bones of the hare, rabbit, and wild cat, with many species of fresh-water shells.* From the existence of numerous marshes, mosses, and pools of water on the Cheshire plain, Mr. Murchison supposes it to have

* Mr. Tollet too has shewn us the splendid horn of a gigantic stag dug up near his mansion at Betley.

been at one time submerged. These pools or meres, of which we have several at the western border of Staffordshire, are deep, often more or less round in form, frequently receive no stream nor transmit any, and many of them are constantly diminishing in size from the encroachment of the moss or morass.

Stalactital formations are going on before our eyes—on an extensive scale in the cavern called Poole's Hole at Grinlow, west of Buxton, remarkable for these formations, and in other caverns near. Some of these concretions in Poole's Hole, are huge rounded bosses formed on the floor by the falling of successive single drops of water; such put on various grotesque forms, and have as extraordinary names given to them; at the summit of each we noticed a little cup or concavity into which the water drops. The stalagmite, called Mary Queen of Scot's pillar, is situated five hundred and sixty yards from the entrance, and the tradition is that the unfortunate queen once penetrated thus far into the cave; this probably is a fable, as, on her visit to Buxton, she was most likely too infirm to enter so damp a cavern. Other remarkable cylindrical stalactites are attached to the sides of the cavern in tiers or rows, and large ones hang from the roof: others project from the sides like immense fleeces of wool.

Tufaceous deposits take place in the limestone district in large masses, and are due to the same cause, the deposition of their carbonate of lime by calcareous waters. At Matlock, and near the bed of the Wye below Buxton, this tufa is got for building purposes. It is frequently seen to envelope different species of land shell.

Petrifying springs, and the formation of peat are mentioned in another place in this volume.

DILUVIUM, ETC.

Besides alluvial depositions, and the gravel or *detritus* of the new red sandstone, to be described hereafter, which contains no fragments of rocks newer than the new red sandstone, and no bones or fossils except those of the older mountain limestone; there occur, as mentioned before, particularly on the western borders of the county, boulders of granite, trap, &c., with deposits of clay, gravel, and sands, containing shells, such as live at present in the British seas. The boulders are numerous about Trysull, Sheriff Hales, &c., and sometimes so large as to weigh many tons. Mr. Darwin found shells in this *detritus* at Little Madeley, and there (in the gravel pit between Great and Little Madeley) we have found fragments of bivalves. Though numerous trap boulders are scattered over the north Staffordshire coalfield, we think this *detritus* does not there exist, except at the north extremity, where it has probably entered through a gorge in the hills. Here the boulders are of such various kinds, that a good collection of specimens of rocks might be made amongst them.

The bones and teeth of the rhinoceros and elephant have been occasionally found in Staffordshire, probably in a diluvial gravel, at Trentham and other places.

In the diluvial deposit of clay, found at the bottom of certain caverns in the limestone of Staffordshire, Thor's cavern, and at Beeston Tor, we last year found bones of two species of deer "one the size of the red deer, the other of the roebuck."* These are commonly associated in caverns with the bones of the rhinoceros, elephant, hyena, &c., the bones of the two former of which have been discovered in the neighbouring Derbyshire caverns.

* According to Professor Owen to whom we submitted the specimens.

To the east of the county, flints, apparently from the chalk, are found on the surface, and on the west borders lumps of silicified wood occur; whilst in the ravines of the north of the county we have noticed rounded boulders of greyish rock, containing traces of fossil shells, and probably derived from the rocks of Wales.

THE LIAS.

We have mentioned the Lias before. It was shewn to exist in the tract alluded to in Salop and Cheshire, by Mr. Murchison. It borders on Staffordshire, at Audlem and Adderley. Mr. Murchison found it to contain the usual lias fossils; his attention was directed to it by hearing that certain speculators deceived by the dark appearance of the lias-shale, had been prosecuting an unsuccessful search for coal in it.

THE NEW RED SANDSTONE.

The new red sandstone of Staffordshire consists principally of a red, rarely greyish-white, sometimes variegated whitish and red sandstone; or of a red, sometimes variegated marl; always lying above the Carboniferous system, though we seldom see the coal-strata actually lying under this formation. At West Bromwich, however, the new red sandstone has been bored through to the coal measures, and in the north of Staffordshire these strata have been reached under the "red rock" in sinking wells at the southern edge of the Pottery coal-field. In 1840 a futile attempt was made to reach the coal strata through the sandstone at Weston Coyney. Here the sandstone was not bored through at the depth of four hundred and fifty

feet; in fact this spot seems to be situated beyond the outcrop of the lowest strata of both the Pottery and Cheadle coal-fields.

Of the magnesian limestone, which in several counties lies between the lower beds of sandstone, we have but imperfect traces, in the thin beds of calcareous conglomerate, burning into an impure lime, at Smethwick, Perry Hill, Pedmore, St. Kenelm's, Kingswinford, Himley, and Upper Areley, in the south of Staffordshire; and similar beds occur in the Handford clay-pits, and in the upper beds of the Pottery coalfield, at Shelton collieries in the north of the county, where it was once got for lime.

The sandstone lies below the red marl, or keuper, and is properly divided by the calcareous beds just described, into an upper and lower division. Though frequently nothing but the soft red stone, such as we see many of our churches, Lichfield Cathedral, Croxden Abbey, &c., built of, yet some of it is a beautiful whitish free-stone, such is that from the quarries near Hollington, Stanton, Tixall, Ingestre, Hill Charlton, and Beech, though in the latter cases more or less veined with red. The fine free-stone of Hollington has been extensively quarried, and the beds are seen to lie in a horizontal position, separated at intervals by layers of sand or pebbles. This horizontal position of the beds of new red sandstone is pretty general, except around the margins of the coal-fields, where they have, in many cases, both in north and south Staffordshire, been tilted up with the coal measures. Frequently the stone is a conglomerate, with many pebbles, as in the quarries at Heyley Castle.

The accumulations of gravel and sand thrown up in such great masses in many parts of the county in long ridges of rounded hills, as at Tittensor, Ashley, Barr,

Kinver, and other places, are subordinate beds of this formation, as is proved by there being in many places an evident transition from the sandstone, or conglomerate, to the gravels and sand, the pebbles too in both having the same characters, all formed apparently from rocks more ancient than the sandstone itself, as granite, porphyry, quartz, amygdaloid, basalt, greenstone, sienite, slate, mountain limestone, and millstone grit. The boulders of chert, limestone, and millstone grit, appear less perfectly rounded by attrition than the older rocks. Rolled fossils of the genera *Tubipora*, and *Favosites*, also *Entrochi*, fossils of the mountain limestone, may be picked up in most gravel-pits. The highest hills of the new red sandstone are from five to eight hundred feet above the sea, the red marl not attaining that height.

In some places, where beds of gravel lie under sandstone rock, the gravel has been got, leaving considerable caverns or excavations, such exists at Ashley, and near Barlaston Common. In other places the sandstone itself has been excavated in a remarkable manner, leaving caverns also; such caverns exist near Kinver, one or two large rocks in particular, having been scooped out so as to form warm and dry habitations for many families, and others exist near Alton, &c.

Above the sandstone lie, as mentioned before, beds of marl or clay, of a red colour, or occasionally variegated with white, grey, blue, or green. This, for example, may be noticed all around Stafford, except towards Cannock Chase, as well as on Needwood.

Mr. Murchison cites examples of trap dykes found in the new red sandstone of Shropshire, raising it up in ridges of dome-shaped hills, running E.N.E. into Staffordshire, from the hills west of Shrewsbury. The elevation of the

high grounds of Ashley Heath in Staffordshire is attributed to the continuation of the same subterranean force of elevation; and that the elevation of these hills is owing to the cause mentioned, attended with heat, is, he observes, proved by the prevalence of copper ores, manganese, &c., along this line. An attempt to work the former, we may add, was made a few years back near Mucclstone, the specimens being a carbonate of copper united with sandstone; in fact a sandstone impregnated with copper may be noticed at Maer Heath, and several other places in this neighbourhood. By the road from Hanchurch to Stableford,* dykes of greenstone exist in the new red sandstone, running about N.N.W. and S.S.E., and we have noticed others in the same neighbourhood, exclusive of beds or dykes of igneous rock found in the coal measures of north Staffordshire, and the basaltic hills of the south of the county. We mention the existence of these dykes here as they account for the inclined position which the beds of new red sandstone (generally horizontal in its stratification) present in many places in the county, evidently upheaved by a force from below.

In the map it will be seen that the new red sandstone in Staffordshire surrounds the limestone and coal strata in the south, occupies in the middle of the county its whole breadth, but ceases in the north. However there are two patches of this formation in this latter district, one situated in the valley of the Cheadle coal-field, on which the town of Cheadle itself, and Cheadle Park are situated; the other surrounding Leek, where it presents some remarkable rounded hills to the south of the town. The villages of Endon and Cheddleton are situated upon this latter patch, which accounts for the better character of the land around

* Pointed out to me by Josiah Wedgwood, Esq.

them, than in the neighbouring sterile grit districts. The new red sandstone likewise extends from Newcastle-under-Lyme in a tongue-shaped strip, through Dimsdale and Chesterton, into the Pottery coal-field.

This formation was apparently deposited under circumstances unfavourable to the occurrence of vegetable and animal exuviae; consequently, at least in our district, there are few appearances of fossils in it. Calamites and Stigmariæ, however, like those of the coal strata, occur frequently in its lower beds in north Staffordshire, also fragments of coal. Fossil shells have been mentioned as occurring in the gypsum beds, but we have not seen such; it would be out of place to introduce here an account of the animal and vegetable fossils which occur in the regular beds of magnesian limestone, or the curious foot-marks of the animal called Cheirotherium, occurring on the sandstone at Storeton Hill in Cheshire, probably a reptile, which left the impressions of its feet on the shore of a sea, into which impressions the sand afterwards drifted, and thus they have been remarkably preserved; as have also the impressions of rain drops at the same place.

The new red sandstone is called the Saliferous system because in it salt springs are frequent, and immense masses of rock-salt are occasionally deposited, with which deposits it is well known that the neighbouring county of Cheshire abounds. In Staffordshire, salt is procured less plentifully; but brine is pumped up, and manufactured into salt at Weston and Shirleywich. In the botanical list of the present volume, will occur several maritime plants which have been found in these spots.

At Shirleywich a pint of the brine is said to yield four ounces of muriate of soda, with sulphate of magnesia, and muriate of lime. We find its specific gravity to be 1.122,

and that, with the excess of sea-salt, it also contains lime, magnesia, sulphuric and carbonic acids. We could discover neither iodine nor bromine in it. The neighbouring spring at Weston is said to yield one part in nine of marine salt.

The spring at Rickerscote has also an excess of muriate of soda, but its specific gravity is only 1.016. It seems to contain the same ingredients as the preceding, no iodine or bromine, a very slight trace of iron, and besides, sulphuretted hydrogen gas, which we did not discover in the former.*

Saline springs occur in the south of the county, at Brierley Hill, Cradley Heath, and Lady-wood Spa. All these are situated, it is supposed, on one line of fault in the coal measures. Mr. Cooper's analysis of the water of the last spring is as follows, its temperature being 50°.†

		In a wine pint.	
	Inches.		Grains.
Carbonic acid	2.1	Muriate of soda	49.75
Azote	4	Do. lime	19.07
		Do. magnesia	7.50
		Do. iron	0.13
		Carbonate of lime	1.50
		Do. magnesia	1.70
		Do. iron	0.90

Salt springs occur also at Sandon, Enson, Draycott, Kingston, Tixall, Ingestre, and Braunston, though, in many of these places, a marshy state of the surface, with an absence of vegetation, may be the only signs of their existence.

In Cheshire, on the Staffordshire border, are salt springs

* Our specimens, however, were not quite fresh.

† There are baths and an inn at Netherton, and this water, as well as that of Rickerscote, must be beneficial in proper cases. There are also baths and an hotel at Hixon, near Shirleywich.

at Adderley, Albrighton, and Lawton, the latter saturated, or nearly so, with muriate of soda. We find its specific gravity to be 1.206, it contains, also, the same ingredients as the brine of Shirleywich, without iodine or bromine.

The water at the Ivanhoe baths at Ashby-de-la-Zouch arises from fissures in the coal, two hundred and twenty-five yards below the surface. Dr. Daubeny discovered the presence of bromine in it.

Gypsum occurs in the red marl of Staffordshire at many points in the hills above the Dove, between Burton and Uttoxeter, as at Draycott, Hanbury, Fauld, and Tutbury, at Shirleywich, Fradswell, Whitgreave, &c. Along the Dove much is obtained, but more on the other side the river, particularly at Chellaston, in Derbyshire. Common gypsum is generally whitish, more or less stained with red, grey, green, or brown. It is manufactured by the lathe into figures and ornaments, and, in former times, its working formed a considerable branch of trade at Burton, where the beautiful altar-tombs, so common in our ancient churches, were probably made. The fibrous variety is pretty when formed into beads and other ornaments. Plot says that, in his time, the choir of Lichfield cathedral was paved with alabaster or gypsum, and cancell from Beaudesert.*

Gypsum is composed of lime 33.0, sulphuric acid 44.8 and water 21.0. When boiled, it loses this water of crystallization, and obtains the valuable quality of setting, or becoming solid when mixed with water, and is applied

* It is largely used for the adulteration of flour, mustard, &c., but its presence may be discovered in any vegetable matter, if it exist in any considerable proportion, by incineration, and then moistening the product, when, if gypsum be present, there will be an escape of sulphuretted hydrogen gas, to be known by its unpleasant odour and flavour.

to many useful purposes. In preparing it, it is first broken, then ground in the dry way, and lastly boiled without the addition of water, its component water liquifying it, and the process being continued until this is dried up. Gypsum is beneficial to some land as a manure, but experiments are perhaps wanting to show its true value, and on what soils and for what crops it is most proper. The leguminous plants evidently grow with luxuriance in a gypsum soil.

CHAPTER VI.

COALFIELDS—MILLSTONE GRIT—MOUNTAIN LIMESTONE—SILURIAN ROCKS.

THE north Staffordshire, or Pottery coalfield, is of a triangular form, with its acute *apex* to the north, and its base to the south. The strata at part of the west side, and for almost the whole of the east, rest upon elevated ridges of millstone grit, presenting frequently a bold and picturesque appearance. On the flanks of the large hill called Cloud these two ridges meet. At the base of the triangle the coal strata are in contact with the lower beds of new red sandstone, but faults appear here to run across. This coalfield is one large triangular valley, though several minor ridges run up its area, produced in some measure by the rising to the surface, or *cropping out* of the coal measures. On the eastern side of the field, the strata lying upon the grit dip conformably to it, or westwards, more to the south, however, on this line, W.S.W. Here, at the south part of the line, the dip is frequently about one yard in four, but with a greater declivity northward, two yards in five, for instance, at Knypersley. On the west side, the inclination or dip, being of course towards the east, is greater, generally one yard in from two to three, but here also much greater to the north, where the strata lie in some places nearly upright, the dip being often four or five yards in one. The strata on this side the field, after being broken by the westerly ridge of grit described above,

are also inclined in the opposite direction, or dip westwards, under the plain of Cheshire. At the southern part of the ridge, where the grit does not appear, it may be observed, for instance at Scot Hay, that, whilst on the Staffordshire, or east side of the ridge, the measures dip east, with an inclination of one foot or more in three, at the top of the ridge they lie nearly flat, then become inclined a little westwards, at first with a gentle dip, afterwards rapidly, or in some places approaching the perpendicular. At the extreme south of this westerly ridge, the strata are known to turn round, or wrap round, as it were, the hill, so as at one point to dip south. Towards the north extremity, or apex of the coalfield, as the strata on its two sides dip in opposite directions, they there of course, from the narrowing of the limits of the coalfield, and from the strata approaching towards the hill Cloud, are seen in the distance of a few yards to be inclined to each other. On the west side of the coalfield, on the westerly dip, the coal is extensively worked; but at present it does not appear to have been found under the sandstone or marl of Cheshire. The ridges of millstone grit, mentioned above, rise to a considerable height, and are frequently called Edges; Brown Edge, Baddiley Edge, &c. The hills Mow Cop,* Cloud, and the rocks above Biddulph are the highest points of these ridges, the former being 1091 feet in altitude, the two latter probably more. A very hard grit of a reddish appearance, occurs at Fenton Park, in the neighbourhood of an important fault, accompanied with iron pyrites, sulphuret of zinc, and some native copper. On the western side of the coalfield, towards Mow Cop, there likewise occurs a rock, which appears to owe its formation in part to igneous action. This is

* *Mau* or *maur*, lofty, *coppe*, summit.

of a lively green colour, very hard, and enclosing many roundish pieces of bright red rock, which, however, are also seen in some of the grit of this spot. In the hill itself, likewise, much conglomerate exists, very hard, apparently semi-fused, and containing a quantity of zinc and iron pyrites; also a very hard and fine grained grey rock, if, indeed, it be granular at all, lying in beds between the strata of grit, and disappearing in one case in a wedge-like manner.

Probably as many as between thirty and forty beds of coal exist in this field, which vary from a few inches to ten feet in thickness. The bands of ironstone which crop out to the west of the field, near Apedale, Silverdale, &c., are very numerous, and each composed of many courses; they are, however, only interstratified with poor coal; though a little to the west, where the dip is reversed, the coal beds are easily attained, ten or twelve seams cropping out in a hundred yards of the surface, the whole containing as much as forty-five feet thickness of coal, rising up from beneath a bed of whitish grit many yards thick. The beds of ironstone alluded to may lie upon this stone, and the coal beneath it has perhaps not been reached to the east. Other seams of coal have been got still deeper to the west. It seems difficult to identify the different beds of coal in one part of the field with those of another, but some beds which exist on this western side of the field are apparently found on the eastern, and the beds alluded to just before are probably identical with the deeper beds to the east, called the Bowling Alley, Sparrow Butts, Holly Lane, &c. The coals got at Fenton Park, to the S.E. of the field called the Ash and Knowles, would appear to be found at the foot of Mow Cop; and the light brittle cannel, of a jet black colour, marked with concentric circles, and dotted occasionally with pyrites,

found on the Twist coal at Hanley, is exactly similar in appearance to a cannel found on the Cheshire side of Mow Cop, and, indeed, to cannel from south Staffordshire.

Another cannel is stony, hard, heavy, brown, and laminated, containing numerous impressions of bivalve shells. Iridescent, or peacock coal, is found in the upper beds. The caking coals leave most coke, and are used for household purposes, being cleanly; and also generally for the manufacture of gas. The bituminous coals, burning almost entirely away to a white ash, are principally consumed in the potteries. Some of the lower beds are hot, clear, and cleanly, but burning rapidly; these are also used for household purposes.

The fossils of this and other coalfields, consisting of vegetable remains, fresh-water shells, fish, &c., will be enumerated hereafter.

The beds of *fire-clay* occurring in the coal measures are numerous, and valuable to the potters. Veins of sulphate of barytes occur in this clay at Shelton, and lead and zinc ore are found in some quantities in coal strata at Golden Hill and other places. Crystallized calcareous spar, and some quartz also occur. Good building stone seldom abounds; the best is seen at Bradwell, and near Kingsley, the latter place, however, is in the Cheadle coalfield.

The Cheadle coalfield is, in formation, similar to that of the Pottery district, having ridges of grit on the west and north-east sides: Sharpstones Cliff and Ipstone Edge being to the north-east, and Wetley rocks, and the ridge extending towards Caverswall, forming the opposite side of the trough. There is likewise the new red sandstone and its *detritus* thrown up into hills across the base of the field to the south. The coals are frequently good and similar to the deep beds of the eastern side of the Pottery

coalfield. Calamites and fine impressions of ferns have occurred, particularly at the Delph House colliery. A small but distinct coalfield occurs to the west of Cheddleton, not worked at the present time. It appears to be a trough with the grit dipping towards it on both sides, east and west. The coalfield, between the Axedge and Swithamley range of rocks, is, probably, the extreme southern point of the Lancashire and Cheshire coalfield. It must be one of the highest above the sea in England. It presents a fine example of the usual disposition of a coalfield, in a trough or basin, formed by surrounding shelving high hills of grit. It has been worked in all directions, but at present coal is got only in one or two spots.

Traces of coal occur in many places in the moors of this part of the county, being, perhaps, the outcrops of carbonaceous beds of the grit and limestone shale. Thin seams of coal, probably belonging to the same formations, have occasionally been worked near Buxton, Warslow, Whiston, &c. The south Staffordshire coalfield differs from those of the north, in lying upon older rocks, the transition limestone or Ludlow and Wenlock formations; the intervening strata of old red sandstone, mountain limestone, and millstone grit, being absent. This coalfield is surrounded by the lower beds of the new red sandstone, having been raised up from beneath this formation. It is divided by the Sedgely, Dudley, and Rowley Hills, in its area, the former of transition limestone and shale, the latter of basalt. This ridge runs obliquely through the coalfield, from north-west to south-east. The curious folding of the limestone and shale around the hills, as may be seen at Wren's Nest and Dudley Castle, shews us, probably, that they have been lifted up from beneath the coal strata by a force from below; which, in fact, may

have raised up the whole area of the coalfield through the new red sandstone, afterwards carried away by denudation. This internal action has also been attended with the formation of the Rowley basalt, which Keir correctly supposed to have been ejected in a fluid state from the bowels of the earth, and to have spread out on the surface. As might be inferred from these views, the coal strata dip away from the limestone or rise towards it, whilst they are continued under the sides of the basaltic hills. The basalt was, consequently, also formed after the coal measures. The strata on the west side of the limestone ridge, are the most inclined, and more coal is got to the east, the dip being less and the coals to be found to a greater distance. The existence of a bed of coal, about ten yards thick, is a remarkable feature in this field: according to Keir, this bed occupies twenty-eight square miles, extending from Wednesbury and Bilston to Amblecote, Brettell Lane, and the Lye, but it may, perhaps, occupy about thirty-six square miles, being more extended than he supposes. It, however, is only found in the southern portion of the coal-field, being a bed which crops out to the north; and the lower thinner beds of coal, attended with more ironstone, are only found in the extensive tract reaching as far as Brereton near Rugeley. The thick coal also crops out to the south west near Stourbridge; and whilst the edges of the coal strata around the coal-field generally rest against the edge of the new red sandstone, being brought up by a fault, here the lower beds are observed to dip under it.

Although the coal strata are cut off, as it were, by the new red sandstone, it is now ascertained that they are frequently only raised at the fault above mentioned, and that the regular coal-beds may, in fact, often be found at some depth below the red rock. Thus, near Christ-

church, two hundred and sixty-nine yards from the surface, the coal has been attained in this situation, as well as in other spots; and even in some places on the outside of the fault beds of coal may be seen on the surface to dip under the new red sandstone.

Besides the basaltic rocks, which have been formed on the surface at Rowley and Clent, there occurs a rock which is considered to be a volcanic grit or tufaceous conglomerate (*Trap Tuff* Yates, Geol. Trans.), often pierced by the shafts of collieries, and called *Espley-rock*, *Peldon* or *blue* or *green-rock*, by the miners. It frequently occurs in thick strata, and is commonly of a green colour, weathering on exposure to dingy yellow, red, &c. It is prevalent in the south part of the coalfield, but there is also an extensive bed, north of Wolverhampton. According to Mr. Murchison it is, as observed above, "a variety of volcanic grit;" and as it alternates in many beds, both with the lower new red sandstone, and the upper strata of the coal measures, there can be little doubt that it was formed from the detritus of submarine volcanoes, which were in action towards the close of the accumulation of the coal measures. The basaltic rocks of Rowley, Powk Hill, &c., have been obtruded through these beds of volcanic grit; and, consequently, are more modern. It, unlike most of the other strata, varies much in thickness, and in some cases seems to throw off vertical dykes.

One bed of coal, described by Keir, and called the *flying-reed*, parts from the higher beds of the main coal at Bloomfield colliery, and, continuing to diverge for several miles, crops out before it gets to Bilston. There are other beds of coal of several feet in thickness above the *main coal*, one of which is called the *broach coal*, being the uppermost bed of any consequence, and so called as being "the index

by which the rich field was broached or tapped." Owing to the separation of the flying-reed alluded to, the main coal at Bilston is thinner than further south at Corngreaves, Tipton, &c., where it attains ten yards in thickness: it is only eight at Kingswinford, and but seven at Darlaston. The soft *clunch*, which at first separates the flying-reed from the main coal, gradually becomes so hard a rock as to strike fire with flint.

The main coal differs in appearance and qualities in different parts of its thickness: the following is a table of it, as it occurred at Catchem's Corner; and others are given in Murchison, Plot, and Pitt, and in Smiths "Miner's Guide," as well as of the strata above and below the main coal, for which, however, we cannot find space.

THE MAIN COAL.

	Feet.	Inches.
White coal, very good shop coal	3	0
Tow coal, best furnace coal	2	0
Brazils, very good furnace coal	3	6
Bat, hard useless rubbish	0	2
Foot coal, very good	2	6
Hob and jack, rubbish with nodules of ironstone	2	0
Slip coal, moderately good	2	0
Stone coal, good but with stone intermixed .	3	0
Patchels, moderately good	2	0
Sawyer, very good	2	6
Slipper coal, equal to the last	3	4
Bat, useless	0	4
Humphreys, good, with waste matter intermixed	2	6

The Wednesbury rock, a fine gritstone, occurs thirty yards above the main coal, and is about eight or nine feet

thick. The Bilston rock is another bed, lying immediately above the main coal, and is ten yards thick : it is much used for building and for grinding-stones. The sandstone of Darlaston, an excellent building material, rises from below the main coal, and immediately overlies the *new mine* coal. This is very rich in vegetable fossils.

Near Stourbridge, where the lower measures rise from beneath the main coal, they are worked principally for the celebrated *fire-clay*; very valuable for its property of withstanding unaltered intense heat; and, consequently, much used for crucibles, firebricks, and other purposes. Two courses of it occur, the lower of which, lying beneath the bottom coal, is the most valuable.

This coalfield is not a trough or basin, not being surrounded by older rocks, on which the coal measures rest; the measures dip from the hills of Dudley and Sedgley, arising in the area of it, and from the limestone strata of Walsall on its eastern side; with other less remarkable points of elevation.

The bands of ironstone are, as observed above, most numerous in the lower measures: about Wolverhampton there are six, each containing several courses: whilst, in Keir's time, only two beds of ironstone were worked, that under the broach coal, and that under the main coal.

The beds between the strata of coal and ironstone present an infinite variety in their appearance at different parts: *clunch* and *clunch binds* differ from *rock* and *rock binds* in shivering when exposed to the weather: red or yellow clunch is called *wild*, blue or grey *kindly*, as the latter more betokens coal. *Penny earth* is clunch containing many nodules of ironstone. Of *peldon*, blue rock, &c., we have spoken above. *Bat* or *bass* is black, bituminous shale.

The lower strata of the coalfield have now been *sunk* into several hundred feet, presenting the usual alternations of clay, shale, (or clunch, binds, and bat,) rock, roach, (ferruginous clay,) smut, coal, ironstone, &c. As many as twenty beds of coal of various thicknesses, from a few inches to four yards, occur; and the principal beds descending are the *heathen coal*, *penny or rubble*, *stinking or sulphur coal*, *new mine*, *fire-clay coal*, *phims or little coal*, *cannel*, *gaynes*, *bottom*, *singing coals*, and *slums*. The beds of ironstone are also known by different names, *new-mine*, *white ironstone*, *penny-stone*, and *ironstone balls*, *poor robin*, *gubbin*, and *blue flats*. Some few of these may be different names for the same bed, the thickness and distance between them varying much at different collieries.

Near Brereton, at the northern extremity of the coalfield, there are several collieries; and in one or two places the coal has been got under the sandstone, and gravel of the new red sandstone, though in other places the coal measures appear bare. They have been pierced seven hundred feet, and twelve or thirteen beds of coal have been found, varying from a few inches to nine feet in thickness. At the S.W. of Beaudesert, cannel has been got; at Brereton there appear to be the usual accompanying ironstones. The beds vary in their dip, which is trifling in degree, and generally N.E.; occasionally E. and W.; faults also exist.

MILLSTONE GRIT.

The villages of Rushton Spencer, Flash, Ipstones, Longnor, Sheen, Tittesworth, Meerbrook, Stanley, Bagnall, Wetley, and Cotton, in north Staffordshire, are situated upon the millstone grit or limestone shale. It lies upon the limestone and limestone shale, when these strata are

present, and is itself covered by the coal strata; all these different formations lying conformably to each other. It generally offers the appearance of gritstone of different degrees of fineness, composed of rounded particles of quartz, and other rocks, and more or less firmly cemented together. Sometimes it is a fine grained sandstone, at other times a pudding stone composed of large rounded pebbles. The colour is frequently red or dull yellow, more commonly whitish, turning dark when exposed to the air. As a building stone it is indestructible; soon, however, putting on the hoary appearance of antiquity. It is also valuable for millstones, whence its name; there is a noted quarry for these on Mow Cop. Three or four of the white varieties of this formation are used in the manufacture of pottery. Some varieties are marked, when fractured, with numerous round red stains, caused by the oxide of iron. These are the species which form excellent hearths for smelting furnaces, and the grit for this purpose has been got at Revedge, north-west of Warslow, &c.; it also abounds above Knypersley. The stains are occasionally beautiful in appearance, shaded off externally around the margin and enclosing, with a defined inner edge, a round space of a lighter colour than the rest of the stone, and in the centre of this a little empty cavity which, probably, may account for the formation of the stains. In the lower beds of the millstone grit, in some situations, occur very micaceous strata of flagstone; such are quarried at Axedge, Morredge, &c.

The thickness of the millstone grit is supposed to be four or five hundred feet; as observed before it constitutes the highest ground in the county.

Six or seven lines of dislocation and elevation may be noticed in this formation, running more or less north and

south ; and the rows of cliffs produced by these elevations are frequently very bold and curious. The surface of these rocks is also frequently polished, and scored in a remarkable manner, a phenomenon which, in some cases in other districts has been attributed to the attrition once produced by bodies of rock and boulders, moved over such surfaces by the progress of glaciers. Perhaps in this case it may have been caused by the upheaving of the strata. The sulphate of barytes or cawk abounds in the veins of the millstone grit. Lead-ore occurs in it occasionally, as south-west of Mow Cop, where in one place it has been worked.

The fossils of the grit are the same as those of the coal measures. Calamites are common, as at Mow Cop ; impressions of *Lepidodendron* abound at Wetley : ferns are rarer ; specimens of *Stigmaria* also abound, particularly in a hard bed at the bottom of the grit.

MOUNTAIN LIMESTONE.

The mountain limestone is the oldest formation existing in the north of the county, and undoubtedly exists below the coal strata and millstone grit. It only appears at the surface in a space of about forty square miles to the N.E., where it enters the county from Derbyshire, and much of this surface is occupied by the limestone shale.

The mountain limestone is considered to be a tranquil deposit from an ancient sea, such a one as is now forming in many places at the bottom of our ocean. That it arises from a tranquil deposition is indicated by the perfect state in which its many fossil shells and corals are found.

Associated with this limestone, but nowhere, perhaps, distinctly in Staffordshire, though it appears near its

borders, occurs a dark, greenish, spotted stone, called *toadstone*; this is found lying in horizontal beds between the strata of limestone. Whilst the very perfect fossils reveal to us how the limestone was formed tranquilly at the bottom of the sea, this formation shews us how the mass of limestone was raised from the ocean to the height it has now attained above its level; for this stone is evidently an igneous or volcanic rock, was injected in a fluid state from the bowels of the earth, and has upheaved the beds of limestone, frequently insinuating itself between their layers. The toadstone has its cells occasionally filled with hornblende, zeolite, mesotype, agate, &c. Occasionally, however, it abounds with cells, which are empty, from the decomposition of the contained minerals.

The limestone must be, at the least, four or five hundred yards in thickness, which may be inferred from a study of the beds as they crop out, or rise to the surface. The lowest bed, or fourth limestone, as it is called, has not, however, been penetrated. This alone occurs in Staffordshire. Farey and other geologists divide the limestone of Derbyshire into these four great beds or divisions, separated from each other by three layers of toadstone. This division is denied by Mr. Hopkins, who affirms that there is but one stratum of toadstone; Mr. Jukes contends for two at least.*

The mountain limestone does not attain the altitude above the sea, in Derbyshire and Staffordshire, which the millstone grit does. The Wever Hills, in Staffordshire, are 1154 feet high, some of the peaks about Alstonefield, Ilam, Blore, and Throwley have a greater elevation, the highest point of the Cromford and High Peak Railway

* See the Analyst. To the papers of the latter the author is somewhat indebted.

is 1270 feet ; but many of the gritstone hills, both in Derbyshire and Staffordshire, are several hundred feet higher.

These beds of limestone are, as may be supposed from the force which has uplifted them, not generally horizontal. The dip, or inclination of the strata, however, varies much ; the limestone district being the extremity of the great ridge which extends from Scotland into the centre of England, and the strata on each side that ridge dipping from it westward and eastward, we might conclude that the dip of the limestone in Staffordshire and Derbyshire would be the same ; and this is the case. But to the south the limestone dips southwards, and to the north it dips northwards, so that we may suppose the centre of the district to have been a focus where the elevatory force was principally exerted. But these observations must be much modified. For instance, where the limestone and grit are in connection in Staffordshire, the former is not always seen to dip under the grit, as might be inferred, but is raised up above it by a fault, presenting its face towards it, and dipping in the opposite direction, or nearly so. In fact, in Staffordshire, no particular plan of dip is evident. Frequently, in the steep hills, the strata are conformable to the surface, unless a fault occur, but this is not a rule without exceptions. The existence of mineral veins frequently point out spots where more than usual upheaving force has been exerted, and, consequently, from such localities the strata frequently dip. The line of these mineral deposits may be sometimes traced for many miles, both in Derbyshire and Staffordshire, running commonly from east to west, or, it may be, deflexed as much as fifteen degrees south of the last point. Such is the case at Mixon, Wetton, and Warslow ; but there are cross veins running in the opposite direction.

In Staffordshire, the limestone is sometimes particularly remarkable for the contortions it exhibits, having been thrown up and twisted in an extraordinary manner. Mr. Jukes has remarked this in Ecton Hill, where on both sides of the river, we notice the same striking appearance; also at the quarries at Waterhouses. It may likewise be observed, in much larger contortions, on the side of the hills in Hope Dale, near Alstonefield; also at Grindon.

As a general rule it may be noticed that the ridges formed by these saddle-shaped elevations run north and south, or nearly so.

The structure and appearance of the mountain limestone vary. In colour it is grey, brownish, or black. Many of the varieties are much used as marbles, such is the grey entrochal marble, and the black marble of Ashford. Other varieties are what are called coralloid, madreporite, and bird's-eye, also rosewood, *roso-moderno*, (found near Buxton,) and heliotrope marbles. Several of the varieties are cherty, gritty, or ferruginous; not marbles at all. Many of the species are found at Wetton, Hartington, Newhaven, Cold Eaton Dale, &c. The colour of the Ashford, and other black marbles, is due to bitumen, as they burn perfectly white: a similar variety, with numerous small shells, called porphyritic marble, occurs at Wetton.

There are some beds of limestone which contain magnesia; such occur at Ecton. A fetid odour is often perceived when pieces are struck or rubbed (Wetton). Silix, or chert, often occurs in the limestone, being found in beds several feet thick near Bakewell, where quantities are quarried for millstones; this is of a lightish colour. Thin layers of black silix occur in other places, as at Mixon and Ecton.

Lead ore, it is well known, occurs plentifully in the mountain limestone, in veins, &c. Rake veins are vertical fissures in the limestone, varying from a few inches across to as many yards, and running across the country, as observed before, for miles. The ore, (sulphuret of lead or galena,) lies in the veins in crystals, or laminæ, in a matrix of calcareous spar, calamine, fluor, or barytes. At Mixon, the lumb, or main vein, is frequently four or five yards wide, producing, (but now little worked,) copper pyrites, galena, and sulphuret of zinc. Some of the shafts are five hundred feet deep. The north veins are most productive of copper ore, the south abound in galena. Of the mine of Ecton we shall speak in another place. The galena at Bincliff occurs in a matrix of barytes, but is not much worked. Lead mines also occur on the hills south of Ecton, and a productive one in lead and copper has been worked for some years in the valley of the Manyfold, lower down, at the foot of the hill. Copper and lead ore have likewise been obtained in the Staffordshire limestone, or limestone shale, at Warslow, Elkstone, Berresford, Butterton, Grindon Moor, Caldon Low, Wever Hills, and other places. In Derbyshire the beds of toadstone do not always cut off the veins of ore, and the ore is frequently more plentiful below a bed of toadstone than above it. The nature of the rock is said to influence the quantity and quality of the ore.

The mountain limestone of Derbyshire and Staffordshire abounds in fossils, in some places appearing almost entirely composed of them. They consist of beautiful corals, such as the *Syringopora*, *Turbinolia*, and *Caryophyllea*, and crinoidal animals, (*Entrochi*, or screwstones) so often cut across in polished Derbyshire marble: the heads of the crinoida are rarely found. Also bivalve shells, as the genera *Pro-*

ducta, Terebratula, Spirifer, Pleurorhynchus, and Inoceramus: and univalves, Goniatites, Bellerophon, Orthoceras, Nautilus, Pleurotomaria, Natica, Euomphalus, &c. Trilobites have also been found by Martin, Jukes, &c., at Ashford, as also the teeth of fishes.

In studying these fossils, we perceive that they are entirely marine in their character; that very few of the genera, much less species, are now found in any part of the ocean; and that those families of shells which now are small in number in proportion to other genera, such as the Brachiopoda and Cephalopoda, formed a much more considerable proportion of the entire number of genera in the seas in which the limestone was deposited.

The mountain limestone is remarkable for the caverns which occur in it. Those of Derbyshire are well known, particularly the Devil's Cavern at Castleton. Poole's Hole near Buxton has been noticed elsewhere for its stalactital concretions; its mouth is contracted, being choked with limestone rubbish. The entrance first runs westward for eighty yards, when it expands into several large vaults, and makes some turns. A stream of water runs along the floor, and the exit from the cavern is below the road by which it is entered.

Thor's, or Thyrsis Cavern, or Hobshurst Hole, has also been before alluded to. The entrance is a very bold natural Gothic arch, in the side of a rock which rises three hundred and fifty feet above the bed of the river below. Its roof is rounded, and presents an appearance of being worn and corroded by the action of acidulous water passing through, and acting upon it. Many little rounded cavities are seen on its sides, probably due to the same cause. It is filled up with rubbish at some distance from the entrance. Much clay is seen on the floor, mixed with

rounded boulders, stalactites, and bones. This cavern was evidently once continuous with others, to be seen above it, and which have been laid open by some of the strata being carried away or dislocated; the same observation applies to other caverns situated near Wetton Mill, on both sides the river. Others exist in the Hamps Valley, Yelpersley Tor, and several remarkable ones in Beeston Tor, of considerable extent, in one of which, also, upon digging in the floor, the author found numerous rolled pebbles in a kind of mud, and many fragments of stags' bones. Other caverns are seen in Dovedale. Reynard's Hall is a fine arch about forty feet high, by eighteen in width, situated in a rock which has been parted from another in the hill side, in which also exists a corresponding cavern, called Reynard's Kitchen. There are other natural arches in this picturesque valley, called Dove Holes, &c. On the Staffordshire side a fine isolated rock has been cleft into four portions, by two cross fissures. Other caverns also exist in Staffordshire and the adjacent part of Derbyshire, and in some cases deep open holes are seen, as at Hanson Grange, Hartington, &c.

Some of these holes and dislocations in the strata are called *shake-holes*, and *water-swallows*, as they frequently absorb small rivulets, or in fact, as was before mentioned, considerable rivers. Such occur at Haughton Cross, Dowall, Gatcham, Grindon, Waterfall, with some others, particularly those of Waterhouses and Darfa, into which the rivers Hamps and Manyfold run.

In Staffordshire the pretty villages and hamlets of Berresford, Alstonefield, Butterton, Wetton, Onecote, Grindon, Waterfall, Caldon, Calton, Ilam, Blore, Upper and Lower Elkstone, and Warslow, are situated upon the limestone, or at its edge, where it joins the limestone shale.

This formation—the limestone shale—may be considered subordinate to the limestone, though it is supposed to be five or six hundred feet thick. In appearance it varies much, being frequently little different from the coal-measures, beds of which it contains at its upper part, and below it runs into the upper beds of limestone. It contains also beds of grit above, and there runs into the millstone grit. The limestone of Staffordshire has a belt of it to the north, and it is seen in many places in the high moors to crop out from beneath the grit, in the valleys and gullies.

Impressions of plants are found in this shale, perhaps the same as those of the coal formation. It will split into useful flags and slates. It contains much ironstone, and the water rising from it is exceedingly ferruginous. The chalybeate spring at Buxton probably rises from it, as that town is situated on the edge of this formation. Sulphur is occasionally seen on the shale.

It is remarkable that the limestone shale and mountain limestone, after running under the millstone grit and coal-measures of the north of Staffordshire, again make their appearance on the opposite side above Astbury, on the Cheshire border. Here the limestone, which of course should be the first, or highest bed of limestone, and not that of the other side the district, which is the fourth, or lowest bed, is worked at the foot of Mow Cop, and it dips S.E. under the Pottery coalfield, at an inclination of about eighteen inches in the yard. *Turbinolia*, *Caryophyllea*, *Syringopora*, and bivalves, abound in this limestone. It has a dark appearance, and is often spotted with green, and also stained red. Much barytes and calcareous spar abound in it. The lime obtained from it is darker-coloured than that of Buxton or Caldon Low, and as it is

preferred by the Cheshire farmers, may probably answer better on their sandy soils, being perhaps more argillaceous. In the limestone shale, above the limestone, higher up on the hill, occur isolated masses of clayey limestone abounding in shells. To the west the strata are perceived again to dip in an opposite direction, under the plain of Cheshire, being in fact at these lime-works of Astbury of a saddle-shaped form.

It would be out of place to discuss here the subject of warm springs, which occur, it is well known, in the limestone at Buxton, Matlock, and Bakewell: they have been attributed to a variety of causes, to the existence of central heat, the decomposition of mineral matters, &c. Buxton is just without the limits of the county.

COMPOSITION OF BUXTON WATER.

		In a pint.
Muriate of soda	. . . . .	0.23 grs.
Sulphate do.	. . . . .	0.08 "
Muriate of lime	. . . . .	0.07 "
Carbonate do.	. . . . .	1.30 "
Muriate of magnesia	. . . . .	0.07 "
Azote	. . . . .	0.580 cubic inches.
Carbonic acid gas	. . . . .	0.187 "
Extractive matter	. . . . .	a trace.

Dr. Pearson discovered the nitrogen. Its temperature is 82°. It is nearly colourless, though it has a slight beautiful green tinge from the organic matter which it contains, and which adheres to the tiles and marbles in a thin slime; it is nearly tasteless, and gives but little deposit on standing, but forms some scum. At a bath it is tepid, but feels cold at first; yet, from its stimulating effect, it produces a remarkable sensation of warmth. The saline and earthy ingredients of the water would not lead us to suppose that it possesses any remarkable medicinal effect, but the cases where benefit has been

derived from it are too numerous to be questioned, particularly those of rheumatic and paralytic affections. Its gaseous contents are probably its most active agents. The chalybeate spring here deposits iron, of which it tastes strongly. Its temperature is from 52° to 55° . Taken internally, it would probably be an excellent remedy in proper cases; it is now principally used as a collyrium.*

Matlock water contains sulphates and muriates of magnesia, lime, and soda. Its temperature is 68° .

The Bakewell water contains $3\frac{1}{2}$ grs. of sulphate of lime and muriate of soda in a pint of water. Its temperature is 60° .

THE SILURIAN SYSTEM.

Of the upper Silurian rocks, the Ludlow and Wenlock formations, the former is uppermost, and occurs around Walsall, at Sedgley, and at the Hayes. These beds at Sedgley are thrown up from north to south, the strata dipping to the east and west, the latter inclination being most prevalent. Beacon Hill is composed of this formation; and at this place, and in a prolongation from its north and south extremities, the strata have been raised up through the coal measures in the form of an elongated dome, the coal dipping from it on all sides, with various degrees of inclination. The upper argillaceous sandstones are removed, in many quarries, to get to the middle beds of this formation, the Sedgley, or Aymestry limestone, of which much of the high ground here is composed. These argillaceous sandstones contain the *Leptæna lata* and *Serpuloides longissima*.

* In the water of the warm spring we find that the ferrocyanide of potassium gradually produces a faint blue tinge, and it must hence contain a trace of iron. The same test produces, in a short time, a bright blue colour in the chalybeate water, which must, therefore, contain a considerable portion of protoxide of iron.

The limestone has also the shells which characterize it in Shropshire, as the *Lingula Lewisii* and the *Terebratula Wilsoni*; also *Pentamerus Knightii*, a large shell, but less general. The limestone burns to a dark argillaceous lime, proper for light lands, and valuable for mortar, particularly if it is to be used under water.

This middle bed is separated from the Wenlock (Dudley) limestone "by a considerable thickness of shale, the equivalent of the lower Ludlow rocks."*

At Turner's Hill and the Hayes the same rocks occur: at the former place, *Terebratula Wilsoni* and *Pleurotomaria* occur; at the latter, the upper beds contain *Leptæna lata* and *Cypriocardia amygdalina*; and the limestone, the usual shells, *Terebratula Wilsoni*, *Pleurotomaria*, *Productus depressus*, *Atrypa affinis*, &c.

The Wenlock limestone is seen at the Wren's Nest, Dudley Castle, and the Priory, Hurst Hill, and Walsall, which last town is built upon it. At the first places it occurs "in several elliptical masses, trending in parallel directions from 10° west of north, to 10° east of south." Wren's Nest is a most remarkable and interesting example of this formation. It is of an elliptical form, rising up, as described before, with the beds which compose it highly inclined and folding round it; the strata have an inclination of 60° on the eastern, and 45° on the western side; it is in the form of "an elevated dome, the calcareous summit of which was truncated during a period of elevation, when the harder or calcareous strata, forming the crest, being snapped asunder, the fragments were removed by subsequent denudation." The inclined external strata are deficient to the N.W., where a natural ingress is obtained to its curious interior, excavated and quarried

* Mr. Murchison.

in a remarkable manner, for the sake of the limestone, with extensive artificial caverns, extraordinary, but perhaps less imposing than those of Dudley Castle Hill. A remarkable fracture occurs to the S.S.E., near the farmhouse, where the external strata have been ruptured. This hill has a centre, or *nucleus*, of shale; the limestone rising around it lies in two beds, the uppermost being twenty-eight feet four inches, the lower forty-two feet three inches, in thickness: the beds are divided into substrata bearing different names; they are also parted by beds of grey shale, or *rotch*, containing concretions of impure limestone, or *bavin*, and there is about a hundred feet of these beds above the upper limestone, between the two ninety, and beneath the lower sixty, exclusive of the central, or Wenlock shale. Many concretions, called *crogs*, occur in the limestone itself, which are more crystalline in texture, and interfere in a remarkable manner with the stratification. The most beautiful organic remains lie in the surface of certain flag-like beds of the upper limestone.

This limestone has not only been quarried from the surface, but also by shafts driven into the sides of the Wren Nest, by which its caverns may be entered; and likewise by shafts sunk at its foot.

Dudley Castle Hill is of similar formation, with two beds of limestone, and has been equally perforated and quarried in all directions. At Hurst Hill and Cinder Hill a similar ellipsoid elevation of the same rocks occurs, the strata dipping under the Ludlow rocks and coal measures, more or less inclined.

The Wenlock formation occupies a greater area around Walsall: to the east it is overlaid by the detritus of the new red sandstone, which is thrown up into the high hills of Barr, to the west it is separated from the coal measures

by a fault. The strata strike north-east and south-west, thus differing from those of Dudley and Sedgley. The beds dip to the north-west at angles of 40° to 50° ; however, in some situations the beds here also are seen to have been thrown up in dome-shaped masses. The limestone of Rushall, Daw End, and Walsall, is about eleven yards thick, and has now to be extracted by shafts, the outcrops being exhausted. The limestone at the eastern boundary is thinner, but, as it is much less inclined, it is still got by open-work. Much of the Walsall limestone tract is occupied by the shale of this formation, forming a cold argillaceous soil. The limestone strata may be proved to exist below the lower coal strata; and, consequently, Mr. Murchison justly remarks, that it is absurd to sink in this tract for coal, as has been done: this shale may, of course, be distinguished from the coal-shale by its fossils, those contained in each being characteristic. The line of limestone, between Hay Head and Ginity Greaves is considered to turn in a saddle shape accompanied with the coal measures, and again to dip south-east under the strata of Barr Beacon. The usual shells are found in these beds, and the band of Hay Head also contains large *Orthoceratites* and the rare trilobite *Isotelus* or Barr fossil; but of these in another place.

As observed above, the limestone has occasionally, in some spots, been reached through the lower coal strata; and latterly both the valuable beds of Wenlock limestone have been attained through the upper coal strata at Dudley Port (at a depth of two hundred and eight yards to the upper bed), where they are thrown up by a fault.

IGNEOUS ROCKS.

Various instances of imbedded trap, volcanic grit, and trap-dykes, have been given above. The Clent Hills are situated in an isolated part of Staffordshire, at the extreme south, and these rounded and verdant hills are composed of a "brownish red, compact felspar, occasionally porphyritic, and sometimes passing into a fine concretionary rock." These hills vary in height from eight hundred to one thousand feet above the sea; their summits are conical, and their sides steep and indented with combs. The peculiar rock of which they are composed occurs in loose pieces, no entire rocks being visible. They are upheaved through the new red sandstone, and are, consequently, of later formation.

The trap rocks of the south Staffordshire coalfield are interesting. Cawney, Tansley, Warren, Turner's, Hailstone, Hawes, and Highman Hills around Rowley, are composed of trap. The rock is well known as the *Rowley Rag*, and is much quarried for road-stuff. It is a hard, fine grained, crystalline greenstone, in some cases approaching very nearly to basalt, being an intimate mixture of grains of hornblende with small crystals of felspar, and a few grains of quartz. It sometimes puts on a columnar form, as is beautifully seen at the Pearl quarry, and in Tansley Hill. No doubt is entertained now as to the igneous origin of these rocks: the coal and sandstones have been raised up by them in places, and the former changed to smut, and the shales also much altered in appearance: but, as mentioned before, in other cases the trap has been poured out on the surface so as to present a mushroom-like form.

The trap rocks of the south, however, vary in character. At the Devil's Elbow one variety of the rock has a base

of felspar, coloured green by chlorite, and traversed by streaks of calcareous spar; a second is an amygdaloid with large kernels of calc spar; and a third is a crystalline hornblende rock, like that of the Hailstone. Outbursts of these rocks also occur at Netherton, Russell's Hall, Cowper's Bank, Fiery Holes, Barrow Hill, Brierley Hill, and in the town of Dudley, frequently throwing up the lower and unproductive coal measures to the surface: much of the coal near these spots being spoiled; whilst, on the contrary, the ironstone is said to be improved. The basalt at Cowper's Bank has a burnt and calcined appearance, from the coal strata near having taken fire. A basaltic rock like that of Rowley appears on the surface at Powk Hill, between Walsall and Wolverhampton, and on the crest of the hill is seen in clusters of four sided columns. At Bentley-forge the angles of the prisms exfoliate, and they run into spheroidal concretions, it being "easy to reduce any of these masses by fracture to a small *nucleus!*" Trap also occurs at Birch-hill.

The minerals frequently or occasionally found in these formations in South Staffordshire, are quartz, jasper, chalcedony, zeolite, mesotype, prehnite, chlorite, calcareous spar, sulphate of barytes, and pyrites.

The irruption of igneous rocks was, no doubt, the cause of the faults which occur in this, as in all other coalfields, which, however, we cannot dwell upon. Some of these took place after the insertion of the imbedded trap; but for a description of the several faults, and for further information on the south Staffordshire coalfield, the igneous rocks, transition limestone, and their fossils, we refer to Keir in Shaw's Antiquities of the county; Aikin, Geol. Trans. vol. iii. old series; Midl. Geol. Soc. Committee, Birm. Herald, June 30, 1842; Smith Phil. Mag. vol. xii.;

Thompson, *Ann. of Philosophy*, vol. viii.; and, above all, to Mr. Murchison's masterly "Silurian System of rocks," to which we acknowledge ourselves much indebted in the above epitome.

OLD RED SANDSTONE.

The natural position of the old red sandstone is between the Ludlow formation and the mountain limestone. It is a formation of great thickness and importance, and is alluded to here, because a member of it, the cornstone, occurs in Staffordshire, north of Bewdley, where it is burnt for lime, and the coal strata of that district rest upon it; it is marked by the existence of fossils, many of which are peculiar to it, and in this situation it is clearly distinguishable from the new red sandstone, and the calcareous conglomerate of its lower beds, by the unconformable position of the two.

The Wyre, or Bewdley Forest coalfield, extends into the county in this south-west part of it. This coalfield is extensive, but the beds of coal are thin and pyritous. A section of its beds of coal, shale, grit, and sandstone, is afforded along the Severn, from Upper Areley to Bewdley: some of the sandstone is of a fine quality, but though the coal itself has been worked in many places, it has not proved profitable.

Trap rocks occur in this coalfield. A trap dyke runs south-west and north-east for two miles and a half, from the Severn to Coldridge Wood, north-east of Shatterford. It is formed by a fine grained greenstone, highly crystalline, the hornblende for the most part predominating over the felspar. It throws up, and alters the coal, shale, and

sandstone. Coal is here got at the surface, and the basalt is quarried to mend the roads.

At War's Hill, an ancient place, but in Worcestershire, occurs a basaltic rock of compact dingy red and purple felspar, similar to the rock of the Clent Hills.

A TABLE OF MINERALS.

Natron, or sulphate of soda. On the walls of galleries in coal-mines near faults, Fenton Park.

Alum. In coal strata, undergoing decomposition.

Gypsum. The *massive* variety common; *crystallized* occasionally in massive gypsum; *fibrous* at Shirleywich, &c.

Fluor Spar. *Yellow* and *white* at Ecton. *Purple* at Ecton Hill, 1842.

Calcareous Spar. Ecton is celebrated for its great masses of large crystals of the *dog-tooth* variety; some of these are a yard or more across, and the crystals contain copper pyrites. In *three-sided pyramids*, shortened with three upper faces, the sides somewhat convex, and the edges obtuse, with particles of metallic matter within; Mixon. In large *six-sided prisms* at Ecton Hill.

Stalactites and Stalagmites. In caverns, also in coal-mines. *Hollow* at Botstone. A substance similar to *Rock milk* on the roof of a cavern.

Carbonate of zinc or calamine. Ecton.

Carbonate of barytes. Mixon.

Sulphate of barytes. Abundant at Mow Cop, and in sandstone at Stoke-upon-Trent, occasionally *spheroidal* or *earthy*. *Ramose* barytes, or *brainstone*, and *calciferous*, or *stalactital* near Buxton, (*Derb.*)

Sulphate of iron. In the partings of coal in one of the upper beds in north Staffordshire.

Carbonate of lead. Mixon, north of Hartington, &c.

Phosphate of lead. Hartington and Matlock, (*Derb.*)

Oxide of manganese. In the new red sandstone, coal strata at Stoke-upon-Trent, and grit. Manganese gravel.

Carbonate of copper. *Green* combined with sandstone at Maer, Mucclstone, &c. *Blue* at Ecton.

Protoxide of copper. Ecton, &c.

Phosphate of iron. In the mud of the Minster Pool, Lichfield, Dr. Wright. In peat.

Quartz. The Derbyshire diamonds are found near Buxton, and at Ecton and Wetton in Staffordshire; in the former case on the side of Grinlow, and amongst fragments of cawk. The largest specimens which we have obtained are rather under an inch long, being very perfect six-sided prisms, with a six-sided pyramid at each end, and some compound; frequently of a dull rose colour, at other times clear and colourless, and in that case used for ornamental purposes.

Porcellanite, or porcelain-jasper. From the action of fire upon clay; and varying in appearance, some specimens being striped. Bradley.

Agate, jasper, cornelian, and obsidian in gravel. Prehnite, zeolite, &c., in igneous rocks.

Chert. Veins of black chert at Mixon and Ecton.

Native copper. In a fault at Fenton Park. Ecton mine, Mr. Attwood.

Titanium. Beautiful specimens in the Birmingham Museum in slag, from an iron furnace in south Staffordshire.

Native gold. A crystal in a boulder, Mr. Abington.

Copper pyrites. The *iridescent* variety of extreme beauty at Ecton and Botstone; also in coal measures.

Iron pyrites. Common in the coal measures. Extremely brilliant and iridescent on cannel at Golden Hill. *Sta-*

lactital, and in large masses at Botstone, 1839. Some seams of coal are useless from the pyrites which they contain. Green vitriol, or sulphate of iron, is made in north Staffordshire from pyrites, by the decomposition produced by the action of the atmosphere, and lixiviation. This spontaneous decomposition from air and moisture is the cause of the high temperature of some coal and ironstone mines, in some cases almost insupportable; also of the spontaneous combustion of mines and coal-beds. *Arsenical* pyrites, Botstone.

Sulphuret of lead or galena. The common lead ore of Staffordshire and Derbyshire. In coal measures at Golden Hill, Kidcrew, Fawnsfield, &c.

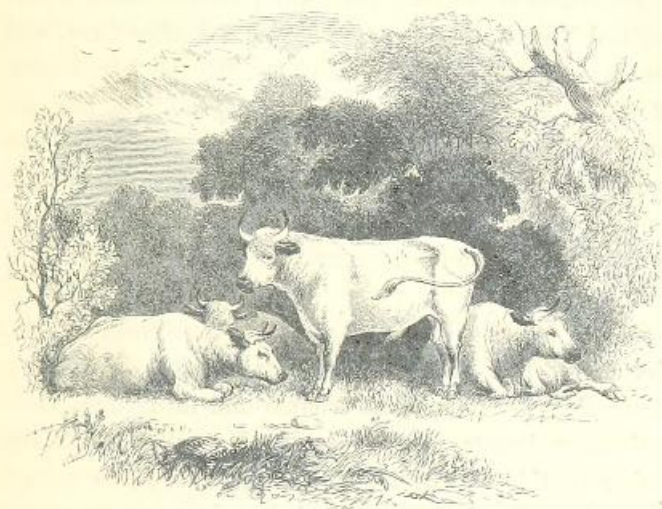
Slickensides. Formerly at Ecton.

Sulphuret of zinc or blende. Abundant at Ecton and Mixon; also at Golden Hill, Mow Cop, and south Staffordshire, in the last cases in coal measures. In the centre of the stems of fossil plants.

Sulphur. In limestone shale; where ironstone has been calcined. The result also of spontaneous combustion of coal measures.

Carburet of iron, or plumbago. Formed in the bottoms of smelting furnaces. Iron pipes passing through coal measures are also sometimes changed into plumbago.

Bitumen. In the cavities of shells at Caldon Low. The curious substance *elastic bitumen* is, as is well known, found at Castleton in large masses. It is insoluble in alcohol, but partially so in ether, naphtha, and oil of turpentine, and rendered transparent by these agents, we can perceive no traces of vegetable structure.



WILD CATTLE.

CHAPTER VII.

ZOOLOGY.—MAMMALIA, BIRDS, REPTILES, FISHES.

IN drawing up the following lists, the author has been assisted in the quadrupeds, birds, and fishes, by communications from Messrs. J. B. Davis, Brown, and Tollet, particularly in the second class birds; and to them his best acknowledgments are due; as also, indeed, to A. Hewgill, M.D., Mr. Emery, and others. To Mr. Davis, also, he may in this place observe, he is indebted to a considerable extent for the list of beetles in the following chapter; and as much to Mr. Brown for that of the Lepidoptera, caught by himself near Burton-upon-Trent. Likewise, he must not

forget the communication of species found by the Misses Wright, Mr. Pinder, &c., in North Staffordshire.

The names of the Birds are given principally after Fleming and Yarrell, the Mollusca are named after Gray, and the Insects generally after Stephens, for the introduction of whose hard names he must apologize. He has not hesitated to make use of the beautiful volumes by Bell and Yarrell on the British vertebrate animals, the illustrations of which volumes rival those of Bewick, whilst the descriptions are the most accurate and interesting that have been given.

A very pleasing book has also been published, by Mr. Ronalds of Lee Fields in this county, "The Fly-fisher's Entomology." It contains original and interesting observations on insects, particularly the Neuroptera; and the author of this volume has, by permission, made use of the work, by far the best of its kind, and beautifully embellished with coloured figures.

Animals are divided into Vertebrate and Invertebrate. The former have an internal skeleton, and a brain and spinal chord, which are inclosed in a skull and vertebral column. The latter are destitute of these organs. Vertebrate animals are divided into four classes—Mammalia (or Quadrupeds, as they are commonly called), Birds, Reptiles, and Fishes.

MAMMALIA.

The mammalia of Great Britain are limited in number. Many of them, such as mice, shrews, and bats, are very small; and, amongst these, several new species which had been overlooked before have been distinguished of late years. Some of our common quadrupeds, as the mole,

dormouse, &c., are curious in their habits, and well worth the observer's attention. The skins of both quadrupeds and birds are most conveniently kept in boxes or drawers, instead of being mounted in glazed cases. After the skin is taken off, it must be brushed internally with a solution of corrosive sublimate, or rubbed with arsenical soap. If, however, it is intended to stuff the skin, and it is a small one, an easy way of fixing the wires, which are to support the animal, is to run them through a central cork, after they have been passed through the legs, &c. They may be firmly fixed in this cork by bending back their pointed ends and drawing them into it.

But let the author recommend the young observer of Nature, particularly of birds, rather to watch their interesting habits, to observe their nests, and to listen to and distinguish their varied songs, without destroying the beautiful little creatures. A useful companion will be a pocket-telescope, by means of which he will often be enabled to discriminate the plumage of birds, the markings of which he could scarcely discern with the unaided eye.

CHEIROPTERA.—BATS.

Vespertilio.

Common Bat, Flitter-mouse (*V. pipistrellus*). Very common, and occasionally seen out, even in winter. The bats are procured with some difficulty. When at rest, or torpid, they hang with the head downwards by the hind feet. So susceptible of impressions are the delicate membranes forming their wings, that, sensible of the greater or less distance of objects by the impulse of the air, they can thread their way with accuracy when flying in unknown places, and even when deprived of their eyes. The common bat lives principally on gnats and moths, the wings

of the latter of which it rejects; but it will also attack meat in a larder.

Great Bat (*V. noctula*). Not rare. This flies high, and is only seen in summer. *V. Nattereri*, from the roof of Stapenhill House, Mr. Brown. *V. Daubentonii*, not rare at Burton, id.

Plecotus.

Eared Bat (*P. auritus*). Not rare. Ears beautiful.

INSECTIVORA.—INSECT-EATERS.

Erinaceus.

Hedge-hog (*E. Europæus*). Abundant. Cruelly persecuted by man and dogs, from the latter of whose assaults it commonly escapes by the admirable power which it possesses of rolling itself up into a ball, and presenting its prickly coat to the assailant. It may easily be domesticated, and is advantageously kept to rid houses and gardens of cock-roaches, beetles, &c. Its skin is often put on the nose of weaning calves to prevent their sucking. Its habits are nocturnal, and it hibernates. It is a vulgar error (a most unhappy one for this poor little creature) that it robs the cow of its milk: it is however accused, perhaps justly, of destroying the eggs and young of game; and consequently is put to death by the gamekeeper.

Talpa.

Mole, Mouldiwarpe (*T. vulgaris*). Common. The form and structure of the mole are beautifully adapted to its subterranean life; its shape is quite cylindrical; its nose conical; its feet powerful for digging; its useless eyes almost wanting; but its smell and hearing most acute; its fur, from being perpendicularly inserted into the skin, offering no resistance to its progression backwards or for-

wards in its burrow. This last is almost as curiously formed as the dwelling of the beaver; it is often near water, but it may be seen on high hills, and it is said by Mr. Jackson, that it sometimes obtains a supply of water for drink by sinking a well: its food is principally earth-worms. It is a good swimmer, and is occasionally in summer seen above ground, when it is found to be much infected with parasitical insects. Its nest is formed of leaves, roots, and grass. Light-coloured varieties are very frequent.

Sorex.

Shrew, or Nurserow (*S. araneus*). Common. Falsely supposed to injure cattle. Sometimes spotted with white, or all white.

Water Shrew (*S. fodiens*). Common in North Staffordshire.

Oared Shrew (*S. remifer*). We have taken this several times. 1843 at Great Fenton.

CARNIVORA.—FLESH-EATERS.

Meles.

Badger (*M. taxus*). Not very common; killed in Trentham Woods, 1841. The badger, a plantigrade animal, has many of the habits of the bear, is slothful, and digs a subterranean burrow in the sand, which it only leaves at night. It feeds on vegetables, nuts, eggs, small animals, and honey.

Lutra.

Otter (*L. vulgaris*). Not rare: in the Trent, found occasionally nearly as high up as its source. Very destructive to fish, and sometimes carrying on its depredations inland: it may, however, be trained to catch fish for its master. It is frequently hunted, and when taken speared

with great ceremony. This animal is as beautifully adapted as the mole to its particular mode of life. According to Pennant and Izaak Walton, the Carthusians, with more ingenuity than good taste, considered this animal to be fish, and ate it on *maigre* days.

Mustela.

Weazel (*M. vulgaris*). Common. Half the size of the following, and the female much less. It feeds on mice, rats, and similar vermin; and, therefore, ought never to be destroyed. It occasionally becomes white in winter.

Ermine Weazel, Stoat (*M. Erminea*). Common. Destructive to game and poultry. Universally in northern countries, and not rarely here, its colour changes to white or party-coloured in winter, and it then becomes the ermine, the furriers inserting the black tip of the tail into the white skin. We have seen it take the water.

Polecat, Fitchet, Fomart (*M. Putorius*). Common. Larger than the two former; it feeds on game and poultry, will attack even geese and turkeys, destroying many more than it can eat; and will catch fish. Its fur is the fitch of the furriers. Its smell is rank.

Martin, Martin-cat (*M. foina*). This has occurred in woods near Dilhorne, Consall, in Needwood Forest, and in the limestone district. It lives principally on trees, pursuing birds and squirrels; it also frequents rocky places.

Vulpes.

Fox (*V. vulgaris*). Common in the more remote districts of Staffordshire, particularly in the limestone district, where the ground is too abrupt for the hunt; here many are bagged for sale. The fox is notorious for its cunning and fraud; it lives in burrows, which it steals

from the badger and rabbit. It soon detects the trap or snare laid for it, and is very difficult to tame. There are some differences in the appearance of the fox, and the sportsman gives distinct names to these slight varieties.

RODENTIA.—GNAWERS.

Sciurus.

Squirrel (*S. vulgaris*). Common; Trentham woods, &c. Beautiful in form, and active in its movements. It lays up stores of nuts, acorns, &c., in hollow trees. Its nest is curiously built, and is frequently placed in the fork of a tree.

Myoxus.

Dormouse (*M. avellanarius*). Probably not common; in Trentham woods, and occasionally in ricks and banks. Retired in its habits, and laying up, like the squirrel, a winter store of nuts, grain, &c., and, like it, becoming torpid in cold weather, only awaking and taking food on warm days; and also eating its food sitting on its haunches. In autumn it is exceedingly fat.

Mus.

Harvest Mouse (*M. messorius*). Rare, in fields and ricks. The smallest of British quadrupeds.

Long-tailed field Mouse (*M. sylvaticus*). Too common. Omnivorous and destructive, particularly in ricks; which may, however, be protected from its ravages by being placed upon pillars, taking care that no props or pieces of timber are ever laid against their sides.

Common Mouse (*M. musculus*). Abundant.

Norway, or Brown Rat (*M. decumanus*). Too common, and very destructive; breeding several times in the year, and producing as many as ten, twelve, or fourteen at a

birth. Originally from Norway; and it has destroyed the indigenous black rat in most districts. Occasionally pied. Mr. Brown.

Arvicola.

Water Vole, or Water Rat (*A. amphibius*). Very common. It feeds entirely on vegetables, and is destructive in gardens near rivers, eating carrots, &c. Killed white at Overseal, Leic. Mr. Brown.

Field Vole (*A. agrestis*). Very common. Food entirely vegetable. It is occasionally very destructive in gardens, particularly to pulse; also in plantations. They may be taken in pit-falls, or by proper traps.

Lepus.

Hare (*L. timidus*). Common. The hare does not burrow like the rabbit. It is admirably adapted for rapid flight, particularly an uphill course. Destructive to young trees, and fond of aromatic herbs. It has generally only one place of rest called its *form*, changing it, however, according to the season. It swims well. The female goes thirty days with young.

Rabbit (*L. cuniculus*). Common on light soil. Unfit for a long flight, and seeking shelter in burrows. Black and white rabbits, with other varieties, are not rare in a wild state.

RUMINANTIA.—RUMINATING ANIMALS.

Cervus.

Red Deer. Male, stag; female, hind (*C. elaphus*). Now found only in a few parks, Chartley, Beaudesert, &c.; in the former place, perhaps, derived from the ancient stock of Needwood Forest. Pairs in August, and the hind goes eight months and a few days with young. The

stag sheds its horns annually in February. Forty years back this noble animal roamed wild in the royal forest of Needwood, together with thousands of fallow deer; at the beginning of this century this forest was enclosed, and, according to Sir O. Mosley, some of the red deer survived for several years in the woods of Foremarke, &c., where they had taken refuge.

Fallow Deer. Male, buck; female, doe; young, fawn (*C. dama*). Abundant in parks, being more gentle than the former. Horns flattened, whilst in the red deer they are round, and this species casts them two weeks later than the stag. Its venison is superior, and its skin valuable; the horns are used for knife-hafts, and the shavings distilled into ammonia, whence the name hartshorn; also boiled to form a nutritious jelly.

Bos.

Wild Ox (*B. Taurus*). Chartley Park. A still nobler animal than the stag, exists in this county, and in its wild state. The wild ox formerly roamed over Needwood Forest, and in the thirteenth century, William de Ferraris caused the park of Chartley to be separated from the forest, and the turf of this extensive enclosure still remains almost in its primitive state. Here a herd of wild cattle has been preserved down to the present day, and they retain their wild characteristics like those at Chillingham. They are cream-coloured, with black muzzles and ears; their fine sharp horns are also tipped with black. They are not easily approached, but are harmless unless molested.

We have also several varieties of the domestic breed. The fine-bred, short-horned cows are preferred in the richer districts of the county and on the limestone; the smaller, more hardy, prick-horned breed, in the barren moorlands;

Trentham Park is stocked with the small black or dark coloured Scotch breed; a hornless, milk white variety, with the ears tipped with red, has also been propagated in the county; but no variety deserves notice so much as the old long-horned Staffordshire cow, frequently with dappled or brindled sides, still preserved in its purity by a few noblemen and gentry in the county. The cow goes with young nine months.

QUADRUPEDS ONLY DOMESTICATED, NOT EXISTING IN A WILD STATE.

CARNIVORA.

Cat (*Felis catus*). It would appear, we think, that the domestic cat is derived from the wild cat, which however is larger, fiercer, yellowish grey, barred with black, and with the tail abrupt and black at the end; the latter has no place in our fauna.

The domestic cat attaches itself commonly more to our dwellings, than to our persons; it is fond of warmth, and delighted with the odour of valerian and catmint. It sleeps lightly, and is very cleanly in its habits. It is very carnivorous, but is fond of one or two kinds of boiled and even raw vegetables; also of fish; and though it dislikes much to be wet, in some cases it will take them from rivers or pools. The varieties are the tabby, which frequently approaches the wild cat in appearance; the tortoise-shell, black, white, and fulvous, the male so coloured being rare; in another variety of tortoise-shell there is no white, and this kind is also prized; the tailless cat, the Chartreux, the Angora, and the white cat with blue eyes. The cat goes with young about fifty-six days.

Dog (*Canis familiaris*). If the dog is, as it has been

supposed, derived from the wolf, nothing shows more the triumph of the art of breeding and education over the natural habits and instincts of an animal, by developing so many different and valuable properties. In the language of Linnæus, "the dog eats flesh and farinaceous vegetables, but not greens; its stomach digests bones; it uses the tops of grass as a vomit; it laps up its drink with its tongue. Its scent is most exquisite when its nose is moist; it scarce ever sweats, but when hot lolls out its tongue. It generally walks round the place where it intends to lie down; its sense of hearing is very quick when asleep, and it dreams. It is the most faithful of all animals, is very docile, hates strange dogs, will snap at a stone thrown at it, and will howl at certain musical notes." The bitch goes with young sixty-three days.

The most interesting varieties of the dog are the *Blood-hound*, or *Talbot*. Brown, with large black spots, strong, tail blunt, ears and lips large and pendent. Following a fugitive with fatal certainty.

Stag-hound. A tall, strong, and swift hound, of mild manners.

Fox-hound. For this England is celebrated. "His legs should be straight as arrows, his feet round and not too large, his shoulders back, his breast wide, his chest deep, his back broad, his head small, his neck thin, his tail thick and bushy, and well carried. It should stand twenty to twenty-two inches."

His ears and legs,
Fleck'd here and there, in gay enamell'd pride,
Rival the speckled pard; his rush-grown tail
O'er his broad back bends in an ample arch:
On shoulders clean upright and firm he stands:
His round cat-foot, straight hams, and wide-spread thighs,
And his low dropping chest, confess his speed,
His strength, his wind, or on the steepy hill
Or far-extended plain.

SOMERVILLE.

Harrier. A smaller breed of hound, standing from sixteen to eighteen inches high, used for the chase of the hare.

Beagle. Smaller still. It is persevering and "of exquisite scent," so that, although slow, it seldom fails to kill at last. Voice musical.

Pointer. Originally from Spain, but the smaller or English variety is now preferred, being more active. This breed inherits in a remarkable manner those qualities, partly natural, partly acquired, which its name expresses.

Setter. Docile, timid, intelligent, acute of scent, active, and enduring of fatigue.

Spaniel. Timid, affectionate, and faithful; it has followed its master in poverty, to prison, to the scaffold or grave, to which he has been known to cling for months. There are several varieties of this gentle creature.

Water-dog. Of fine scent and wonderful sagacity, strong, and of aquatic habits. Muzzle short, hair curled, tail short and directed upwards.

Terrier. Strong, courageous, and active. The Scotch, or wire-haired terrier, is prized by some. The otter-hound is a cross between the terrier and the hound, the bull-terrier between the terrier and the bull-dog.

Dalmatian, or Coach-dog. Prized from its handsome spotted appearance. Not very sagacious.

Shepherd's Dog. Very docile, intelligent, watchful, active, and faithful, though sober in appearance. There are several varieties, the cur, or drover's dog, being one.

Lurcher. Gloomy, silent, sly, stealthy. The fit companion of the poacher; hunting by scent.

Greyhound. Hunts by sight, and is graceful in form. The rough variety is discarded by the legitimate sportsman. The deer-dog, as well as the wolf-dog, are, perhaps, both varieties.

Newfoundland Dog. Strong and hardy, but of limited speed and scent. "Bears with composure the insults of more ignoble dogs and the teasing of children, also fond of his master and his friends," whom he long remembers. There is reason to believe, however, that he is occasionally somewhat capricious in his temper. Fond of the water. The large black and white variety should be preferred as most sagacious.

Bull-dog. Ferocious, and obstinately retaining its bite. Some have a fifth claw on the hind feet. The colliers of south Staffordshire, who are noted for a pure brindled variety of this ferocious dog, in general cruelly draw the incisor teeth, enabling it to bite deeper. They also cut the ears close.

Mastiff. The English mastiff was celebrated even in the Roman amphitheatre for its noble courage. Whilst the bull-dog attacks "with insidious silence," the mastiff barks before he bites, and unlike the former, is "susceptible of great attachment."

PACHYDERMATA.

Hog (*Sus scrofa*). Originating from the wild boar, which probably, at no remote date, existed in Needwood and Cannock Chase; where also were large herds of the domesticated swine belonging to different proprietors, and confined to particular parts of these tracts. The time of gestation in the sow is one hundred and twenty days.

Horse (*Equus caballus*). Common in England even before the Roman invasion. Its only natural paces are the walk and gallop. The mare goes eleven months with foal. The callous spots high up on the legs may be the rudiments of the thumb and inner toe.

Ass (*Asinus vulgaris*). Degenerate in England, from

bad food and ill treatment. A tendency to the stripes of the zebra is seen in the cross band over the shoulder, and on the legs of the young ass. The horse has more tendency to put on a spotted appearance.

The Mule is derived from the mare and male ass, and is more esteemed than the hinny, obtained from the stallion and female ass. The mule has occasionally bred with the ass or horse, but two mules never. Mules are employed in the hilly parts of Staffordshire and Derbyshire to carry coals and lead ore.

RUMINANTIA.

Sheep (*Ovis Aries*). The sheep of Cannock Chase is grey-faced and grey-legged, without horns; wool short, close, and fine; size rather small, approaching the South-down in appearance, but somewhat more lank. This and similar varieties from open hilly districts, are active and wild, and consequently troublesome when confined in enclosed lands. The above variety is noted for its fine-flavoured mutton. The ewe goes one hundred and fifty days with young.

BIRDS.



Both amongst ancients and moderns Birds have at all times engaged the attentive observation of mankind, and have seemed to be invested with a peculiar interest. The imagination has even endowed them with something approaching to the spiritual—hence the mind has attached to them conceptions of sacredness and mystery. The varied tints of their plumage, their velocitous aerial flights, their sudden migratory departures and returns, their many-tongued imitative voice, and their wonderful instincts, so

diversified and so perfect, have all conspired to this end. Yet these form only a portion of those attributes which have attracted to them the curiosity of man. That extraordinary structure which fits them for the place they occupy in creation—the endless changes this structure undergoes to adapt it to their various wants and circumstances—their remarkable faculty of construction, displayed in the ingenious receptacles for their eggs and young—their domestication, or semi-reclaimed attendance on the lord of creation, are all additional sources of the interest we feel in the feathered tribes. It is on these grounds that we propose, in introducing the birds of Staffordshire to the notice of the reader, to offer a few unconnected observations on some of their peculiarities.

The flight of birds in so rare a medium, more than a thousand times lighter than the solid structures of their own bodies, first attracts our notice. This would seem a problem to develop the skill of the Divine Architect. The result, so perfectly accomplished, has displayed a consummate wisdom and goodness, which excites our profound admiration, and involuntarily leads us silently to adore its grand Contriver. It was an observation of the amiable White, that, “as the swift eats, drinks, collects materials for its nest, and, as it seems, propagates on the wing, it appears to live more in the air than any other bird, and to perform all functions there, save those of sleeping and incubation. It is a most alert bird, rising very early, and retiring to roost very late, and is on the wing in the height of summer, at least sixteen hours.” And Alex. Wilson, who so enthusiastically admired, and eloquently described the feathered creation, says: “let a person take his stand, on a fine summer’s evening, by a new mown field, meadow, or river shore, for a short time, and among the numerous

individuals of the swallow tribe that flit before him, fix his eye on a particular one, and follow, for a while, all its circuitous labyrinths, its extensive sweeps, its sudden rapidly-reiterated zigzag excursions, little inferior to the lightning itself, and then attempt, by the powers of mathematics, to calculate the length of the various lines it describes. Alas! even his omnipotent fluxions would avail him little here, and he would soon abandon the task in despair. Yet, that some definite conception may be formed of this extent, let us suppose that this little bird flies, in his usual way, at the rate of one mile in a minute, which, from the many experiments I have made, I believe to be within the truth; and that he is so engaged for ten hours every day; and farther, that this active life is extended to ten years, (many of our small birds being known to live much longer, even in a state of domestication,) the amount of all these, allowing 365 days to a year, would give us 2,190,000 miles, upwards of eighty-seven times the circumference of the globe!" And how, we may ask, are such wonders performed? We know that even were the bodies of some of the higher animals to undergo such a change of structure as to enable them to traverse the air, yet it would still be impossible for them to pass through it with anything like this velocity. Respiration would be totally incompatible with it. The bird, however, performs all its aerial evolutions with more than safety, even with gracefulness and complete ease. To effect this, in the first place, its body is permeated in all directions with air. The air which it inspires is not arrested when it reaches the lungs, which are small, and closely fixed to the inside of the ribs, but it passes on into a number of large membranous cells in and about the trunk of the bird, into the cavities of the bones, which are hollow for its reception,

and into the barrels of the quills, so that the animal may be justly regarded as a balloon. And this structure is most carefully apportioned to the wants and habits of each species. In some gallinaceous birds, whose flight is of such secondary importance, the bones of the lower extremities contain marrow, like those of other animals; and in the *Apteryx*, a singular bird of New Zealand, differing in other remarkable respects from the rest of its class, and probably coursing over the ground somewhat in the manner of the ostrich, the wing bones are filled with marrow. The results of this balloon-like construction are, that the body of the bird is greatly distended, so as to occupy a much increased space, which has the effect of considerably lightening it; and, secondly, the respiration is facilitated and secured under circumstances of the most rapid flight, for the body contains in itself a reservoir of air at all times, capable of being replenished at the will of the animal.

As an evidence of the surprising extent to which the lightening of the skeleton and locomotive apparatus of a bird has been carried, we may adduce the skeleton, skin, and feathers of a redwing, which had been carefully denuded of the soft parts by insect anatomists. This skeleton and integumentary apparatus only weighed two drams, whilst the weight of the entire bird would have amounted to three or four ounces. And this is further confirmed by the French Academicians, who found the skeleton of the pelican to weigh only twenty-three ounces, the entire bird weighing twenty-five pounds, and being five feet in length. The air may be viewed as circulating through the bird's body in search of the blood, for the air-cells are lined by a thin membrane, through which the aeration of the blood and juices is carried on, so that the animal has not to depend on the lungs alone for the accomplishment of this

prime function of respiration. And to ensure the propulsion of the blood through the small and less-expansile true lungs, the right, or pulmonary ventricle of the heart is provided with a strong muscle peculiar to these animals. Although the air-cells of the two sides of the body differ in form and extent, yet the supply is so regulated as that the two sides balance each other, and thus ensure an equilibrium in locomotion. To accomplish the astonishing flight of birds the muscular system is, as it were, concentrated in the powerful muscles which move the wings, and the great pectoral muscles have been said to weigh more than those of all the rest of the body; whilst in man Borelli has computed that they weigh only one seventieth part of the whole mass put together. The long breast-bone undergoes a remarkable modification of form; it acquires a crest, or keel, projecting along its centre, and it is from the sides of this crest, the body of the bone, the collar-bones, or *clavicles*, and the merry-thought, or *furcula*, that the large muscles moving the wings take their rise. The depth of the keel varies greatly in different birds, and thus becomes a good measure of the capacity of flight. In some birds of the ostrich kind, which almost cease to use the wings as organs of locomotion, it is altogether wanting. The *furcula*, besides affording an additional point of origin for the wing muscles, serves greatly to increase their power, by maintaining the shoulders fixedly at a considerable distance from each other. The vertebræ of the back also indicate the same subordination and adaptation to flight—they are consolidated; yet, again, in the ostrich and cassowary they remain loose.

The fan-like wing, an instrument of such beauty when viewed in its structure and aptitude for elevating the bird in the rare atmosphere, undergoes great modifications to

adapt it to the use of each particular species. In no two of our British hirundinidæ is it precisely the same in every respect. Its bones, even to the very extremities and quills, are filled with air. Its concave form, when expanded in flight, enables it to grasp the atmosphere.

The tail of birds is not less diversified in the different species, and executes its office of a rudder, in the elastic sea through which they sail, with admirable precision. By the aid of these instruments, and the head and feet suitably disposed to balance the two extremities of the body, the bird performs its evolutions without number, which fill us with surprise and admiration. As in so many other of the works of the Divine Architect, it is probably in the minutest structures of birds, that the nicest adaptation and most wonderful skill are displayed. In the ultimate fibrils of their feathers, especially the wing and tail-feathers, we find the same discriminating accurate adjustment which is observed in the structure and functions of every other part. The wing-feather consists of the *quill* and the *vane*. The quill is an elastic hollow cylinder, which, in its mature state, is formed of two layers of a fibrous nature, the fibres of the internal being longitudinal, those of the external circular. It thus combines in itself every element of strength. The vane is composed of the *stem* and the two *webs*, one on each side. The stem is constructed of a highly elastic tapering prolongation of the quill, passing along its upper surface, and of a cork-like pith below. It has a curved form, and is entirely constructed so as to oppose the greatest resistance when the wing strikes the air; but when obliquely drawn back, it, as well as the whole wing, presents a perfectly smooth surface—every impediment to facility of motion is removed. Each web again is formed of a great number of flat *plumules*, arranged side by side

from one end of the vane to the other. They are also placed edgewise, so as to possess the greatest strength in the direction in which they oppose the air, exactly as the carpenter has learned to dispose the joists which support a floor. The plumules on the two sides of the vane differ in length, and slightly in their direction, by which means the vanes of the corresponding wing-feathers are enabled to adapt themselves to each other. But beyond all this, in the analysis of a wing-feather, and exhibiting a greater nicety than all besides, we find each plumule of either web to be barbed near the outer surface on both sides with a great number of *fibrils*, more than a thousand of them being contained in the length of an inch. These fibrils are closely arranged along the edges of each plumule, and, in the manner of miniature plumules, pass off at different angles on the two sides, near to the upper edge. But most effectually to secure the entanglement of the two rows of fibrils opposed to each other on adjoining plumules, the one row always consists of straight tapering fibrils, whilst the other constitutes a series of stems, to the under side of which are affixed microscopical *secondary fibrils*, or hooks, sometimes to the number of eight or nine on one fibril. So that the minute fibrils themselves are effectually locked together, and the air is most surely repressed below the expansile wing. To give some idea of the numbers of these minute objects, deserving of the care of their great Contriver, and effectually administering to the comfort of the bird, nay, on which its very existence frequently depends, we have calculated that there are from eleven to twelve thousand plumules on the vane of an ordinary goose quill; from two to three thousand fibrils on each of these plumules; and, on about one half of these fibrils, from eight to twelve secondary hooked fibrils, so that the fibrils

on a single goose-quill are about three millions in number, and upon about one half of these there are nearly fifteen millions of grappling hooks. What secret philosophy slumbers in a feather ! Is not a single feather enough to prove the almighty power, wisdom, and beneficence of the creative Father of all ! In some night-feeding birds this structure has undergone a marked modification, to fit them for stealing upon their prey with a noiseless flight. "In the owls," says Sir W. Jardine, "the wings present a larger surface, but are not so capable of swift motion ; and to prevent the noise which would necessarily be produced by the violent percussion of so great an expanse, the webs are entirely detached at the tips, and the plumules of the inner ones being drawn to a fine point, thus offer a free passage to the air, and a gradual diminution of resistance." It is worth remark, also, that we find around the facial disks of the owls, a few stiff hairs, the representatives of the whiskers of the cat, and in all likelihood designed to serve a similar end, to advertise it of the proximity of objects when not appreciable by light.

The migrations of birds have offered a problem to the curiosity of man from the remotest ages. The prophet Jeremiah declares that, "the stork in the heaven knoweth her appointed times ; and the turtle, and the crane, and the swallow, observe the time of their coming." The Greeks and Romans were equally satisfied of the migration of this latter bird, and Anacreon even mentions Africa as the place of its winter retreat. Yet it is a remarkable circumstance that Gilbert White, who so closely observed nature, and so faithfully described what he saw, could not divest himself of the hypothesis of their hybernation. Alex. Wilson, in his clever satire upon this hypothesis, says : "this little winged seraph, if I may so speak, who, in a

few days, and at will, can pass from the borders of the arctic regions to the torrid zone, is forced, when winter approaches, to descend to the bottom of lakes, rivers, and mill-ponds, to bury itself in the mud with eels and snapping turtles; or to creep ingloriously into a cavern, a rat-hole, or a hollow-tree, there to doze with snakes, toads, and other reptiles, until the return of spring! Is not this true, ye wise men of Europe and America, who have published so many *credible* narratives on this subject?" We need no other examples than White's strong inclination to the chimerical idea of the hybernation of swallows, and the illustrious Priestley's adherence to the doctrine of phlogiston, to read to us lessons of humility and diffidence, however ardent we may be in our love of truth, or, however keen and penetrating our researches after it. Swallows leave even Italy, Spain, and the southern countries of Europe, and also Egypt and north Africa, for climes still nearer the sun. In Abyssinia, on the river Senegal, at Sierra Leone, and other regions approaching the equator, it is now known that they find a permanent home; being less numerous in these countries during the rainy season, from June to September, when we may reasonably conclude that they have taken their departure for England, and other northern countries, including Denmark, Norway, Lapland, Russia, and Siberia. In these latter countries their insect food is more rife during the heats of a short summer, than in England; and the purposes of their wonderful change of climate, whether as regards themselves or the favoured creature man, we may be well assured are amply fulfilled. It probably may have a connexion with these purposes, that the process of nidification is carried on with more comfort to the bird in a colder than in a warm climate. The fact of the migration of

the denizens of air is without dispute ; its frequent impelling motive is most likely that to which allusion has just been made, to procure a better supply of food ; it is a habit of a large proportion of the feathered tribes inhabiting all regions, which gives us both winter and summer visitors, as they come from northern or southern countries ; the shy redwing of our snowy wastes, is the nightingale of Norway, and its common companion here, the fieldfare, there builds and breeds in large societies ; yet the instinct which points out the regular times, and guides such distant aërial voyages, cannot cease to be a perpetual miracle to us, audibly proclaiming the care of the universal Creator and Preserver. The anomalous habit of the cuckoo seems to be intended to provide for a special case connected with migration. Jenner, the immortal discoverer of vaccination, and Audubon, by their labours and observations, have, at length, satisfactorily solved that riddle of natural history presented by this bird, and the solution is a beautiful example of the gradual accumulation of knowledge resulting in the evolution of truth.

Jenner, when young, was urged, by no less a man than John Hunter, to make the habits of the cuckoo his study. He fixed all the principal facts relating to these habits with which we are acquainted, by careful observation, and remarked the small size of the internal sexual organs of this bird, which do not equal in magnitude those of the little wren. Its egg is the exact size of that of the skylark, a bird only one fourth the magnitude of the cuckoo. Jenner assigned the short residence of the bird in this country, and the call nature makes upon it to produce a numerous progeny, as the causes of its singularities. Other observers have endeavoured to account for the smallness of the ovarium, and the intervals

of six or eight days at which the cuckoo lays her eggs. But Audubon having ascertained that the yellow-billed cuckoo of America, although building its own nest and rearing its young, is also distinguished by this latter habit, and that both eggs and young, at different stages of growth, are usually found in its nest, the theory of Jenner may now be considered as established. We find, therefore, an extraordinary coincidence between the organization and functions of our cuckoo, and its habits, and the short time of its residence in our island, which lays upon it the necessity of abandoning its offspring to the cares of a step-mother. A coincidence and adaptation which extends even to the moral feelings of the bird. For there are few animals in which we behold a stronger and more persevering love of their offspring than in birds; yet, as Mr. Yarrell inquires, "may not the small size of the internal sexual organs, and the probable low degree of excitement, also diminish the interest attached to the providing for the wants of the young?" He adduces the opinion of Mr. J. E. Gray, however, to which we shall again allude, that the cuckoo's desertion of her offspring is neither so uniform nor so entire as is supposed.

The food of birds exhibits the greatest diversity; whether animal or vegetable, living or dead. In some instances their subsistence is both scanty and precarious; in almost all they earn their livelihood by a surprising exercise of diligence, vigilance and cunning. And their organization, both for capturing and destroying their prey, or for procuring it by milder means, and for its digestion and assimilation to the wants of their bodies, manifests a wonderful skill, and fitness of means to ends. The formidably-hooked horny beak and talons of the eagle undergo a multitude of intermediate modifications before

they are transformed into the flat sensible bill, and webbed feet of the duck. But every intermediate change is exactly coincident with a change in the wants, or the food of their owner. Whilst the *falconidæ* need such powerful instruments of destruction to kill and lacerate their prey; the *emberizidæ*, or buntings, which live on seeds, possess a prominent bony knob projecting from the palate, which serves to retain the seed at the side of the bill, and to enable the sharp edge of this organ to denude it of its husk; the swift is provided with a short, wide, gaping bill to ensure the capture of his insect prey, when both are on the wing; the night-jar to aid his twilight feeding, besides the wide bill of the swift, has a number of bristles falling down from the edge of the upper mandible, which almost preclude the escape of an insect once included within his gape, and most probably is endowed with a serrated claw for the purpose of grasping more effectually his insect prey, encased as it frequently is in a hard slippery coat of mail,—

“Hark! from yon quivering branch your direst foe,
 Insects of night, its whirring note prolongs,
 Loud as the sound of busy maiden’s wheel:
 Then with expanded beak, and throat enlarged
 Even to its utmost stretch, its customary food
 Pursues voracious;”—

the crossbill possesses his double-hooked opposable overlapping pincers to dissect the fir cones and pick out the seeds from between their imbrications; the woodpecker enjoys his singular slender barbed tongue, extended with such velocity and retracted by a living spring, to secure his insect prey when discovered in the dark recesses and galleries of a rotten tree; the duck plies his nervous strainer in the mud, at the bottom of a pool, and detects and washes every morsel fit for subsistence; the snipe,

with his equally sensitive probe, the bones of the upper mandible of which are covered with numerous elongated hexagonal cells, "which afford at the same time protection and space for the expansion of minute portions of nerves," (Yarrell,) pierces the more solid mud to discover and extract the insects, worms and mollusks on which he subsists; the *grallatores*, or waders, are stilted upon long shanks to wade after their food, which their long diversely-formed bills enable them to seize with the utmost precision; and the *scansores*, or climbers, having two of their claws directed forwards and two backwards, are empowered to ramble about the trunk and branches of a tree in all directions to secure their prey. A peculiar structure, in the upper mandibles of birds, facilitates them in capturing their prey. The muscles which depress the lower mandible, when opening the mouth, at the same time, and by the same contraction, by means of the *os quadratum*, elevate the upper mandible, so as to produce a rapid and simultaneous motion so necessary in the fly-catching birds. The *ingluvies*, or crop, the *membranous stomach*, the *gizzard*, and the *intestines*, are the chief internal organs for the digestion of the food of birds, but they are modified infinitely to suit the food of the particular species to which they belong. The powers of digestion of birds are very considerable, and always in accordance with their singular aerial life.

The delightful music of our groves seems to be an attribute of temperate regions alone. In New Zealand, the representative of Great Britain in the Austral hemisphere, the same melodious sounds proceed from the feathered tribes, and the song-birds of North America abound. In tropical countries the birds are mostly silent, or utter only monotonous or discordant notes. Their brilliant plumage is but an inadequate compensation for the loss of such ex-

hilarating music. Early morning appears to be their favourite hour of song, and if we ramble through the fields and woods in spring, or at the commencement of summer, at this hour, we perceive one species after another awaking to join the chorus, till the welkin rings with the sweet melody. The organs of voice, whence this melody springs, offer a variety as extensive as any that prevails in the diversified organization of birds. The length and magnitude of the vocal tube, its contortions and shape, all undergo great changes. In the spoonbill, the *trachea*, or windpipe, is very long, and is convoluted in the form of a figure of 8 on the surface of the breast-bone inside the chest. Yet the bird possesses no true muscles of the organ of voice, and is devoid of any modulation of sound. In the hooper, or wild swan, and in Bewick's swan, the windpipe is subjected to great contortion in a cavity in the keel of the *sternum*, or breast-bone; and in the crane this contortion is still further increased. To this conformation of the trachea these birds are no doubt indebted for their grave tones; shrill notes, on the other hand, being produced by short tubes, which occur in singing birds. Large tubes produce low notes, and *vice-versa*. Baron Cuvier has shown that the essential organ of voice in birds is the inferior larynx, an organ situated at the divarication of the trachea, and sometimes consisting of a solid bony structure. Mr. Yarrell has directed his attention to the anatomy of the organs of voice in birds, and has deduced some very interesting conclusions from his observations. He has found that the degree of complexity of the muscles in connection with the trachea, affords a good measure of the powers of voice. In some few birds no such muscles exist at the inferior part of the trachea. The vulture is an example, the voice of which bird is very monotonous.

The next division, or those possessing but one pair of muscles, includes a large number of birds, most of the *Raptores*, some of the *Incessores*, and all the *Rasores*, *Grallatores*, and *Natatores*, with a few exceptions. The family of pigeons possesses two pairs of muscles. Amongst British birds Mr. Yarrell has not met with any having three or four pairs of muscles; he passes on, therefore, to the most complex, or those having five pairs. "The birds included in this division are all those of the family of the crows, the starling, the thrush tribe, the warblers, larks, buntings, finches, swallows, &c., the organs of voice in which vary only in size." This division, therefore, embraces the birds to which we are indebted for the music of our meads, and contains those able to execute the greatest vocal feats, and especially that most difficult of musical exercises, the imitation of the human voice.

Amongst the remarkable instincts of birds, that which decides them to be either solitary or gregarious, excites our particular attention. The crow and the rook offer the most familiar example of the two states. Where food is scarce, and where a ferocious character, as in birds of prey, is essentially connected with its procurement, we can easily understand why there should be an absence of the social instinct. In other birds, their wants, their defence, and their pleasures, impel them to seek the society of their congeners. And, in the case of a common enemy approaching, whether it be the hawk, or the cold and storms of winter, we behold birds of different species instantly associating together for defence and mutual protection. White denominates the swallow, probably the male, the *excubitor*, or sentinel of small birds, announcing the approach of the hawk; when the little birds, individually so easy a prey, immediately congregate and buffet and

annoy their enemy, screaming all the time, till he is glad to make his escape. And the congregation of small birds in autumn, after the labours of incubation are over, includes a variety of species, the linnet, the chaffinch, the greenfinch, the sparrow, the yellow-ammer, the common bunting, and others. They assemble in large flocks, and, in the dreary season of the year, not only aid each other in defence, but mutually cheer and embolden one another in the attacks which the pinching cold and scarcity of food render imperious. When spring arrives it is probable they commence their segregation by dividing into flocks of the same species, as, when the sun beams out at this season, we observe them again attuning their lays, particularly flocks of linnets joining in sweet concert to the rising year.

From our island position, the British birds, which are made to include our regular, and even occasional visitors, are very numerous. They embrace representatives of all the orders, and most of the families under which birds have been arranged by ornithologists. As a very interesting division of creation, the study of their structure, habits, mode of life, &c., affords a ceaseless means of innocent and exhilarating amusement; and it insensibly leads the mind, through an admiration of the works, to contemplate and adore the great Architect, who, by His almighty power and in His ineffable goodness made them all!

GALLINADÆ.

Tetrao.

Black Cock, Black Grouse (*T. Tetrix*). Abundant at Chartley Moss, and on Cannock Chase; other woods and heaths, frequent. The outer feathers in the tail of the cock are curved outwards; the hen is grey; food, berries,

heath, birch, and fern, also corn. Hybrid varieties have occurred.

Lagopus.

Red Grouse (*L. Scoticus*). In abundance on exposed moors in the north of Staffordshire, and seldom found more south. Feeds on berries and heath-tops. Poachers have a successful method of calling them.

Perdix.

Partridge (*P. cinerea*). Common, and has been shot white. The Guernsey partridge has been introduced at Teddesley, &c., but it is no *desideratum* for the sportsman.

Coturnix.

Quail (*C. vulgaris*). Rare; has been killed, particularly on Needwood Forest.

COLUMBÆ.—THE DOVE TRIBE.

Columba.

Ring-dove, Queece, Wood-pigeon (*C. Palumbus*). Plentiful. Larger than the domestic pigeon.

Stock-dove (*C. Oenas*). Plentiful on Needwood Forest. Builds in holes in the stumps of trees. It is frequently brought to market with the former, than which, however, it is smaller.

Turtle-dove (*C. Turtur*). Rare in Staffordshire, near Lichfield, Burton, and Heyley Castle.

ACCIPITRES.—BIRDS OF PREY.

DIURNAL HAWKS.

NOBLE HAWKS.

Falco.

Peregrine Falcon (*F. Peregrinus*). Killed at Beaudesert, 1841, the specimen is in the Burton-upon-Trent Museum.

Kestrel, Windhover (*F. Tinnunculus*). Common. This sustains itself in one place for some time, hovering in the air; its food is principally mice. When tame it attaches itself somewhat to those who feed it.

Hobby (*F. Subbuteo*). Needwood Forest.

Merlin (*F. Æsalon*). Needwood Forest, Tean, Burton.

Gyrfalco.

Jer-falcon (*G. candicans*). Shot in Beaudesert Park.

Balbusardus.

Osprey (*B. Haliætus*). Shot near Stafford; at Burton a few years back. Chetwynd Park and Overseal on the borders.

IGNOBLE HAWKS.

Milvus.

Kite (*M. vulgaris*). Occasional. Has been caught in vermin-traps on Needwood Forest.

Pernis.

Honey Buzzard (*P. apivorus*). Shot this summer at Trentham. The specimen is now in the possession of a bird-stuffer.

Aquila.

Golden Eagle (*A. Chrysaetos*). This has several times made visits to the county, having been shot on Needwood, Cannock Chase, and in Beaudesert Park; at the former place it has been seen in late years. One is recorded to have been shot on Lichfield Cathedral, in the reign of Charles I.

Circus.

Hen Harrier (*C. cyaneus*). Occasional. The male is the dove-hawk, or blue hawk, the female the ring-tail. Destructive to game.

Buteo.

Buzzard (*B. vulgaris*). Common, we having several times seen it recently. A sluggish bird, comparatively with its congeners.

Rough-legged Buzzard (*B. Lagopus*). We have seen a specimen shot near Leek, and one exists in the Burton collection from Needwood.

Sparrow-Hawk (*B. Nisus*). Common, but less so than the kestrel. Bold and destructive.

Marsh Harrier, Moor Buzzard (*B. æruginosus*). Not very rare.

NOCTURNAL OWLS.

Otus.

Long-horn Owl (*O. vulgaris*). Not rare; near Leek, Burton and Smallwood Manor. Resident.

Short-horn Owl (*O. brachyotus*). Frequent. We have had this species alive; it never shewed its horns; and when frightened spread itself out, hissed, and snapped with its bill. The eyes are very beautiful. It is a winter visitant, and unlike the other owls, is frequently seen in broad daylight.

Aluco.

Barn Owl (*A. flammeus*). Common, and resident the whole year. Feeding principally on mice. Plumage beautifully pencilled.

Strix.

Ivy, or Wood Owl, Screech Owl, Tawny, or Brown Owl (*S. stridula*). Abundant in Swinnerton Woods, &c. The young are curious objects, being covered with long whitish down; they eat flesh greedily. Resident.

PASSERES.

FISSIROSTRES.

HIRUNDO.

Swallow (*H. rustica*). The swallow arrives about the second week of April, and departs towards the end of October. Here it very frequently builds down the shafts of old coal-mines. It is easily known when on the wing from the martin by its long forked tail. It has been seen of a white colour.

Martin (*H. urbica*). This arrives a little later than the swallow, and leaves about the middle of October; it is also slower in its flight; it builds under the eaves of houses, and about windows.

Sand Martin (*H. riparia*). Common: it arrives the earliest of all the tribe, and *probably* leaves at the end of August. It is usually seen about some favourite sand or gravel pits, or banks, in the sides of which it makes its excavations, having the nests at the bottom; the eggs are beautiful. It jerks much in its flight.

Cypselus.

Swift (*C. Apus*). The swift does not arrive till May, and departs from north Staffordshire before the middle of August.

Caprimulgus.

Goat-sucker, Fern-owl, Night-jar (*C. Europæus*). Occurs at Oakamoor, Cheadle, Chartley, Cannock Chase, Sutton Park, &c., appearing about the middle of May, and departing at the end of August. It commences its peculiar note in the evening. Its eyes and ears are large; bill very small, but the gape very wide, and the upper mandible fringed with hairs; an organization beautifully adapted to the nature of its food, which consists of moths and other insects, and to its nocturnal habits.

DENTIROSTRES.

Lanius.

Cinereous Shrike, Butcher-bird (*L. excubitor*). Needwood, Bramshall, &c. Called butcher-bird from its habit of impaling insects and other small animals, which constitute its food, upon thorns, &c.

Red-backed Shrike (*L. Collurio*). Not so rare as the last. It migrates, appearing here in summer.

Muscicapa.

Pied Flycatcher (*M. atricapilla*). Bagot's Park; seen at Trentham, 1843.

Spotted Flycatcher (*M. Grisola*). Common; appearing at the end of May, being late in its arrival; departing at the end of September. It is a tame bird, and will take moths as they fly from the hand, watching their departure.

Bombycilla.

Bohemian, or Waxen Chatterer (*B. garrula*). Rarely occurring in winter, and very beautiful. Dr. Hewgill, Mr. Brown, &c.

Turdus.

Missel-thrush, Shrike, Storm-cock, Thrice-cock (*T. viscivorus*). Common. It sings very early in the spring from the top of high trees, its notes being loud and wild; it builds in the forks of trees, frequently near houses, and in towns.

Thrush, Thristle (*T. musicus*). Common. White notices that it eats the roots of the arum, or wake-robin, during snows; in summer it and the blackbird devour also the spathes of the same plant; also great quantities of shelled snails. A white pied variety was killed, 1842, at Thickbroom.

Redwing (*T. iliacus*). Common. Migratory; arrives earlier than the fieldfare.

Fieldfare (*T. pilaris*). Common. Numbers may be shot at one discharge of the gun in very cold weather in farm-yards. It does not depart till May, or as late as June occasionally.

Blackbird (*T. Merula*). Common. Singing beautifully most of the year. In the hilly parts of Staffordshire it sometimes imitates the notes of the cuckoo. Occasionally pied or white.

Ring Ouzel, or Thrush (*T. torquatus*). In the limestone district, and occasionally in other parts of the county; arriving in April, and perhaps breeding with us. Occasionally seen in September at Betley; Mr. Tollet.

Cinclus.

Dipper, Water-ouzel (*C. aquaticus*). Common along the Dove, Hamps, Manyfold, and Churnet. Many ornithologists have not seen this bird alive; we have many times disturbed it on its native streams, along which it flies much like the kingfisher. It has much white about the neck and breast; the wings are short; it dives under water. Sings early in the year.

Oriolus.

Golden Oriole (*O. Galbula*). Killed May 28, 1841, at Egginton; the specimen, a female, being in the Burton collection.

Saxicola.

Fallow-chat, Wheatear (*S. Oenanthe*). Abundant in summer, particularly about deserted coal-pit lows.

Whinchat, Utic (*S. rubetra*). Common in summer on heaths and in meadows.

Stone-chat (*S. rubicola*). Not rare on heaths and commons, and resident all the year. Sedgeley Quarry.

Sylvia.

Redbreast, Robin (*S. rubicola*). The robin sings the year round. Retiring in summer, as winter comes on it approaches our houses and yards, where it seldom receives ill-treatment, owing partly, perhaps, to its confiding boldness, but in no small measure to its celebration in the ballad of the "Children in the Wood."

"Thus wander'd these two pretty babes,
Till death did end their grief,
In one another's arms they died,
As babes wanting relief ;
No burial these pretty babes
Of any man receives,
Till Robin Redbreast painfully
Did cover them with leaves."

Its visits are beautifully described by a more modern poet ;

"Half afraid, he first
Against the window beats ; then, brisk, alights
On the warm hearth ; then hopping o'er the floor,
Eyes all the smiling family askance,
And pecks and starts, and wonders where he is ;
Till more familiar grown, the table-crumbs
Attract his slender feet."

Redstart (*S. Phœnicurus*). Common ; appearing in the middle of April ; and building, particularly in the moorlands, in stone walls.

Curruca.

Grasshopper Warbler (*C. locustella*). Occasional. Both heard and seen at Betley, by Mr. Tollet.

Sedge Warbler (*C. salicaria*). Common in the Trent meadows. Sings at night ; song varied. Arrives in April.

Reed Warbler (*C. arundinacea*). Not rare; also warbling at night, and visiting us in April. Its nest is curiously attached to reeds, &c.

Nightingale (*C. Luscinia*). Weston-under-Lizard, Burton, Himley, and Swindon. Smallwood Manor, Dr. Hewgill. Never heard in most parts of the county, and not known in the rich valley of the Trent, north of Lichfield. It arrives in the middle of April, and, as is well known, sings beautifully at night.

“ Sweet bird, that shun’st the noise of folly,
Most musical, most melancholy !
Thee, chantress, oft the woods among,
I woo to hear thy even-song.”

Garden Warbler, Pettychaps (*C. hortensis*). Not very rare, arriving at the beginning of May. It sings beautifully.

Wood Wren, or Wood Warbler (*C. sibilatrix*). Burton, Mr. Brown. Arriving also in May, and its song superior.

Black-cap, Mock Nightingale (*C. atricapilla*). Not rare, Abbey Hulton, Trentham, and Burton-upon-Trent; arriving in the middle of April. Male black, female brown upon the head. Notes very varied, and only inferior to those of the nightingale, “ full, deep, sweet, and loud.”

White-throat (*C. cinerea*). Common, appearing late in April.

Lesser White-throat (*C. garrula*). Common, appearing about the same time.

Regulus.

Yellow Wren, Willow Wren (*R. Trochilus*). Very common, appearing in the middle of April. Its simple, lively, pleasant, strain may be heard in every garden and copse. It builds a round nest on the ground among long grass; and its small, beautiful, semi-transparent eggs, spotted with pale pink, are like gems.

Lesser Pettychaps, Chiffchaff (*R. Hippolais*). We have seen specimens shot at Trentham. Burton, Mr. Brown. Arrives early, before the preceding.

Golden-crowned Wren (*R. cristatus*). Frequent on firs in many parts of the county. The smallest of our birds: its notes sweet.

Fire-crest Wren (*R. auricapillus*). Occasional.

Accentor.

Hedge-sparrow (*A. modularis*). Common; singing early and sweetly. Its livery is sober, but prettily marked. It has occurred white.

Troglodytes.

Common Wren, Kitty Wren (*T. vulgaris*). Common. It sings in winter sweetly and loudly for so small a bird. Its nest is curiously made, with a little hole on the side, often placed amongst roots in a hollow bank. How so minute a creature can find food for near a score young, and feed them in the dark without missing one, is, as the excellent Ray observed, one of the many wonderful things of Nature.

Motacilla.

Pied Wagtail (*M. Yarrellii*). Common and pretty, particularly in its form and lively motions.

Grey Wagtail (*M. boarula*). Common. *M. neglecta* also occurs. Betley.

Yellow Wagtail, Ray's Wagtail (*M. flava*). Very common.

Anthus.

Meadow Titling, or Pipit, Titlark (*A. pratensis*). Common.

Field Titling, or Pipit (*A. trivialis*). Not rare; in the Trent meadows. Comes early in April.

CONIROSTRES.

Loxia.

Crossbill (*L. curvirostra*). This has been seen near Uttoxeter, Burton-upon-Trent, &c., occurring irregularly in large flocks. Bill curiously crossed.

Corythus.

Hawfinch (*C. Enucleator*). Needwood. Bred in an orchard, north Staffordshire, 1842.

Emberiza.

Yellow Bunting, Yellow Ammer, Goldfinch (*E. citrinella*). Common. Song monotonous, but pleasing.

Common Bunting (*E. miliaria*). We have seen this shot abundantly amongst small birds in farm-yards in winter in north Staffordshire.

Reed Bunting, Reed Sparrow (*E. Schoeniculus*). Common in the Trent meadows, amongst sparrows and chaffinches, in winter.

Snow Bunting (*E. nivalis*). Has been seen at Burton-upon-Trent, Whitmore Heath, and Swinnerton.

Alauda.

Field-lark, Sky-lark, Laverock (*A. arvensis*). Common. It soars high, and is heard when out of sight, singing on the wing. It may be heard also long before daylight, as had been noticed by Milton :

“To hear the lark begin his flight,
And singing startle the dull night,
From his watch tower in the skies,
Till the dappled dawn doth rise.”

Woodlark (*A. arborea*). Not uncommon. Sings in a fine tone early in the year and late at night. Often heard, like the skylark, when out of sight.

“ Unseen the soft enamoured Woodlark sings.”

Parus.

Great Tit, Ox-eye, Saw-whetter (*P. major*). Common. We have heard its oft-repeated note early in January. Its local name Saw-wetter is very expressive.

Cole Tit (*P. ater*). Common.

Marsh Tit (*P. palustris*). Not rare.

Blue Tit, Tomtit, Bluecap (*P. cæruleus*). Common. Several of these are much persecuted, as they are considered to be thieves and mischievous; but it is doubtful whether they are not rather beneficial to the gardener by destroying caterpillars and insects.

Long-tailed Tit, Bottle-tit, Mumruffin (*P. caudatus*). Not uncommon. Its beautiful nest is generally found in the bramble.

Bearded Tit (*P. biarmicus*). Rare, but has occurred at Aqualate Mere, and on the Dove; Mr. Emery. Beautiful in its form and plumage.

Pyrrhula.

Bullfinch (*P. vulgaris*). Frequent.

Coccothraustes.

Grosbeak (*C. vulgaris*). Two, shot at Sandon, were given to Mr. Dickenson; Shaw. They have since been found at other places, but are irregular in their appearance.

Green Grosbeak, Green Linnet (*C. Chloris*). Common.

Pyrgita.

Tree Sparrow, Mountain Sparrow (*P. montana*). Rare, remote from houses.

House Sparrow (*P. domestica*). Very common. One dusky white, is seen by us every day.

Fringilla.

Chaffinch, Pied-finch, Pink (*F. cælebs*). Common. The sexes congregate in separate flocks, and in hard winters no females are to be seen in north Staffordshire; Mr. Tollet. The nest is beautiful.

Mountain Finch, Brambling (*F. montifringilla*). Frequent in winter with the last.

Brown Linnet (*F. cannabina*). Common; gregarious except in the breeding-season. Its flocks, when assembled on some bare tree during the colder season of the year, send forth the most cheering sounds—their voices all rising in one sweet chirruping chorus.

Mountain Linnet, Twite (*F. montium*). Common in hilly places. Breeds in Staffordshire.

Rose Linnet, Lesser Redpole (*F. linaria*). Not rare. As we observed this singular little bird June 3, 1843, the southern limit of its breeding may be considered to extend to north Staffordshire.

Siskin (*F. spinus*). Not common. A male kept by us sang prettily, with a few harsh notes like the noise of a stocking frame. It did not breed with a yellow hen canary.

Goldfinch, Red Linnet (*F. carduelis*). Not rare. Stoke meadows, in winter.

Sturnus.

Starling (*S. vulgaris*). Abundant in great flocks, and breeds in lofty buildings.

Garrulus.

Jay (*G. glandarius*). Frequent in our more remote woods. A handsome but shy bird, possessing great powers of imitation.

Pica.

Magpie, Chatterpie (*P. caudata*). Common. Clamorous and mischievous, picking out the eyes of young lambs.

Corvus.

Raven (*C. Corax*). Not rare. Dovedale, Ramshorn, Chedale, &c. Nest generally on trees, but we have noticed it in the cleft of a rock in Dymingsdale.

Crow, Carrion-crow (*C. corone*). Common. Sometimes white.

Hooded, or Royston Crow (*C. Cornix*). Needwood. Uttoxeter 1841.

Jackdaw, Daw (*C. Monedula*). Frequent, particularly about limestone rocks and ruins, as Croxden Abbey. A jackdaw was killed 1830, in the parish of Stanton, with the beak crossed like that of the crossbill. *Mag. Nat. Hist.*

Rook (*C. frugilegus*). Very common.

TENUIROSTRES.

Sitta.

Nuthatch (*S. Europæa*). Not very rare, resident.

Certhia.

Creeper (*C. familiaris*). Not very rare; we have noticed it in Trentham woods.

Upupa.

Hoopoe (*U. Epops*). Abbot's Bromley, Barton, and Tutbury. One was winged a few years back at Whitmore, and afterwards kept in a cage. Beautiful from its fine crest.

SCANSORES, CLIMBERS.

Cuculus.

Cuckoo (*C. canorus*). Common. Appearing late in April, the old birds departing as early as July. The eggs are deposited, with wonderful instinct, in the nests of

small birds, particularly the titlark's, hedge-sparrow's, and wag-tail's; and when hatched by the duped bird, the young cuckoo is furnished with appropriate food by it, and speedily becomes the sole possessor of its attentions, by ejecting the young pipits. It is interesting to observe that, though a large bird, the cuckoo's eggs are not larger than those of a lark; and this may in some measure account for the stupidity of the foster-parents. The true mother has been observed, in the neighbourhood of Betley, to feed the young bird herself. The pleasing cry of the cuckoo reminds us of the following lines:—

“ Soon as the daisy decks the green,
 Thy certain voice we hear ;
 Hast thou a star to guide thy path,
 Or mark the rolling year ?

 Delightful visitant ! with thee
 I hail the time of flowers,
 When heaven is filled with music sweet
 Of birds amongst the bowers.

 The school-boy, wandering in the wood
 To pull the flowers so gay,
 Starts, thy curious voice to hear,
 And imitates thy lay.”

Picus.

Green Woodpecker (*P. viridis*). Not rare. Swinner-ton woods, &c. The organization of the tongue, bill, feet, and tail of this bird, are wonderfully adapted to procure its food, insects, &c., from the crevices of old trees.

Greater Spotted, or Pied, Woodpecker, French Pie, (*P. major*). Not rare. Swinnerton, Burton, &c. We have it from Consall woods.

Lesser Spotted Woodpecker (*P. minor*). Rarer. Small-wood Manor, Dr. Hewgill. We may add *Picus Martius* on Mr. Brown's authority.

Yunx.

Wryneck (*Y. torquilla*). Not rare in north Staffordshire. Comes with the cuckoo, and sometimes called the cuckoo's mate. It is prettily marked. Tongue very long and curious.

Alcedo.

King-fisher (*A. Ispida*). Common in the Trent meadows. Nest of fish-bones. It is very brilliantly coloured.

GRALLÆ, WADERS.

Ardea.

Heron (*A. cinerea*). Common in many parts, as about the pools on Cannock Chase, and in the Sow meadows. It built at Norbury in Plot's time; but, at present, we are not aware of any heronry in the county. The male, in mature plumage, is a beautiful bird. The heron is very destructive to fish.

Bittern (*A. stellaris*). Not common. Cannock Chase, Betley. Crakemarsh, 1841, Dr. Hewgill. The little bittern, we believe, has been shot on the Dove or Trent, Mr. Emery.

Ciconia.

Stork (*C. alba*). This has occurred several times on the Dove. Dr. Hewgill, Messrs. Brown and Emery, (shot by the latter.)

Rallus.

Water Rail (*R. aquaticus*). Not very common; stationary.

Ortygometra.

Corncrake (*O. crex*). Abundant, appearing at the end of April, and departing in October. Their creaking noise is heard in the evening, and through the night. Fowlers call them easily by rubbing two notched sticks, or bones,

on each other: they are good eating. The young are curious, being covered with black down.

Gallinula.

Water-hen (*G. chloropus*). Abundant. Half domestic.

Spotted Gallinule (*G. Porzana*). Occasional. Shot at Fauld, by A. Bass, Esq., 1841, and presented to the Burton-upon-Trent Museum.

Fulica.

Coot (*F. atra*). Not rare. Mr. Tollet, whose situation at Betley gives him opportunity to observe the habits of aquatic birds, seems to have succeeded in domesticating this naturally shy species.

Phalaropus.

Grey Phalarope (*P. lobatus*). Rare. Uttoxeter, Mr. Brown. A winter visitant.

Recurvirostra.

Avoset (*R. Avocetta*). This very rare bird occurred in Plot's time, at Aqualate Mere, and recently on the Dove. The bill is curiously curved upwards.

Numenius.

Curlew (*N. arquata*). Not rare. Chartley and Moddershall. It builds on heaths, and frequents the shore in winter.

Ibis.

Glossy Ibis (*I. falcinellus*). Shot on the Dove at Fradley, 1840, and the specimen is in the Rev. T. Gisborne's collection, with other rare species.

Totanus.

Redshank (*T. calidris*). Occasional. Marshy land on the Churnet, &c.

Green Sandpiper (*T. ochropus*). Rare. Shot at Betley; Mr. Tollet: we have examined the specimen.

Common Sandpiper (*T. hypoleucos*). Not rare, breeding on the margin of the Dove, &c., and we have it from the Churnet.

Greenshank (*T. glottis*). Not common. Winter.

Scolopax.

Woodcock (*S. Rusticola*). Not rare. This fine and valued bird arrives on our coast the first week in October, and leaves in March. It has bred at Betley, Mr. Tollet.

Solitary Snipe (*S. major*). Occasional.

Common Snipe (*S. Gallinago*). Common and resident.

Jack Snipe (*S. Gallinula*). Abundant. A winter visitor.

Tringa.

Dunlin (*T. alpina*). Occasional on heaths, &c.

Little Stint (*T. minuta*). Rare. Dr. Hewgill, &c.

Knot (*T. Canutus*). Visits us occasionally in winter.

Vanellus.

Lapwing, Pewit (*V. cristatus*). Abundant. The young may be found by a pointer, and they, as well as the eggs, are good eating. This species, so graceful in its flight, occurs in flocks in winter, when they are with difficulty approached, though the reverse when engaged in incubation, or with the young.

Cursorius Isabellinus has been shot in Charnwood Forest, Leic., and is now in the Rev. T. Gisborne's collection.

Charadrius.

Green Plover, Golden Plover (*C. Pluvialis*). Occasional. Uttoxeter Meadows, Dr. Hewgill. Stoke Meadows, 1843.

Dottrel (*C. Morinellus*). Spring and Autumn, on the high moors for a short time.

Ringed Plover, or Ringed Dottrel (*C. Hiaticula*). Rare; but we have it, shot on the Churnet by — Bagnall, Cheddleton.

Hematopus.

Oyster Catcher (*H. ostralegus*). Several times killed on or near the Trent.

PALMIPEDES, WATER BIRDS.

Many of these are only winter visitors of our rivers and pools, or stragglers from the coast: all the following have been taken in the county.

Phalacrocorax.

Cormorant (*P. Carbo*). Has occurred at Aqualate, Burton, &c.

Oidemia.

Velvet Scoter, or Duck (*O. fusca*). Batchacre, Aqualate, Burton, 1841, &c.

Black Scoter (*O. nigra*). Near Burton, and placed in the museum of that place. Mr. Brown.

Clangula.

Golden Eye (*C. vulgaris*).

Nyroca.

Pochard (*N. ferina*). Scaup (*N. Marila*).

Tufted Duck (*N. Fuligula*).

Anas.

Mallard, Wild Duck (*A. Boschas*). Common.

Sheldrake (*A. Tadorna*).

Shoveler (*A. clypeata*).

Wigeon (*A. Penelope*). Not rare. Some varieties in plumage.

Teal (*A. Crecca*). Not rare.

Cygnus.

Wild Swan (*C. ferus*). Occasionally shot in winter. Smaller than the tame swan: the voice loud and shrill: the windpipe passes through a cavity in the breast-bone.

Anser.

Wild Goose (*A. ferus*). Common. Flocks frequently heard when out of sight: flight in a row, or in a triangular form.

Bernacle Goose (*A. Bernicla*).

Canada Goose (*A. Canadensis*). Two shot at Greenway Bank, 1842.

Brent Goose (*A. Brenta*).

Laughing Goose (*A. Erythropus*).

Sula.

Solan Goose (*S. Bassana*). Occasional on the Trent, and Dove: Aqualate.

Mergus,

Green-headed Goosander (*M. Merganser*).

Red-brested Goosander (*M. Serrator*).

White-headed Goosander (*M. albellus*).

Mergulus.

Rotche (*M. melanoleucas*).

Podiceps.

- Crested Grebe (*P. cristatus*).
 Red-necked Grebe (*P. rubricollis*).
 Horned Grebe (*P. cornutus*).
 Little Grebe, Dipper (*P. minor*).
 Eared Grebe (*P. auritus*).

Colymbus.

- Northern Diver (*C. glacialis*). Aqualate, &c.
 Speckled Diver (*C. septentrionalis*). Occasional; Rochester, and we have seen it fresh from near Uttoxeter.

Uria.

- Foolish Guillemot (*U. Troile*). During a severe frost, 1841, near our residence.

Cataractes.

- Arctic Skua (*C. parasiticus*). Burton-upon-Trent, and the specimen is in the museum, Mr. Brown.

Procellaria.

- Stormy Petrel (*P. pelagica*). This has occasionally been captured, driven inland by stress of weather. It has occurred after a storm in the streets of Birmingham.

Sterna.

- Tern (*S. Hirundo*).
 Arctic Tern (*S. arctica*). Great numbers of this species visited north and south Staffordshire, in May, 1842.
 Black Tern (*S. nigra*). Roseate Tern (*S. Dougallii*).

Larus.

- Common Gull (*L. canus*). Kittiwake (*L. Rissa*).

Yellow-legged Gull (*L. fuscus*).

Black-headed Gull, Black-cap, Sea-crow, Pewit (*L. ridibundus*). Occasional. Bred at Shebden Pool, near High Offley, in Plot's time: none 1794; Shaw.

With Plot's quaint account of this last species, and of their breeding at Shebden Pool, we close our List of Birds.

It is as follows:—"Being of the migratory kind, their first appearance is not till about the latter end of February, and then in numbers about six, which come, as it were as harbingers to the rest, to see whether the hafts or islands in the pools (on which they build their nests) be prepared for them, but these never so much as lighten, but fly over the pool, scarce staying an hour. About the 6th of March following, there comes a pretty considerable flight of a hundred or more; and then they light on the hafts and stay all day, but are gone again at night. About lady day, or sooner in a forward spring, they come to stay for good; otherwise, not till the beginning of April, when they build their nests, which they make not of sticks, but heath and rushes, making them but shallow, and laying generally but four eggs, three and five more rarely, which are about the bigness of a small hen egg. The hafts, or islands, are prepared for them between Michaelmas and Christmas, by cutting down the reeds and rushes and putting them aside, in the nooks and corners of the hafts and in the valleys, to make them level; for should they be permitted to rot on the islands the pewits would not endure them.

"After five weeks sitting, the young ones are hatched, and in about a month they are almost ready to fly, which usually happens on the 3rd of June, when the proprietor of the pool orders them to be driven and caught, the gentry coming in from all parts to see the sport; the

manner thus :—they pitch a rabbit net on the bank side, in the most convenient place, over against the hafts, the net in the middle being about ten yards from the side, but close in the ends, in the manner of a bow ; then six or seven men wade into the pool, beyond the pewits, over against the net, with long staves and drive them from the hafts, whence they all swim to the bank side, and landing, run like lapwings into the net, where people are standing ready to take them up, and put them into two pens made within the bow of the net, which are built round, about three yards in diameter and a yard in height, or somewhat better, with small stakes driven into the ground in a circle, and interwoven with broom.

“ In which manner there have been taken of them, in one morning, fifty dozens at a driving ; which, at five shillings per dozen, the ancient price of them, comes to twelve pounds, ten shillings, so that some years the profit of them has amounted to fifty or three score pounds ; beside which the generous proprietor usually presents his relations, and the nobility, and gentry of the county withall, which he does in a plentiful manner ; sending them to their houses in crates alive, so that, feeding them with livers, they may kill them at what distance of time they please, according as occasions present themselves, they being accounted a good dish at the most plentiful tables.”

He further adds to his long account, “ Whilst driving them some have observed a certain old one, that seems to be somewhat more concerned than the rest, being clamorous and striking down upon the very heads of the men, which has given ground of suspicion that they have some government amongst them, and that this is their prince who is so much concerned for its subjects.” Vide Plot, who besides the plate of this species of fowling, gives an

interesting view of the neighbouring old moated Manor House.

REPTILES.

SAURIA. LIZARDS.

Zootoca.

Common Lizard, Swift (*Z. vivipara*). On heaths and banks, in both north and south Staffordshire; but, apparently, not numerous.

Lacerta.

Sand Lizard (*L. agilis*). Burton-upon-Trent; on Mr. Brown's authority.

OPHIDIA. SERPENTS.

Anguis.

Blind-worm, Slow-worm (*A. fragilis*). Whitmore Heath, Wybunbury and Chartley Mosses, and the limestone hills. Length about a foot; its food being insects, worms, and snails. It is not venomous, and sheds its skin.

Natrix.

Common or ringed Snake (*N. torquata*). Very abundant everywhere. Swims and dives in water after fish; but eats principally young birds, frogs, and mice. Harmless; and may be immediately known from the viper, by its having a yellow ring around its neck.

Pelias.

Viper, or Adder (*P. Berus*). We have killed or noticed this on Cannock Chase, where it abounds; in Chartley Park, at Whitmore, and Wybunbury. It varies

in colour, and its bite has been fatal. We have noticed it to disgorge a whinchat, which it had swallowed, in order to effect its escape. We took a vole from the stomach of another.

BATRACHIA. FROGS, &c.

Rana.

Common Frog (*R. temporaria*). Common. It catches its prey by suddenly darting out its slimy tongue; it consists of insects and slugs. Colour variable.

Bufo.

Common Toad (*B. vulgaris*). Common. Persecuted for its uninviting appearance; but the philosopher observes it to be "highly useful, harmless, inoffensive, timid, and susceptible of no inconsiderable degree of discriminating attachment, to those who treat it with kindness." It darts its tongue upon its prey with the rapidity of lightning; and according to Prof. Bell (whose accurate and elegant words we have often quoted) will not touch the insects, on which it principally subsists, unless they are in motion. Its eggs are like a string of beautiful beads, and are deposited in water.

NEWTs.

Triton.

Common warty Newt, Asker (*T. cristatus*). Abundant. Seldom leaves the water.

Lissotriton.

Smooth Newt, Eft, or Evet (*L. punctatus*). Frequent, and may often be seen on dry land in very moist weather.



LIST OF FISHES.

Perca.

Perch (*P. fluviatilis*). Common. Rarely taken more than two or three pounds in weight; but Mr. Hunt of the Brades, near Dudley, took one from the Birmingham canal six pounds; in some waters the perch never attains more than a few ounces. It is so bold a biter that "it is generally the first prize of the juvenile angler."

Acerina.

Ruffe, or Pope, Daddy-ruffe (*A. vulgaris*). We have taken it in the Trent, Churnet, and Dove. Allied to the last.

Cottus.

Bull-head, Miller's Thumb (*C. Gobio*). Common in the the Trent; feeding on insects.

Gasterosteus.

Stickleback, Jacksharp, Pink (*G. trachurus*). Common. Males pugnacious; pink on the under surface. *G. semi-armatus* and *leivurus* are equally or more common.

Ten-spined Stickleback (*G. pungitius*). Plentiful in ditches near the station at Burton upon Trent; Mr. Brown.

Cyprinus.

Carp (*C. Carpio*). Not indigenous. At Weston Hall the painting of a carp is preserved, which weighed nineteen and a half pounds; it was taken from the White-sitch. We have seen one fifteen pounds from our own neighbourhood. The carp is shy of a bait, and often manages to avoid the net, hence it is called the *river-fox*. The Prussian Carp is another imported species, as is the Gold Carp, or Gold and Silver Fish.

Barbus.

Barbel (*B. vulgaris*). Common. One eleven pounds weight has been taken from the Trent. Its food is small fish, &c.; and its flesh is coarse eating.

Gobio.

Gudgeon (*G. fluviatilis*). Common, and attains a good size in ponds. Its flesh good.

Tinca.

Tench (*T. vulgaris*). Common. It will live in the most muddy and stagnant waters; and its flesh is esteemed by many.

Abramis.

Bream (*A. Brama*). Common in large pools and rivers. One seven pounds weight has been caught in the Trent. Flesh lightly esteemed, though Izaak Walton says, "he that has bream in his pond is able to bid his friend welcome."*

* Anciently Ralph de Waymer held "the stew," or fishpond, without the eastern gate of the town of Stafford, in this manner, that when the king should please to

White Bream, Bream-flat (*A. blicca*). In the Trent.

Leuciscus.

Roach (*L. rutilus*). Common. Taken easily with paste.

Dace, Dare, or Dart (*L. vulgaris*). Common, particularly in the Dove, where, in some parts, these fish may be abundantly taken with a live May-fly, or moth, as a bait. Less tenacious of life than the roach, and less glittering; therefore not so good as a bait, though its flesh is superior. Fishermen insist on two varieties of dace in Staffordshire.

Chub (*L. cephalus*). Frequent, and large in the Trent, attaining the weight of five pounds. Old Walton gives an approved method of cooking it.

Rudd, Red-eye (*L. erythrophthalmus*). Found in the Trent; frequent. Abundant in an engine-pit at Stoke-upon-Trent. We know of no provincial name for it.

Bleak (*L. alburnus*). In the wider part of the Trent. A beautiful little fish.

Minnow, Pink (*L. Phoxinus*). Common. A bait for the trout and perch. The *Gasterosteus trachurus* is called the pink in Staffordshire.

Cobitis.

Loach or Loche (*C. barbatula*). Common in brooks.

Botia.

Spined Loche, Groundling (*B. tania*). Rare in the Trent. Not rare at Burton, Mr. Brown.

fish he was to have the pikes and breams; and the said Ralph and his heirs were to have all the other fishes; with the eels, coming to the hooks; rendering therefore to the king half a mark at the feast of St. Michael. Yarrell.

Esox.

Pike, Jack, or Luce (*E. lucius*). Staffordshire is celebrated for fine pikes, and for the species of angling called trolling, by which they are taken; and they have occasionally been obtained of a great size, from twenty to thirty pounds. Plot gives an account of one gorging the head and neck of a swan in Trentham Pool, which caused the death of both. Night lines, or trimmers, as used by poachers, are very destructive to this fish.

Salmo.

Salmon; Grilse, first year; Laspring, fry (*S. Salar*). In the Trent, Dove, and Severn: the laspring is numerous in the Dove. A large salmon, not in season, was taken this winter, 1842-3, at Maveysin Ridware, with a live bait.

Salmon Trout (*S. Trutta*). In the Severn.

Common Trout (*S. Fario*). Many of our rivers are justly celebrated for trout, none more so than the Dove. One weighing five pounds was once taken, it is said, from the Minster Pool at Lichfield. The trout lives on flies and mollusks, and also upon minnows, gudgeons, and dace; preferring, however, the first mentioned food. In season, in spring, and summer.

Thymallus.

Grayling (*T. vulgaris*). Common in the Dove, Blythe, and Trent. It spawns in spring: unlike the trout it is in season in October and November: its food is insects, larvæ, and mollusks, and it will not take the minnow as the trout does. It does not afford such sport as the latter. Its scales shine like burnished steel in its native clear streams in the sunshine.

Lota.

Burbot, Eelpout, Burbolt (*L. vulgaris*). Not rare. In the Trent, Tame, and Sow. It has been taken as large as eight pounds. An ugly fish, but excellent for the table. Forty or fifty are usually, annually, taken about Burton-upon-Trent; Mr. Brown.

Platessa.

Flounder (*P. Flesus*). In the Severn.

Anguilla.

Silver Eel, Sharp-nosed Eel (*A. acutirostris*). Common in our rivers.

Broad-nosed Eel, Glut Eel (*A. latirostris*). In the Trent and Severn, but not common. In the Sow at Stafford.

Snig, or small yellowish Eel (*A. mediorostris*). Not rare. In the Trent; several 1843.

Acipenser.

Sturgeon (*A. Sturio*). Very rare in the wider part of the Trent.

Petromyzon.

Lamprey (*P. marinus*). Ascends the Severn in spring.

River Lamprey, Lampern, Nine-eyes (*P. fluviatilis*). In the Trent, Severn, &c. Burton-upon-Trent, Mr. Brown. The young animal abundant in small rivers, in spring in north Staffordshire.

Mud Lamprey, Pride (*P. branchialis*). Found with the young of the preceding in spring, but less common.

CHAPTER VIII.

INVERTEBRATE ANIMALS—SHELLS—INSECTS—ETC.

INVERTEBRATE animals are divided into four classes ;—Molluscous, Articulated, Radiate, and Infusory Animals.

The Mollusca are, as the name implies, soft-bodied animals, most commonly furnished with a *shell*, single, as in the snail ; double, or *bivalve*, as in the mussel. Many of the molluscous tribes are only found in the sea, and, therefore, are absent in an inland Fauna ; and other families we have only in the fossil state in our limestone rocks.

The Articulata comprise all animals of which the body is covered externally with a *horny* or shelly case, divided into a number of *joints*, or *articulations*. Such are insects ; Crustacea, as the river cray-fish ; Arachnida, or spiders ; and Annelides, such as the leech, hair-worm, or Nereis.

The Radiata are animals having the parts of their body commonly disposed in a *radiate*, or *rayed* manner. Such is the Hydra of our fresh-water streams. Many fossil corallines of the limestone likewise belong to the Radiata.

The Infusoria are those very minute beings abounding in water, and almost every other fluid, only visible by means of the microscope. Such are the wheel-animalcule, common in the sand in our roads, and the Volvox, equally common in ponds, &c. We have noticed many Infusoria in the waters of dark and deep mines.

MOLLUSCOUS ANIMALS.

Though these creatures are made a study by few only, and would be turned away from in disgust by the over refined, yet are they far from uninteresting to those who enter upon their examination. It will be seen, from the following list, that we are probably destitute of a few species not uncommon in many counties, such as *Cyclostoma elegans*, and *Helix Pomatia*. *Planorbis cornea* and *Helix aspersa* are by no means general, and *Neritina fluviatilis* and *Paludina vivipara* we have never found in the north of Staffordshire, though they are included in this list. The limestone district is remarkably prolific in shells; after rain, the turf there is sometimes almost covered with them; the other districts are as remarkably deficient in them, though a few common species are general, and some rarer ones are found about old walls and ruins in many places. We have in vain looked for *Alasmodon margaritiferus* in our rapid rivers, and in the Severn at Over Areley, and also at Shrewsbury.

Water shells are easily collected by means of a small net. The animals are immediately destroyed by plunging the shells into boiling water, and they may be extracted by means of a small hook. The shells must be then washed, and they may be rubbed with a little oil or gum-water to brighten the colours.

“ Each crawling insect holds a rank
Important in the plan of Him who framed
This scale of being.”

LAND AND WATER SHELLS.

I.—UNIVALVES (WITH ONE SHELL, GENERALLY SPIRAL).

LIVING ON LAND, OR TERRESTRIAL.

SHELL INTERNAL.

Arion ater. Common. Var. *rufus*, occasional.

A. hortensis. Common.

Limax maximus. Common in most cellars.

L. flavus. Common.

L. agrestis. Common.

WITH AN EXTERNAL SPIRAL SHELL.

Vitriina pellucida. Frequent under stones and moss. Stoke-upon-Trent, Wetton Valley, Heyley Castle.

Helix aspersa. Tutbury Castle and Burton Abbey walls, Uttoxeter, Cheadle. Not general.

H. hortensis. Common, particularly on the limestone.

H. hybrida. Common.

H. nemoralis. Very common, and frequently seen high up on trees. Var. thin, transparent, horn-coloured, umbilicated, paler below and along the junction; Wetton Valley.

H. arbustorum. Common on the limestone.

H. lapicida. Abundant on the limestone; also at Heyley Castle.

H. pulchella. Wetton, Dovedale, Stoke-upon-Trent. Alton Castle; Mr. Carter. Minute, but pretty. Var. *costata*, frequent.

H. Cantiana. Not rare in Dovedale and Wetton Valley.

H. fusca. Stoke-upon-Trent, dell at Oakamoor.

- H. fulva*. Under leaves. Cheadle Park; Mr. Carter
- H. aculeata*. Occasional on *Jungermannia*. Trentham woods. Dovedale; Mr. Thompson.
- H. lamellata*. Among leaves, in a valley near Oakmoor; only three specimens found in October (living); Mr. Carter.
- H. hispida*. Common. Stoke-upon-Trent.
- H. rufescens*. Common. Stoke-upon-Trent, Wetton Valley.
- H. virgata*. Frequent on the limestone, but rarer than *H. ericetorum*. Dovedale, Wetton Valley, &c.
- H. caperata*. Occasional on limestone. Dovedale; Mr. Carter. Wetton Valley; rarer than the last.
- H. ericetorum*. On limestone. Dovedale, Wetton, Wever Hills, Dudley.
- Zonites rotundatus*. Common under stones, Stoke-upon-Trent.
- Z. umbilicatus*. Common under stones on limestone.
- Z. pygmaeus*. Cheadle; Mr. Carter.
- Z. alliarius*. Under grit stones, on Mow Cop, &c.
- Z. cellarius*. Common. Stoke Meadows.
- Z. nitidulus*. Common. Ditto.
- Z. radiatulus*. Cheadle Park; Mr. Carter.
- Z. excavatus*. Under stones. Dimsdale, Alton; Mr. Carter.
- Z. crystallinus*. Alton; Mr. Carter. About Beeston Tor; abundant; L. G.
- Succinea putris*. Abundant. Stoke Meadows.
- S. oblonga*. Staffordshire, Birmingham Museum. Probably common.
- Bulimus obscurus*. Alton; Mr. Carter. Not rare on limestone, and at Heyley Castle.
- Zua lubrica*. Walls at Stoke-upon-Trent. Abundant.

Azeca tridens. A curious little shell, and very different from the last. Fine specimens about Cheshire Cavern, above Ilam; L. G.

Achatina Acicula. Common on limestone rocks at Wetton and Beeston Tor.

Pupa umbilicata. Frequent. Croxden, Wetton, Weaver Hills, Cheshire Cavern.

Vertigo edentula. Adhering to the barren fronds of ferns. Dimsdale; Mr. Carter. Not rare.

Balæa perversa. Occasional.

Clausilia bidens. One specimen at Beeston Tor. Dove-dale; Mr. Thompson. Many specimens at Cheshire Cavern; L. G.

C. biplicata. Alton Castle; Mr. Carter.

C. dubia. Common, particularly on the limestone.

C. nigricans. On the limestone, and at Heyley Castle.

Carychium minimum. Near Cheadle; Mr. Carter.

AQUATIC UNIVALVES BREATHING AIR.

Limnæus auricularis. Common. Stoke canals.

L. pereger. In every puddle.

L. stagnalis. Common. Fenton Pool. Var. *fragilis*, common.

L. palustris. Common.

L. truncatulus. Common.

Amphipeplea glutinosa. Common. Stoke-upon-Trent.

Ancylus fluviatilis. Not rare. Newcastle Canal, Dove at Uttoxeter, river near Drayton abundant. A smaller variety in the rivulet at Trentham. Deposits the *nidus* of its *ova* on stones, each containing eventually four curious young ones.

A. lacustris. Fenton Pool; on equisetæ and shells.

Physa fontinalis. Newcastle Canal.

- Planorbis corneus*. Not common. Kingston Pool.
P. lævis. Occasional in pools.
P. carinatus. Common.
P. marginatus. Common.
P. cortex. Common. Betley, &c.
P. spirorbis. Common.
P. nitidus. Occasional.
P. contortus. Common. Betley, &c.
Segmentina lineata. Canals at Stoke.

AQUATIC UNIVALVES BREATHING BY GILLS.

- Neritina fluviatilis*. In the Trent near Burton; Rev. A. Bloxam and Dr. Hewgill.
Paludina vivipara. Common in the south, absent in the north of the county.
P. achatina. South of the county.
Bithnia tentaculata. Abundant in the Newcastle Canal.
Valvata piscinalis. Streams, &c. Stoke-upon-Trent.
V. cristata. Stoke-upon-Trent.

II.—BIVALVES.

- Cyclas rivicola*. Common in canals at Stoke.
C. cornea. Common, id. loc.
C. lacustris. Common.
Pisidium obtusale. Frequent. Betley Pool.
P. amnicum. In the Dove at Uttoxeter.
Anodon cygneus. Common; and *A. anatina* is probably not distinct from this. Var. smaller, darker, more solid, and striated; common. Var. thin and broad; common.
Unio pictorum. Occasional.
U. ovalis. Occasional.
U. tumidus. Canals at Stoke, and in the Dove.
Dreissena polymorpha. Birmingham Museum, obtained

from the Wednesbury canal, and Edgbaston reservoir, Mr. Ick.

ARTICULATA.

INSECTS.

So numerous are insects, that many thousand species are found in Great Britain alone. Of beetles, Stephens describes between three and four thousand. Every plant has its particular species, and frequently more than one, and they abound in all possible localities,—on banks, rocks, and heaths, in quarries and gravel pits, in water and in marshes, on plants and under the bark of trees, in wood, dung, and carcases; in all places, and at all seasons, will the search of the entomologist be rewarded. Insects are, likewise, so beautiful that every one admires their forms and colouring, and their habits and instincts are so amazing that volumes have been written on the manners of single species, such as the ant or bee. Their internal structure is, likewise, so perfect and admirable, that an extensive treatise was written by Lyonnet on the anatomy of the common goat-moth, and another by Durekheim on that of the May-bug, each of which works must have been the labour of years.

Insects are important to man in many points of view. It is from an insignificant looking insect that the richest of dyes is procured, and from the labours of millions of caterpillars that the most beautiful material for clothing is produced. For many other useful substances, as honey and wax, and for valuable medicines, as the blistering fly, we are indebted to these little creatures. Insects furnish, likewise, food for a multitude of birds, &c., and in many cases assist in the fertilization of the seeds of plants. In

other cases, they are terrible scourges to vegetables, and to man and beast. From the above considerations, it must be extremely interesting, particularly to those who reside in the country, to possess some knowledge of these little, but important beings.

The collection of British insects is a rational and pleasing pursuit of many in all ranks, down to the humble mechanics, who in some cases have become celebrated entomologists. It is a taste which is productive of little expense. A few store boxes lined with cork, gauze nets, a water net of coarser material, a digger, forceps with bowed blades, over which is stretched gauze or muslin, useful to seize stinging flies, &c., a supply of phials, and little boxes, and pins of various sizes, are all that is required to equip the young entomologist for the field. The finest specimens of moths, &c., may, however, be obtained from the caterpillars, which must be sought after and fed with their proper plants in a cage.

If, however, we destroy the insects for the sake of studying them, *the least we can do* is to find out the quickest way of killing them. Beetles may be destroyed in a few moments by plunging them into alcohol; if, however, the colours are delicate, they must be placed in an empty phial, which is to be immersed in boiling water. Other insects are directly killed by pinching them on the chest, and the smaller moths without pinching, by merely transfixing them; but very large moths, dragon-flies, &c., must be suffocated under a glass with the vapour of a burning match. It seems cruel to destroy animals merely to study them, but it should be recollected that we should remain quite ignorant of them unless we did so. We destroy every day thousands because they disgust or inconvenience us, and millions are every minute devoured by a

multitude of insectivorous creatures; may not a few be deprived of life by the least cruel methods, to enable us to take a nearer view of one of the most wonderful divisions of creation, and to ascertain the species of insects and their nature, a tribe of creatures which are of great benefit to man, or, on the contrary, cause him serious loss or trouble, and, therefore, require a remedy to be discovered against their ravages? The poet, it is well known, says:—

“The poor beetle that we tread upon
In corporal suffering feels a pang as great
As when a giant dies!”

But a thousand facts and considerations tell the philosopher that this is not the case, and that the lower we descend in the scale of creation, so the degree of sensibility to injury is proportionally and greatly diminished.

When our insects are brought home and deprived of life, we must, if not done before, transfix them with a pin, beetles through the right wing-case, and other insects through the chest. We must then fix them on the setting-board, adjusting their limbs and antennæ with pins, and spreading out and fastening down the wings by means of strips of card. Insects of bulky bodies must be embowelled, and stuffed with cotton-wool. When dry they may be transferred to the store-boxes, in which a lump of camphor should be pinned down.

COLEOPTERA, BEETLES. UPPER WINGS, OR ELYTRA, HARD.

Cicindela campestris. Tiger beetle. Frequent in sandy districts, especially around Whitmore; elegantly adorned, yet sanguinary. The larva, which inhabits a cylindrical burrow in the sand, is provided with two claws on a pro-

jection of the back, which serves as a dorsal foot, in ascending or descending its cell.

Dromius 4-maculatus.

Clivina Fossor. Madeley; Mr. Pinder.

Cychrus rostratus. Found under bark, dead leaves, &c.

Carabus catenulatus. Chain-beetle; Mr. Pinder.

C. granulatus. Common.

C. violaceus. Occasional.

C. nemoralis. Abundant.

Helobia brevicollis. Very common.

Leistus spinilabris.

L. rufescens.

Loricera pilicornis.

Agonum parumpunctatum.

Pæcilus cupreus, versicolor.

Omaseus melanarius. Common.

Steropus madidus. Abundant.

Elaphrus cupreus. In marshy places.

E. riparius.

Haliplus obliquus.

Hyphidrus ovatus.

Hydroporus erythrocephalus. Abundant.

Colymbetes exoletus, maculatus, nebulosus, Sturmii, aterrimus (?), *bipustulatus.*

Dyticus marginalis. In canals, &c., Stoke; R. G.

Acilius sulcatus. In pits on Wetley Moor; L. G.

Gyrinus natator. The little shining beetle seen so commonly swimming rapidly on the surface of water.

Helophorus grandis. Abundant.

H. granularis.

Hydrobius fuscipes.

Cercyon suturale.

Sphæridium Scarabæoides.

S. marginatum.

Choleva angustata.

Necrophorus Humator. The burying beetle. Found in carrion.

N. Mortuorum. Ramshorn ; R. G.

N. Vespillo.

Necrodes littoralis. Throwley ; L. G. ; Tittensor ; J. B. D.

Oiceoptoma thoracica. Ramshorn, with the *N. Mortuorum.*

O. rugosa. Plentiful.

O. sinuata. Throwley ; L. G.

Silpha obscura.

Phosphuga atrata. L. G. With the elytra testaceous.

P. subrotundata.

Cryptophagus fumatus. In houses.

Attagenus Pellio.

Creophilus maxillosus.

Trichoderma nebulosum.

Staphylinus castanopterus.

Goërius olens. Great rove-beetle. Frequent in autumn.

Byrrhus pilula. Pill-beetle. Frequent on foot-paths.

B. sericeus.

Hister unicolor, cadaverinus, bimaculatus, quisquilius.

Saprinus nitidulus.

Sinodendron cylindricum. Rhinoceros-beetle. Frequent in rotten trees. The larva undergoes its changes in this situation, and, as well as the mature insect, gradually mines for itself a number of cylindrical galleries in its course. It consumes the wood in this progress forwards, whilst the excrementitious portion, expelled in grains, fills up the gallery behind. The cylindrical form of the beetle, its thorax having an equal diameter with the rest of the body, and the coriaceous coat of mail with which

it is covered, are wonderfully adapted to this singular mode of life. The remarkable horn on the forehead of this insect, no doubt serves in effecting its mining operations. It acts as a fulcrum, to enable the beetle to push itself backwards, as well as to facilitate other motions, but especially to assist in tearing off the fibres of the wood.

Onthophagus ovatus.

Typhæus vulgaris. The bull-comber. Abundant on Swinnerton and Whitmore Heaths; Mr. Pinder.

Geotrupes vernalis, sylvaticus, foveatus, punctato-striatus, mutator.

G. stercorarius. Dung-beetle. Frequent.

Aphodius Fossor, fimetarius, nigripes, luridus, sphaclatus, merdarius, rufipes.

Melolontha vulgaris. May-bug, or cockchafer. Abundant.

Phyllopertha Horticola. Fernshaw. Abundant on flowers and fern.

Adrastus limbatus.

Agriotes sputator.

A. obscurus. The wire-worm.

Prosternon holosericeus.

Melanotus fulcipes. Hanchurch. Abundant in a rotten ash.

Ctenicerus pectinicornis.

C. cupreus. Cheadle Park, Mr. Carter; and other places.

Athoüs niger, hæmorrhoidalis.

Cyphon marginatus.

Lampyris noctiluca. The glow-worm. Frequent at Caverswall, Dilhorn, and Bagnall. Abundant at Throwley, Wetton, Dovedale, and Matlock. Kept under a glass, it sometimes sheds its skin, and then, for a time, is of a much lighter colour.

Telephorus flavilabris, testaceus, pellucidus, rusticus, lividus, fuscus, maculicollis.

Ragonychia melanura, pallida.

Malachius bipustulatus. Mr. Pinder. Trentham Park ;
J.B.D.

M. viridis. Ditto.

Ptinus Fur. Thief-beetle. Shelton.

P. crenatus. Stafford.

Anobium striatum. Common in old houses ; the death-watch is a species of *Anobium*, though other insects make a similar noise.

Scolytus destructor. This is the beetle which forms the curious pinnate markings under the bark of old trees.

Cionus Scrophulariæ. On the water-betony, Dovedale ;
R.G.

Nedyus assimilis, Erysimi.

Ceutorhyncus didymus.

Orchestes Fagi. Numerous in Trentham Park on the beech, 1843, R.G. Hinder thighs robust, like those of the *Haltica nemorum*. From its agility and amazing leaps, it is difficult to secure. The foliage is much disfigured and the trees seriously injured by this insect.

Notaris Æthiops?

Molytes coronatus.

Hylobius Abietis.

H. stramineus.

Otiorhynchus notatus, septentrionis, vorticosus, tenebricosus, pellucidus.

Strophosomus Coryli.

Sitona grisea, crinita, puncticollis.

Polydrusus micans, Chrysomela.

Nemoicus oblongus.

Phyllobius calcaratus.

P. Pyri. On sycamore, &c., Mow Cop.

P. argentatus. On the beech. Trentham Park. *P. maculicornis.*

P. parvulus. Frequent.

Prionus coriarius. Old trees in the south of the county.

Astynomus Ædilis. A specimen of this extraordinary beetle was taken in the Trent Meadows, below Hanley.

Callidium violaceum. North Staffordshire, R.G.

Clytus mysticus, Arietis.

Rhagium Inquisitor. Trentham, R.G.

R. bifasciatum. Common in rotten trees.

Toxotus meridianus.

Strangalia elongata. Trentham Park.

Grammoptera lævis, præusta. Oakamoor.

Pachyta 8-maculata. Do. On the wild Angelica.

Donacia cincta, Proteus.

Crioceris puncticollis.

Galeruca Tanaceti.

Luperus flavipes.

Haltica Nemorum. Turnip-flea or fly. The habits of this insect, so destructive this present year, 1843, have, at length, been successfully investigated by Mr. H. Le Keux; and a very instructive paper upon it, by Curtis, is inserted in the Journal of the Royal Agricultural Society. The insect is only about a line in length, yet possesses very muscular hinder thighs, which enable it to leap eighteen inches, or two hundred and sixteen times its own length. The following is a portion of Mr. Curtis's summary of his communication:—

“The *eggs* are laid upon the under side of the rough leaf of the turnip, from April to September; they hatch in ten days. The *maggots* live between the two skins, or cuticles, of the rough leaf, and arrive at maturity in sixteen days. The *chrysalis* is buried just beneath the surface of the earth, where it remains about a fortnight. The *beetles* live through the winter in a torpid state, and revive in the spring,

when they destroy the two first leaves, called the cotyledons, or seed leaves. There are five or six broods in a season. Their *scent* is very perfect: the beetles fly against the wind, and are attracted from a distance."

H. nitidula.

Mantura Chrysanthemii. Trentham.

Sphæroderma Cardui.

Melasoma Populi. The marlow-buzz of the fly-fisher.

M. Tremulæ. R.G.

Timarcha lævigata. Abundant in the limestone district.

In March at Penkridge.

T. coriaria. Common on heaths.

Chrysomela polita, *Staphylæa*, *pallida*.

Helodes Phellandrii. Abundant on *Caltha palustris*, R.G.

Phædon Vitellinæ, *Betulæ*.

Coccinella 7-punctata, *22-punctata*, *dispar*.

Blaps mortisaga. In Madeley mill, Mr. Pinder. Shelton.

Proscarabæus violaceus. Bagnall, L.E.G.

P. vulgaris.

Pyrochroa rubens. Chartley Castle on nettles, R.G. Stapleford.

ORTHOPTERA. UPPER WINGS OF THE CONSISTENCE OF PARCHMENT, RETICULATED.

Forficula auricularia. Earwig. Common.

F. minor.

Blatta orientalis. Cockroach. In many kitchens, but originally from the East. There are traps, or pit-falls, made of pitcher, or glass, by which they may be kept under.

B. Americana. Burton, Mr. Brown, 1842.

Acheta domestica. Cricket. Common. Crickets produce their noise by friction of the *elytra* against the thighs.

A. campestris. Field Cricket. Rare, but caught in North Staffordshire.

Gryllus stridulus. Grasshopper. This, and other species, common.

Gryllotalpa vulgaris. Mole-cricket. Taken in gardens about Birmingham. A large and curious insect.

Locusta migratoria. Egyptian Locust. A female was caught at Burton, 1842. It was full of eggs when dissected by Mr. Brown, my informant.

HEMIPTERA. A PORTION OF THE UPPER WINGS FREQUENTLY
MEMBRANOUS.

Pentatoma. Wood Bug. Common.

Cimex flavomarginatus. Donovan. On nettles.

Lygaeus equestris and *apterus*. On nettles.

Gerris lacustris. Frequent; the long-legged insect which leaps so actively on the surface of water.

Velia currens.

V. rivulorum. Common, with other allied species.

Notonecta glauca. Fenton Pool. The young are very curious, and might be mistaken for different animals.

N. striata. More common; brooks.

N. stagnalis and *Geoffroyi*.

Naucoris cimicoides. Common in brooks.

Nepa cinerea. Water Scorpion. Probably less common than the preceding. Canals at Stoke-upon-Trent.

Cercopis spumaria. This insect forms what is called *frog* or *cuckoo-spittle*. Many allied species; many of them prettily marked and coloured.

Aphis. Plant-louse. Many species. These are a great pest to vegetation. They form what is termed *honey-dew*, as well as the cottony substance which frequently infests plants.

Cimex lectularius. Bed-bug. Too common, not only in towns, but in remote villages.

NEUROPTERA. FOUR EQUAL, TRANSPARENT, RETICULATED WINGS.

Libellula depressa. Common; easily captured, as it generally returns to the same twig.

L. grandis. Common. This is one of the largest of our dragon-flies. Many other species are not uncommon.

L. aenea (?) In moist woods.

L. Scotica. Donovan. On Whitmore Moss.

Agrion virgo. Common. Beautiful; varying much in colour. There are at least five varieties on the Trent.

A. puella. Common. Red and blue specimens.

Panorpa communis. Scorpion-fly. Common.

Hemerobius perla. Common about Stoke-upon-Trent. Very beautiful; wings gauze-like, light green; eyes very brilliant.

Ephemera vulgaris. The May-fly appears about the end of May, or frequently not till June. Trout are so greedy of it, that in many streams fishing is prohibited, when it is on the water. The *Ephemera* appear sometimes in immense quantities; but in their perfect state many species only live a few hours. They are remarkable for casting their skins; and the present species, in its different states, is the green, grey, and black drake, and the mackarel of the fly-fisher. The genus has three filaments at the tail, whilst *Baetis* has but two. Species of *Baetis* are the duns, spinners, and cob-fly of the fisherman. *Cloeon* has two filaments or bristles, and only two wings.

Perla bicaudata. This, or an allied species, is not uncommon in Dovedale; it is there nearly two inches across when the wings are expanded. It is, perhaps, the stone-fly of the fisherman.

P. lutea. The yellow-sally of the fly-fisher.

Nemoura nebulosa. The willow-fly.

Leptocerus —. The silver-horns. Common about canals at Stoke. Curious from its long antennæ.

Phryganea. Many species; some very large. Certain varieties are the grannom, cinnamon, and sand-fly.

Siablis niger. Common on bridges, &c., at the end of spring. The orl-fly of the fly-fisher.

HYMENOPTERA. WINGS SOMEWHAT SIMILAR TO THE LAST, BUT THEY HAVE NOT THE NERVES AND RETICULATIONS SO WELL MARKED.

Tenthredo. Saw-fly. The larvæ of this genus are frequently very injurious. One species (*T. Caprea*) commits its ravages on gooseberry trees, quite stripping them of their leaves, the fruit becoming tough and flavourless. The caterpillar is greenish, spotted with black, and suspends itself at last by a thread. To be got rid of, it should be picked off, and the soil should be occasionally removed from under the trees.

Sirex gigas. Ilam. Vide Correspondence of Sir J. E. Smith.

Cynips Quercus folii. This forms the very fine galls on the nerves of the oak leaf. They are very common; as are innumerable other species of galls.

C. Rosa. This forms the large red hairy swellings on the wild rose.

C. Hieracii? Female, body black, thorax and head rough, abdomen glossy, legs yellowish brown. Male, legs lighter coloured, lower part of head yellowish, a spot in the middle of the wings, antennæ shorter, with apparently six or seven articulations, no ovipositor like the female. From the swellings on the stalks of the *H. umbellatum*.

Chrysis aurata. Common; very brilliant.

Ichneumon luctatorius. The species of the family, constituting the genus *Ichneumon* of Linnæus, are so numerous and extraordinary in their habit of depositing their eggs in the bodies of other living insects, that volumes would be necessary to contain their history. The eggs are frequently laid in the fatty matter that surrounds the viscera of caterpillars, on this the larvæ of the *Ichneumon* feed till they attain their full growth, taking care never to touch the vital parts of the caterpillars, which would destroy them, and, of course, cause their own death.

Chalcis minuta. Brilliant; common on flowers.

Vespa crabro. Hornet. Not rare. Whitmore.

V. Holsatica. Common. Its nest is nearly globular, pierced at the bottom, the size of a walnut, with only a few cells in the interior, and seated under a kind of saucer, frequently attached to beams, trees, roots in hollow banks, summer-houses, &c.

V. vulgaris. Common Wasp. Builds its nest in a bank.

V. media. Smaller than the hornet, and hangs its nest upon trees. Frequent.

V. parietina.

Wasps may frequently be noticed about old palings, and other wood-work. They are then employed cutting the particles of wood, with which they form the curious paper for their nests.

Andrena. A species of this forms, by its borings, the small holes and hillocks seen in sandy ground; such may be frequently noticed on the hardest and driest footpaths.

Formica. Ant. Several species.

Apis centuncularis. Leaf-cutting Bee. Its nests are common in sandy banks at Maer and Whitmore. They are formed of rose leaves.

Apis lagopoda. Donovan.

A. muscorum. Carder Bee. Frequent.

A. mellifica. Hive Bee. A community of this species has for some time inhabited an ancient tomb in Stoke churchyard ; a very secure hive !

Bombus terrestris. Humble Bee. Common ; nest in the earth. We have noticed it to fly to flowers on board a vessel two or three miles out at sea.

B. lapidarius. Frequent ; nest in stony places.

Many species of bee are not only very valuable to man, from their production of honey and wax, but are extremely beautiful in appearance and flight.

“ Observe each wing—a tiny van !—
The structure of her laden thigh,
How fragile !—yet of ancestry
Mysteriously remote and high ! ”

The Hive, or Honey Bee, has frequently obtained the attention and observation of philosophers, from its extraordinary instincts and provident industry.

“ A statist prudent to confer
Upon the public weal, a warrior bold,
Radiant all over with unburnished gold,
And armed with living spear for mortal fight,
A cunning forager
That spreads no waste,—a social builder, one
In whom all busy offices unite,
With all fine functions that afford delight.”

DIPTERA. WITH ONLY TWO WINGS.

Culex pipiens. Gnat. Common.

Chironomus plumosus. Midge. Common.

Tipula oleracea. Harry-long-legs. Common with other species, the largest being *Pedicia rivosa.*

Anisomera obscura. Spider-fly. Frequent.

Bibio Pomonæ. Frequent.

B. Marci. Hawthorn-fly. Frequent.

- Tabanus pluvialis.* Troublesome to horses by its bite.
Chrysops cæcutiens. Common.
Rhagio scolopaceus. The fisherman's name, downhill-fly, is expressive, as it is generally found on the trunks of trees, with its head directed downwards.
Conops aculeata. This and other species.
Scatophaga stercorea. The common dung-fly.
S. ceparum. The grub of this destroys onions.
Oestrus bovis. Wornils. Common; laying its eggs in the flesh of cattle and horses, and causing them great torture. Another species fixes itself in the frontal sinus of sheep.

Gastrophilus equi, or *hæmorrhoidalis.* Bots, breeze, gad-fly, &c.; not rare. This and other species deposit their eggs on the hairs about the knees of horses, which lick the spots and so convey them into the stomach: the maggots here fasten themselves, and when they attain maturity are voided, when they turn to the chrysalis state. It seems doubtful to what extent the infected animals receive injury from these parasites. Many species are confounded under the above names, possessing different habits.

Mesembrina meridiana. Frequently seen on the trunks of trees in many places.

Musca carnaria. Flesh-fly.

SUCTORIA. WINGLESS.



Pulex irritans. The Flea.

THYSANOURA. WINGLESS, NOT UNDERGOING A METAMORPHOSIS.

Podura. One species is common on the surface of stagnant water, another is sometimes so numerous on sandstone walls as to discolour them, another of a white colour, but similar to the former in shape, is found in houses.

PARASITA. LIVING ON OTHER ANIMALS.

Pediculus. Louse. Many species.

Ricinus. Tick. Many species.

LEPIDOPTERA.—BUTTERFLIES AND MOTHS.

DIURNA.

Flying by day. Genus *Papilio*, Linn.; or Butterflies.

Papilio Machaon. Swallow-tail. The caterpillars have been found at Whitmore on the wild carrot. One of the finest and most elegant of British butterflies.

Gonepteryx Rhamni. Brimstone Butterfly. Not rare, abundant in Dovedale.

Pontia Brassicæ. Cabbage B. Common. The largest of the white butterflies. Black at the top of the anterior wings.

P. Rapæ and *Napi*; common.

P. Cardamines. Orange-tip. Common and beautiful.

Melitæa Dia. Sutton Park, Stephens.

M. Artemis. Mr. Pinder at Madeley. Common generally, 1842.

M. Euphrosyne and *Selene.* These are very beautiful; reddish, spotted with black, with silver markings below. They are called *Fritillaries*.

The two last and two following we have taken, particularly in Dovedale.

Argynnis Aglaia, and *Paphia*; not rare.

Vanessa C-album. Named from the white C. the posterior wings. Rare.

V. polychloros. Great Tortoise-shell. Once in a garden near Stoke-upon-Trent. Burton, Mr. Brown.

V. Urticæ. Small Tortoise-shell. Common, but pretty.

V. Io. Peacock's Eye. Some years very abundant, not one of late, 1842. Very beautiful; the eyes on the wings emulating those of the peacock's tail.

V. Atalanta. Admiral red. Burton, Hatherton, Swinerton, Abbey near Leek, Whitmore. Common, 1842. Rich with black, red, blue, and white above; more beautiful still below.

Cynthia Cardui. Painted Lady. Near Stoke-upon-Trent, Sep. 1842.

Hipparchia Aegeria, *Tithonus*, *Megara*, *Hyperanthus*, *Polydama*, *Davus*, *Pamphilus*.

Thecla Quercus. Purple Hair-streak. Burton; Mr. Brown.

T. Rubi. Very abundant at Oakamoor, Wetton Valley, and Dovedale, at the end of May.

Lycæna Phlæas. Common Copper. Frequent.

Polyommatus Argiolus, *Alexis*, and *Alsus*. These are the small blue butterflies.

P. Agestis.

Thymele Alveolus, and *Tages*.

Pamphila Paniscus, *Linea*, and *Sylvanus*.

CREPUSCULARIA.—GENERALLY FLYING IN TWILIGHT.

The two following genera, however, as well as *Macroglossa*, *Aegeria*, and *Trochilium*, fly in the sunshine. *Sphinx*, Linn. Hawk-moths.

Ino Statices. Green Forester. Plentiful in Wetton Valley.

Anthrocera Filipendulæ. Burnet-moth. Plentiful on Needwood Forest, &c. Brightly coloured with blue, black, and deep red.

Smerinthus ocellatus. Eyed Hawk-moth. Not very rare.

S. Populi. More frequent than the last, not so handsome.

Acherontia Atropos. Death's-head-moth. Occasional in several places. The caterpillar once given to us. It feeds on the potatoe.

Sphinx Ligustri. Privet Hawk-moth. Not rare.

S. Convolvuli. Burton; Mr. Brown.

Deilephila Elpenor. Elephant Hawk-moth. Not rare in several places.

D. Porcellus. About Birmingham; Stephens.

D. Celerio. Dudley; Stephens.

Macroglossa Stellatarum. Humming-bird Hawk-moth. In gardens half a mile from Stoke-upon-Trent. In the Izaak Walton Hotel garden, Dovedale; Dr. Hewgill. This insect darts about from flower to flower, in the morning and evening, poising itself over them with a humming noise, and extracting the honey by means of its long spiral proboscis.

Ægeria Tipuliformis. Fly Clear-wing. Frequent in gardens. Its caterpillar feeds on the pith of the currant. Appearance more like that of a fly than a moth.

Trochilium Apiformis. Bee Clear-wing. Not rare in North Staffordshire. Madeley; Misses Wright. Like a wasp in appearance.

I.—NOCTURNA.—GENERALLY FLYING BY NIGHT.

Phalæna. LINN.—Moths.

Pomeridiana. Frequently forming silk cocoons, and flying early in the afternoon.

Hepialus Humuli. Ghost-moth. Common in June; hovering over grassy places, particularly in churchyards.

H. hectus, lupulinus, sylvinus, and carnus.

Cossus ligniperda. Goat-moth. Madeley; Misses Wright. Burton; Mr. Brown. Eating in the larva state the solid wood of willows, poplars, &c.

Pygæra bucephala. Buff-tip-moth. Frequent in Staf-

fordshire, though rare in some counties. Strips trees of their foliage. Handsome.

Clostera reclusa. Rare. North Staffordshire.

C. curtula.

Cerura Vinula. Puss-moth. Frequent. Wetley in the north, and Stourton Castle in the south of the county, where we have taken the caterpillars from the weeping willow and poplar.

C. furcula.

Episema caruleocephala.

Notodonta ziczac.

Saturnia Pavonia. Emperor-moth. Madeley; Misses Wright. Caterpillar found on the heath. Ornamental.

Lasiocampa Rubi.

L. Quercus. Oak Egger-moth. Common. Wetley; L. G.

L. Roboris, *L. Trifolii*. Mr. Pinder.

Pacilocampa Populi, *Eriogaster Lanestris*, *Trichiura Cratagi*. Burton; Mr. Brown.

Odonestis potatoaria. Drinker-moth. Frequent.

Psilura Monacha. Black Arches. Madeley; Misses Wright.

Orgyia antiqua. Not rare. Burton; Mr. Brown. Cauldon; Mr. Davis. Female of this and others, wingless.

Leucoma Salicis. North Staffordshire; Misses Wright.

Porthesia chrysorrhæa. Smaller than the last; both white. Their caterpillars are very destructive to willows and other trees.

Euthemonia Russula. Clouded Buff. Not rare on heaths. Mr. Pinder, &c.

Arctia Caja. Great Tiger-moth. Very common and plentiful. Beautiful, large. Marked above with red, black, and white. Caterpillars hairy, dark; feeding on chickweed, &c. Abounds at the end of July.

Nemeophila Plantaginis. Wood Tiger-moth. Burton ; Sutton Park ; Whitmore. Floating on the Dove in Dove-dale once.

Phragmatobia fuliginosa. Not rare.

Spilosoma Menthastris. Common. Stoke-upon-Trent. Wings white spotted with black.

S. lubricipeda. Nearly as frequent.

Diaphora mendica. Burton ; Mr. Brown.

II.—NOCTURNA.—REPOSE DURING THE DAY AND FLY IN THE TWILIGHT AND DARKNESS.

Lithosiidæ.

Callimorpha Jacobææ. Cinnabar-moth. Burton ; Mr. Brown. Beautiful, crimson and brown.

C. miniata. Mr. Brown.

Lithosia complana.

Noctuidæ.

These are so numerous that we can only give a bare list. Some of them, as the *Mormo Maura*, common in North Staffordshire, are large insects. Many are of dull colour, whilst others, as the *Plusia Festuca*, of which we have seen numerous beautiful specimens from our district, have the most brilliant metallic markings. But few of the following have English names ; but *Thyatira batis* is the Peach-blossom of collectors ; *Calyptra Libatrix*, the Herald Moth, a common species ; *Phlogophora meticulosa* is the Angle-shades, also common in North Staffordshire. Some are occasionally extremely injurious, as the *Agrotis Segetum*, and *Plusia Gamma*, both very common. We prefix an asterisk also to a few others, which we have in our collection from North Staffordshire : the others were taken at Burton by Mr. Brown, or in North Staffordshire by the Misses Wright.

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|-------------------------|------------------------|
| Triphæna pronuba. | Hadena contigua. |
| T. innuba. | H. adusta. |
| T. fimbria. | H. glauca. |
| T. orbona. | H. plebeia. |
| T. Janthina. | Heliophobus Popularis. |
| Charæas Graminis. | Mamestra oleracea. |
| Agrotis Segetum. | M. Pisi. |
| A. radia. | M. Brassicæ. |
| * A. exclamationis. | M. furva. |
| Graphiphora renigera. | M. Chenopodii. |
| G. festiva. | Apamea nictitans. |
| G. C. nigrum. | A. secalina. |
| * G. augur. | A. I. niger. |
| G. plecta. | A. furca. |
| Semiophora gothica. | Miana strigilis. |
| * Orthosia instabilis. | M. Æthiops. |
| O. Pistacina. | M. fasciuncula. |
| O. Upsilon. | Miselia Oxyacanthæ. |
| O. litura. | M. Aprilina. |
| Mythimna grisea. | Polia Chi. |
| M. conigera. | P. Templi. |
| Grammesia trilinea. | Acronycta tridens. |
| Caradrina redacta. | * A. Psi. |
| * C. cubicularis. | * A. Romicis. |
| C. superstes. | * Bryophila Perla. |
| Amphipyra pyramidea. | * Thyatira batis. |
| Pyrophila Tragopogonis. | * Calyptra Libatrix. |
| * Nænia typica. | Tethea retusa. |
| * Xylina putris. | * Cosmia traptezina. |
| Xylophasia polyodon. | * Xanthia fulvago. |
| X. rurea. | X. citrigo. |
| X. combusta. | Gortyna micacea. |
| X. epomidion. | * G. flavago. |

Leucania Comma.	P. Gamma.
* L. impura.	* P. chrysitis.
L. pallens.	* P. Festuæ.
* Phlogophora meticulosa.	P. bractea.
Cucullia Umbratica.	Heliopsis peltigera.
C. lucifuga.	Anarta Heliaca.
Abrostola Urticæ.	* Mormo Maura.
* Plusia Iota.	Euclidia Glyphica.

III.—SEMIDIURNA.

The body less than in the former, the wings larger and thinner. Many fly in the day, some in the evening, others at night. But few of these have English names, the *Biston Betularius* is the Pepper-moth, and is occasionally taken; *Rumia Cratægata* is the Brimstone-moth, extremely abundant; *Abraxas Ulmata* is the Clouded Magpie, and *A. Grossulariata* the Speckled Magpie, both very common and pretty; *Ourapteryx Sambucaria* is also elegant and pretty common. The *Halia Vauaria* is destructive in gardens. We prefix an asterisk to a few which are in our collection from North Staffordshire; the others were taken near Burton.

Geometridæ.

* <i>Fidonia atomaria.</i>	<i>G. lunaria.</i>
<i>Hybernia defoliaria.</i>	* <i>Rumia Cratægata.</i>
<i>H. capreolaria.</i>	* <i>Ourapteryx Sambucaria.</i>
* <i>Biston Betularius.</i>	<i>Campæa margaritaria.</i>
<i>Crocallis elinguaris.</i>	<i>Hipparchus papilionarius.</i>
<i>Geometra erosaria.</i>	<i>Alcis repandata.</i>
<i>G. Quercaria.</i>	* <i>A. rhomboidaria.</i>
<i>G. angularia.</i>	* <i>Hemerophila abruptaria.</i>
<i>G. illunaria.</i>	* <i>Halia Vauaria.</i>
<i>G. Juliaria.</i>	* <i>Cabera exanthemata.</i>
<i>G. sublunaria.</i>	* <i>C. pusaria.</i>

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| Epione apiciaria. | * Abraxas Ulmata. |
| * Phasiane plumbaria. | * A. Grossulariata. |
| Larentia Chenopodata. | * Melanippe hastata. |
| L. bipunctaria. | * Triphosa dubitata. |
| Cidaria didymata. | * Camptogramma bilineata. |
| C. unidentaria. | * Cheimatobia brumata. |
| C. miaria. | C. rupicapraria. |
| * C. implicaria. | Eupithecia rectangulata. |
| C. fluctuata. | E. nebulata. |
| C. propugnata. | E. vulgata. |
| * Harpalyce fulvata. | E. angustata. |
| H. ocellata. | * Minoa Chærophyllata. |
| * H. subtristata. | Aplocera cæsiata. |
| Polyphasia commanotata. | Emmelesia decolorata. |
| P. centumnotata. | E. turbiaria. |
| P. saturata. | E. albulata. |
| Steganolophia Prunata. | Venilia maculata. |
| Anticlea derivata. | Acidalia virgulata. |
| Electra Populata. | A. inornata. |
| E. Spinachiata. | * A. aversata. |
| E. achatinata. | Pœcilophasia marginata. |
| E. pyraliata. | Timandra imitaria. |
| Anaitis plagiata. | |

Platyptericida.

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|---------------------|------------------|
| Drepana falcataria. | Cilix compressa. |
|---------------------|------------------|

PYRALIDÆ.

Many of these are destructive in houses. Some are prettily marked, as the common *Hydrocampa Potamogata*, and *Nymphæata*; to be caught in the evening hovering over water; the latter the beautiful China-mark.

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|-------------------------|-----------------------|
| * Hypena proboscidalis. | * Pyralis farinalis. |
| * Aglossa pinguinalis. | Simaëthis Fabriciana. |

Enychia octomaculata.	M. lutealis.
Hydrocampa Sambucata.	M. sericealis.
* H. Potamogata.	* Eurrhypara Urticata.
* H. Nymphæata.	Mesographe forficalis.
H. Lemnata.	Scopula Prunalis.
H. Stratiotata.	S. nivealis.
Margaritia verticalis.	Nola cucullatella.
M. cineralis.	

IV.—VESPERTINA.—GENERALLY FLYING IN THE EVENING.

Tortricidæ.

Hylophila prasinana is the Silver lines, not rare in North Staffordshire. *Tortrix viridana* is the little triangular green moth to be seen in thousands about oak trees.

Hylophila prasinana.	Steganoptycha tetraque-
Tortrix viridana.	tana.
Lozotænia Forsterana.	Semasia Pomonella.
L. Grossulariana.	Orthotænia Urticana.
L. Rosana.	Orthotelia venosa.
L. oporana.	Paramesia subtripunctula-
Antithesia Betuletana.	na.
A. Pruniana.	P. gnomana.
Spilonota aquana.	Xanthosetia diversana.
S. Cynosbatella.	Argyrotoza Bergmanniana.

Yponomeutidæ.

Anacampsis sarcitella is, with other species, destructive to clothes; *Yponomeuta* to fruit trees; *Adela De Geerella* is remarkable for its very long antennæ.

Depressaria applana.	Cheimophila Phryganella.
D. Sparmanniana.	Diurnea Fagella.
Anacampsis subcinerea.	Yponomeuta cognatella.
A. sarcitella.	* Y. Padella.
A. domestica.	Epigraphia Avellanella.
Dasycera Oliviella.	Argyrosetia semifasciella.
Adela De Geerella.	Microsetia sequella.

Tineid.

Several of these are also destructive to woollens, &c.

Eudorea dubitalis.	C. petrificellus.
E. Mecurella.	C. paleellus.
Cramrus pascuellus.	Tinea tapetzella.
C. angustellus.	

Alucitidæ.

These are the curious little many-plumed moths found in windows, stables, &c. Very beautiful when narrowly examined.

Pterophorus pentadactylus.	P. trigonodactylus.
P. fuscodactylus.	Alucita hexadactyla.

CRUSTACEA.

The animals composing the *Crustacea* are very beautiful : most of them inhabit salt water, many, however, fresh, and of these some are interesting.

Argulus foliaceus. Very common on the stickleback ; most of which little fish, in one canal, we have noticed to be affected with this parasite. The *Argulus* is very curious, and adheres to the fish by two round suckers, generally about the head, or to the side ; when detached it swims beautifully.

Astacus communis. Craw-fish. Abundant in clear streams. This will live long out of water, but a short time if placed in water from a pond or well.

Gammarus Pulex. Fresh-water shrimp. Common : this is by no means a test of the purity of water, as has been said ; I find it in muddy brooks, as well as in fountains.

Asellus vulgaris. Common with the preceding.

Cyclops vulgaris. This and the following are very minute, and both may be seen in water from most streams or ponds.

Daphnia Pulex.

THE FOLLOWING ARE TERRESTRIAL.

Oniscus Asellus. Common, congregated under stones, &c.

Porcellio scaber. Abundant in decayed wood; Swinerton Park.

Armadillo vulgaris. Under stones, &c. Cheshire cavern.

ARACHNIDA, OR SPIDERS.

The *Arachnida* are fierce and cruel in their habits, but, nevertheless, extraordinary in many respects. Every one must have been struck with their beautiful geometric webs, and the colours of some of them are beautiful, as of the common aquatic scarlet one, and many of the species living in flowers; one, for instance, found in the corolla of the foxglove, beautifully variegated with pink and light green, and another on the hawthorn, of a delicate pea-green colour. Their nests, too, are highly curious; we have noticed a very remarkable one (of the *Clubiona*?), the size of a small cherry, made of delicate white tissue, hanging by a pedicle from the roofs of caverns. It may also have been observed with what care some species (*Dolomedes mirabilis*, &c.) carry about their bags of eggs when threatened with danger. Perhaps few animals more repay their study. Some *arachnida* are aquatic, others parasitical; we can only add a few.

Aranea domestica. Common spider.

A. labyrinthica. Spreads its web horizontally, which at the bottom leads into a funnel-shaped cavity in the ground, in which the animal lies concealed.

A. aquatica. Weaves a web under water. Common in Fenton Pool.

Epeira Diadema. Sceptre or Diadem spider. A specimen of this large and beautiful species has been brought to us alive, caught here.

Limnochares holosericea. Red; common in water.

Gamasus Coleopratorum. Beetle mite. Common on large beetles.

Acarus domesticus. Common mite. In cheese, &c.

Caris vespertilionis. On the common bat.

Glomeris marginata. Abundant in the lime-stone district, Oakamoor and Heyley castle. Like a bead when rolled up.

Julus sabulosus. Common under stones and on agarics.

J. terrestris. Common under stones.

J. ———. Without transverse or longitudinal markings; common.

Polydesmus complanatus. Not rare under stones; Wetley.

Lithobius forficatus. Common Scolopendron.

Geophilus longicornis. Common under stones.

G. subterraneus. Equally common.

ANNELIDES.

Gordius aquaticus. Hair-worm. Common in North Staffordshire.

Lumbricus terrestris, &c. Earth-worm. The effect produced by the boring of these creatures seems to be in some respects beneficial to grass land, by loosening the surface and rendering it more porous; they also raise it considerably, as shewn by Mr. Darwin.

Hirudo sanguisuga, &c. Horse-leech. Common. It is this species which, kept in a bottle, forms so good a barometer, foretelling bad weather by its restlessness.

Erpobdella vulgaris. Fenton Pool.

Planaria nigra, fusca, &c. Common on water plants.

Nais. Several species. These are the red worms seen in the mud at the bottom of pools, so remarkable for their wriggling motion.

RADIATA.

Plumatella repens. Common on bricks by the side of our canals.

Alcyonella stagnorum. It has been doubted whether this substance is formed by polypi, but they are easily seen when it is placed in fresh water. Common in canals on stones and posts; Trentham rivulet, and Grand Trunk Canal. It is frequently seen hanging in considerable masses from the wet arches of bridges and tunnels.

Spongilla friabilis. Bright green, at length somewhat digitate and branched, branches acute; brittle when dry; smelling strongly when taken from the water. On one little foot-bridge in Trentham park.

Hydra grisea. Abundant on the Sium.

H. viridis. Rarer on the Chara.

Vorticella hemispherica (?) Covering plants in a brook in great plenty, so as to give them a shaggy appearance, which disappears when the water is agitated, from its producing the contraction of the little creatures.

INFUSORIA.

Volvox globator. Common; just visible to the naked eye.



ROCK HOUSES ENIVER.

CHAPTER IX.

BOTANY—INTRODUCTION—FLOWERING PLANTS.

VEGETABLES are most naturally divided into Phænogamous (flowering), Cotyledonous, or Vascular plants; and Cryptogamous (flowerless), Acotyledonous, or Cellular plants. The former have evident flowers, often however not coloured, as in grasses and sedges; and bear seeds furnished with *cotyledons*, as we see in a germinating bean, the two white, close-pressed, oval, fleshy bodies being the cotyledons; they have also vessels of different sorts, amongst others, *spiral vessels*, formed of a fine spiral thread, wound in a close cork-screw manner, such as may be seen on close observation by breaking the stalk of many plants across and carefully drawing the parts asunder. The latter have no flowers; no true seeds; and with the exception of the ferns no spiral vessels; but are composed entirely of a tissue of minute cells. The first division embraces all the classes of Linneus except the last (cryptogamia) which is constituted entirely by, and embraces all this second division.

Flowering plants are also susceptible of a further distribution into two great tribes, of which Linneus took no account in his system. Dicotyledonous or exogenous plants, and monocotyledonous or endogenous plants. The former have the seeds with two cotyledons, as in the bean; and have the stem composed of wood and bark, the wood increasing by new layers from the outside, the bark by new layers from within. The wood likewise surrounds a *pith*. In the latter the seed has but one cotyledon, as may be seen in a grain of wheat, and the stem has no distinction of *wood*, *bark*, and *pith*, and grows from within. To this tribe the lilies, grasses, orchideæ, palms, &c. belong. The former have likewise the nerves of their leaves variously branched; both a *corolla* (flower proper), and *calyx* (the green leafy part enveloping the base of the flower at the top of the stalk), and the *petals* or separate divisions of the corolla, and the *sepals* or corresponding divisions of the calyx, as well as the *stamens* and *pistils*, frequently either five in number, or a multiple of five, as ten. The latter have the nerves of the leaves parallel and unbranched, and the number three or a multiple of it, as six, more commonly prevalent in the parts of the flower.

Linneus arranged plants principally from the number and situation of their stamens and pistils. The stamens are those little organs which are contained within the flower,—as may be seen in the primrose, for instance, or more numerous in the wild rose, or in the crowfoot,—and are composed of *filaments* or threads, with a little body called the *anther* on the tip of each. The anthers produce the yellow fertilizing powder called *pollen*. Linneus took his classes generally from the number, &c. of the stamens, and as there are five of them in the primrose, it belongs to the class Pentandria (five stamens), whilst, as there are many

in the crowfoot, it belongs to the class Polyandria (many stamens).

The pistil or pistils are situated in the centre of the stamens, and each is composed of three parts, the swollen base or *germen*, becoming eventually the *seed vessel*; the middle bristle-like body or *style*; and the top or *stigma*. The orders of the great Swede are frequently taken from the pistils, and as there is but one in the primrose, the pin-like little body, it belongs to the order Monogynia (one stigma or style),—Pentandria Monogynia. There are many pistils in the crowfoot, consequently it is of the order Polygynia,—Polyandria Polygynia.

The study of our indigenous plants must always be interesting to those who have any taste for botanical pursuits. Besides their many uses to man, there is a great charm, on account of their extreme beauty and the rarity of many, in searching them out in their secluded and varied *habitats*.

It is curious to observe how undeviating most plants are in choice of situation and soil. Some are never found off limestone, or chalk, or basalt; some prefer the gloomy shade; others on the contrary scorched rocks; in fact these peculiarities are innumerable; generally, however, there is an abundance of vegetables in every situation.

“ Thus spring the living herbs profusely wild,
O'er all the deep green earth—
With such a liberal hand has Nature flung
Their seeds abroad.”

It is remarkable, likewise, how pertinaciously some plants adhere to particular spots in a country, being found perhaps on one hill, or rock, or in one wood, or marsh, or in a few bushes, and only there throughout a whole district, and this for centuries. A rare corn plant may be con-

stantly found in one or two fields, though the soil is frequently ploughed and varied in crop; and such rare corn plants are not often spread from one county to another, though in many cases, perhaps, their seeds are conveyed in the grain sown. It may also be observed, with how great difficulty plants are, with a few exceptions, naturalized, whether by accident from gardens, or if sown by design. Those plants that do escape from gardens and run wild, are frequently natives of some other part of Great Britain, though there are certainly exceptions to this, as will occur in the following list; where, however, these interlopers are distinguished by remarks.

It is hoped that a tolerable sprinkling of rare plants will be found in the following list. The botanist will observe that the character of the Staffordshire Flora is somewhat subalpine. In fact much of the surface of the county is considerably above the surface of the sea, from 700 to 1800 feet. In many districts wheat cannot be grown.

It will be seen that we are quite deficient of many plants very common in the south of England, and near London. The chalk plants too are generally absent, though a few are common to the chalk and limestone; these, therefore, we have. The plants peculiar to the high mountains of North Britain are likewise mostly absent. A few species, which appear to be common plants in many places, are likewise absent; whilst, on the contrary, some which are in almost every field in Staffordshire, would be great rarities elsewhere, as near the metropolis.

The following plants appear very rare or absent in Staffordshire, though pretty common in numerous districts.

<i>Veronica polita.</i>	<i>Centunculus minimus.</i>
<i>Iris foetidissima.</i>	<i>Gentiana Pneumonanthe.</i>
<i>Lolium temulentum.</i>	<i>Sison Amomum.</i>

Viburnum Lantana.	Limosella aquatica.
Ornithogalum umbellatum.	Helminthia echioides.
Cerastium arvense.	Adonis autumnalis.
Stratiotes aloides.	Cuscuta Epithymum.

Marrubium vulgare.

In gathering plants to dry for the *hortus siccus*, we should have the roots, if possible, they being often curious and characteristic, as in the *orchises*. If the plants are of an awkward form from being packed in the box, they may be improved by fixing them for a time by small leaden weights on a table, always however recollecting that the natural form is best. They should be pressed till quite dry and stiff, between a good supply of white unsized paper, the pressure being moderate, and moving them occasionally into fresh dry paper. The leaves and flowers should be adjusted when first the plant is laid out, as it does not answer to do this afterwards. The stems or bulbs, &c. of the plant may be thinned, if necessary, with the knife. *Sedums*, &c. vegetate in the press for months, owing to their tenacity of life, and are spoiled; they, as well as *orchises*, should therefore be dipped into boiling water for a moment before pressing. Some plants, as *Lathræa*, had better be hung up in a kitchen till dry, and then pressed. Many others, as the beautiful Buckbean, some *Galia*, and Willows always go black; in some cases rapid drying by a heated iron, or by bags of hot sand, will prevent this. The blue colours of flowers are very apt to change: yellow, also, in the primrose, whose flower becomes green: but this to a botanist is of minor importance.

That there may be many errors in the following lists, particularly in those of the lower *cryptogamic* plants, the author is well aware. He trusts that of the flowering plants is correct as far as it goes; probably most incorrect

in the *omission* of plants which he may either not have found or not distinguished.

The author thinks the Linnean arrangement most suitable for British plants; and particularly for the Flora of a district; where the number of genera is too limited to furnish examples of the numerous natural families. He has, therefore, arranged his plants after that method.

The names of Hooker (Brit. Flora, 1838; and Eng. Flora, Vol. 5, Part 1, 2, 1833—6) have been adopted throughout.

Lastly, in giving to the public the following lists of Staffordshire plants, it is proper to state from what sources they have been drawn up. That the greater portion of the localities are from the author's own personal observations, will be apparent on the inspection of them. Where the Roman type is used he has always himself found the plant in the particular place or places. In a few of these instances he may not be the discoverer of the plant on the particular spot; but this is not often the case, and seldom or never when any rare or remarkable plant is in question. In the case referred to, as in the localities given on the authority of others, which generally follow (printed in Italics) those verified by his own observation, he has been obliged often to suppress names, or his list would have been much more swollen out. But he has not often done this in remarkable cases, and he trusts that in the following paragraphs he supplies the deficiency of references alluded to. Several Staffordshire localities of rare plants occur in Plot, Ray, Hudson, and Withering, in Turner and Dillwyn's Botanists' Guide, and in Purton's Midland Flora; but the best list of the plants of the county is that published forty years back in Shaw's Antiquities of Staffordshire. To this list Messrs. Dickenson, Foster, Bourne, Sneyd, and

others appear to have contributed. To the first-named gentleman, however, the principal merit is due. The *cryptogamic* plants in the list appear to have been contributed by the same botanist, and (particularly the *Agarics*) constitute an interesting part of it. The list in Pitt's Staffordshire is principally a compilation from this of Shaw.

Other localities have been published by Smith, &c., and in Watson's New Botanist's Guide. The names of Stokes,* Woodward, Waring, Pitt, Woods, Salt, Merret, Butt, Lees, Gisborne, Howitt, Babington, Darby, and Bowman, ought also to be mentioned as contributing to the Flora of Staffordshire.

Mr. Carter has published "A List of Plants as they occur around Cheadle,"† and there is a "List of Plants found near Lichfield,"‡ by Miss Jackson, also published. There has likewise appeared one of the "Plants occurring near Birmingham," (many of them in Staffordshire,) by Mr. Ick. It will be seen that these catalogues have not been overlooked.

The author likewise *particularly* renders his acknowledgments, for the communication of botanical information, to Arthur Hewgill, Esq., M.D.,§ James Spark, Esq., William Valentine, Esq., F.L.S., Sir Oswald Mosley, Bart., and to Mr. Pinder. He has likewise received information from Messrs. Clark, Quekett, F.L.S., Brown, Stammers, Davis, and Blair.

The lists of *cryptogamic* plants are also principally from the author's own observations. That of the mosses he hopes will be found less imperfect than the others, and interesting to the cryptogamist, as he has pretty assi-

* Dr. Stokes published an edition of Withering.

† Magazine of Natural History.

‡ Analyst.

§ To Dr. Hewgill's list, Messrs. Nuttall, Hawkesworth, Beynon, and Birch appear to have contributed.

duously collected these elegant little objects for some years.

As far as these latter lists are concerned, he has always mentioned when he is indebted to others.

FLOWERING PLANTS.

“Consider the lilies of the field, how they grow; they toil not, neither do they spin: And yet I say unto you, That even Solomon in all his glory was not arrayed like one of these.”

CLASS I.—MONANDRIA. 1 STAMEN.

Hippuris vulgaris. Mare's-tail. In pools and ditches. Kingston Pool and Rickerscote. Near *Stafford*, towards *Aston*, *Withering*. *Burton*.

CLASS II.—DIANDRIA. 2 STAMENS.

ORDER I.—MONOGYNIA. 1 STYLE.

Ligustrum vulgare. Privet. Flowers white. Wild in the valley of the river Hamps.

Veronica Anagallis—*Beccabunga*—*officinalis*—*agrestis*—*serpyllifolia*. Common.

V. scutellata. Marsh Speedwell. Flowers flesh-coloured. At Endon, Gravenhanger, Calf Heath, Whitmore. *White-sitch*, *Weston-under-Lizard*, *Barton*, *Lichfield*.

V. montana. Mountain Speedwell. Flowers light purple. General in moist woods.

V. Chamædryas. Germander Speedwell. Flowers blue. Common on banks, and very beautiful.

V. hederifolia. Ivy-leaved Speedwell. Flowers light blue. Common. In flower at the beginning of March.

V. arcensis. Wall Speedwell. Flowers blue. Frequent. Flowering very early on limestone rocks.

Pinguicula vulgaris. Butterwort. Flowers purple. In bogs and wet ground. Gravenhanger, at the foot of Axedge, and below Buxton, (Derb.) *Blymhill, Sutton Park*. The *Pinguiculæ, Droseræ*, and several other plants of a similar habit, are readily grown under a bell-glass in the parlour.

Utricularia vulgaris. Greater Bladderwort. Flowers yellow. Frequent in pools. *Plymhill, Aqualate, Betley, Craddock's Moss, Whitmore, Maer*. A curious plant.

U. minor. Lesser Bladderwort. Flowers yellow. *Craddock's Moss and Wybunbury (Chesh.)*; pointed out to me in the last spot by Mr. Spark. Near *Betley; Midl. Flora*.

Lycopus Europæus. Gipsywort. Flowers whitish, dotted with purple. Common about ditches.

Salvia Verbenaca. English Clary. Flowers purple. About *Tutbury Castle. Kincer*.

Circea Lutetiana. Enchanter's Nightshade. Flowers white. Common in shady places. *Stoke meadows, Trent-ham woods, &c.*

C. alpina. Alpine Enchanter's Nightshade. Flowers white. Woods at *Froghall, Oakamoor, and Heyley Castle. Hanchurch; Dr. Davidson*. Var. *major*. *Oakamoor and Froghall*.

Fraxinus excelsior. Ash. Common and valuable for its tough wood.

Lemna trisulca—minor. Common.

L. polyrhiza. Greater Duckweed. Copmere.

L. gibba. Gibbous Duckweed. Copmere, with all the other species.

Cladium Mariscus. Prickly Twig-rush. Wybunbury, (Chesh.) *Chartley Moss, Moreton, Tamworth, Dosthill*.

ORDER II.—DIGYNIA. 2 STYLES.

Anthoxanthum odoratum. Sweet-scented Vernal-grass. A grass: all the other grasses belong to *Triandria*. The sweet smell of hay is derived from this plant.

CLASS III.—TRIANDRIA. 3 STAMENS.

ORDER I.—MONOGYNIA. 1 STYLE.

Valeriana rubra. Red Valerian. Flowers deep rose-coloured. On old walls, but perhaps not truly wild. *Matlock, (Derb.) Burton*.

V. officinalis. Great Valerian. Flowers lilac. Common. Cultivated for sale, being very valuable medicinally, in nervous affections. Var. β . Near *Birmingham, Mr. Ick. Lichfield, Miss Jackson*.

V. Pyrenæica. Heart-leaved Valerian. Flowers lilac. Discovered by Mr. Carter in the rocky wooded dell leading up from *Oakamoor*, towards *Cotton*. It exists in plenty here for a mile or two up the rivulet; flowering a little before *V. officinalis*, about the same time as the following. The root possesses the Valerian flavour in a high degree. A rare, fine, and beautiful plant.

V. dioica. Small marsh Valerian. Flowers rose-coloured. Common.

Fedia olitoria. Corn-salad. Flowers blue. Occasional. *Fair Oak, Wetton Valley, Ecton Hill. Lichfield, &c.* Flowering very early on limestone rocks: cultivated occasionally as a salad.

F. dentata. Smooth narrow-fruited Corn-salad. Flowers flesh-coloured. Var. α . In cornfields near *Wooton*. Var. β .

at Beeston Tor with *F. olitoria*, and at Shirleywich. Var. *Eriocarpa*. *Dovedale*; *New Bot. Guide*. *Cheadle, Lichfield*.

Crocus nudiflorus. Naked-flowering Crocus. Flowers purple. Abundantly in a field near Wolstanton, and in two other fields near. *Shutt End*; *Midl. Flora*. This appears to agree with specimens of the Nottingham plant, and scarcely differs from *C. speciosus*, Hook.

Iris Pseudacorus. Yellow water Iris. Flowers yellow. Common in wet places. Handsome.

I. Germanica. About a ditch in Stoke meadows. Introduced.

Cyperus longus. English Galingale. Hamstall Ridware, Pitt. This and the following genera to *Nardus*, with *Cladium* and *Carex*, form the natural family *Cyperaceæ*.

Schoenus nigricans. Black Bog-rush. Wybunbury, (Chesh.) Moreton.

Rhynchospora alba. White Beak-rush. Whitmore, Craddock's Moss, &c., *Chartley, &c.*

Scirpus lacustris—*setaceus*. Common.

S. glaucus. Glaucous Club-rush. Shirleywich.

S. carinatus. Blunt-edged Club-rush. *Chickhill Pool* near *Enville, Himley*; *Midl. Flora*.

S. maritimus. Salt-marsh Club-rush. In a ditch by the salt-marsh, near Kingston.

S. sylvaticus. Wood Club-rush. Common. Stoke meadows, &c.

Blysmus compressus. Broad-leaved Blysmus. *Yoxall Lodge*, near *Buxton*, (Derb.)

Eleocharis palustris—*multicaulis*—*cæspitosa*—*acicularis*. Common.

E. pauciflora. Chocolate-headed Spike-rush. *Reservoir* near *Stourbridge*; *Dr. Hastings*.

E. fluitans. Floating Spike-rush. Common. Craddock's Moss, &c.

Eriophorum vaginatum. Hare's-tail Cotton-grass. Common on bogs. Wetley Moor, Whitmore, &c.

E. polystachion. Broad-leaved Cotton-grass. Willow-bridge and Chartley Moss.

E. angustifolium. Common Cotton-grass. More frequent than the last. Wetley Moor.

Nardus stricta. Mat-grass. Moors. Wetley and Chartley Park. This with *Anthoxanthum*, and with all the genera of the following order, constitute the natural family, *Gramineæ* or Grasses.

ORDER II.—DIGYNIA. 2 STYLES.

Alopecurus pratensis. Meadow Fox-tail-grass. Plentiful and valuable for hay.

A. agrestis. Slender Fox-tail-grass. Abundant about Stone and Stafford. *Mavesyn Ridware*.

A. geniculata. Floating Fox-tail-grass. Common.

A. fulvus. Orange-spiked Fox-tail-grass. *Edgbaston Park*; *Eng. Flora*. Near the railway station, *Burton*; *Mr. Brown*.

Phalaris Canariensis. Canary-grass. Frequent, but not wild. Pretty.

P. arundinacea. Reed Canary-grass. Common. Occasionally striped, but not really wild. *Weston-upon-Trent*.

Phleum pratense. Timothy-grass. Common.

Milium effusum. Spreading Millet-grass. Common. *Trentham Woods*, &c. Graceful.

Calamagrostis Epigejos. Wood Small-reed. *Blymhill*, *Aqualate*, &c.

C. lanceolata. Purple-flowered Small-reed. *Aqualate*, *Pensnett*, &c.

Agrostis canina—vulgaris—alba. Common. The bent,

couch, or squitch grasses are frequently troublesome to the agriculturist from infesting ploughed land.

Catabrosa aquatica. Water Whorl-grass. Not rare by road-sides.

Aira cristata. Crested Hair-grass. Limestone rocks, Dovedale, Wetton, Hartington, and Crich, (Derb.)

A. cæspitosa. Turfy Hair-grass. Common in wet places.

A. flexuosa. Waved Hair-grass. Abundant in heathy places.

A. caryophyllea. Silvery Hair-grass. On sand at Kinver, Blymhill, Ashley, Tittensor, Whitmore, Lichfield.

A. præcox. Early Hair-grass. Common. Trentham, &c.

Setaria verticillata. *Stourbridge; Messrs, Lees and Scott.*

Melica nutans. Mountain Melic-grass. Abundant on broken limestone, in bushy spots, in the valleys of the Hamps and Manyfold.

M. uniflora. Wood Melic-grass. Frequent in shady woods, as at Trentham.

Holcus mollis. Creeping Soft-grass. Common in pastures and hedges.

H. lanatus. Meadow Soft-grass. Common in fields and woods. These two species of grass are troublesome in arable land.

Arrhenatherum avenaceum. Oat-like Grass. In every hedge and cornfield. Root curiously knotted, and troublesome to the farmer.

Poa aquatica. Reed Meadow-grass. Common in wet places: Trent side, &c. All the meadow grasses are valuable and grateful to cattle, by which the present species is greedily sought after in marshes. Horses, however, refuse it.

P. fluitans—trivialis—pratensis—annua. Common.

P. rigida. Hard Meadow-grass. Common in dry places. Tutbury Castle, walls, &c.

P. nemoralis. Wood Meadow-grass. Probably not rare. *Brewood*.

Triodia decumbens. Heath-grass. On Mow Cop and Cat's Edge.

Briza media. Common Quaking-grass. In meadows and pastures.

B. minor. *Stourbridge*; *Messrs. Lees and Scott* (?).

Cynosurus cristatus. Crested Dog's-tail-grass. Common in fields; valuable in pasture. Viviparous, occasionally, 1841.

Dactylis glomerata. Rough Cock's-foot-grass. Common; coarse, but productive for hay.

Festuca ovina. Sheep's Fescue-grass. Common on limestone. The fescue-grasses are valuable in pasturage.

F. duriuscula—*bromoides*—*pratensis*—*Myurus*. Common.

F. calamaria. Reed Fescue-grass. Occasional in woods.

F. loliacea. Spiked Fescue-grass. Occasional in moist places.

F. elatior. Tall Fescue-grass. Bushy places by the Trent at Stoke, &c.

Bromus giganteus. Tall Brome-grass. About the Trent bridge at Stoke, &c.

B. asper. Wood Brome-grass. Moist woods. Handford, &c.

B. sterilis. Barren Brome-grass. Common in fields and hedges.

B. secalinus. Smooth Rye Brome-grass. In cornfields, Penkhull, &c.

B. mollis. Soft Brome-grass. Very common and the most valuable of the brome-grasses.

Avena fatua. Wild Oat, Mad Oat. Near Stoke, but it is not common.

A. pratensis. Narrow-leaved Oat-grass. Near Calton on limestone.

A. pubescens. Downy Oat-grass. Common on limestone hills.

A. flavescens. Yellow Oat-grass. Common, Stoke meadows, &c.

Arundo Phragmites. Common Reed. Common in pools, Betley, &c.

Elymus Europæus. Wood Lyme-grass. *Matlock, (Derb.)*

Hordeum murinum. Wall Barley. Waste places; but rare in the north of the county. Lichfield Close and near Stourbridge.

H. pratense. Meadow B. Uttoxeter, Stone, Stafford.

Triticum caninum—repens. Common. Troublesome weeds.

Brachypodium sylvaticum. Slender false Brome-grass. Common on limestone and also on red marl. Stafford, Stone, Mill Meece, and Uttoxeter.

B. pinnatum. Heath false Brome-grass. Matlock and Crich Cliff, (Derb.) *Hamstall Ridware.*

Lolium perenne. Perennial Darnel or Rye-grass. Common. Pinnated in its spike at Clayton.

L. arvense. Annual Darnel. Commonly sown with clover.

ORDER III.—TRIGYNIA. 3 STYLES.

Montia fontana. Water-blinks. Flowers white. Common in watery places; Wetley Moor, &c.

CLASS IV.—TETRANDRIA. 4 STAMENS.

ORDER I.—MONOGYNIA. 1 STYLE.

Dipsacus sylvestris. Wild Teazle. Flower purple. At Great Bridgeford, Eaton Woods near Uttoxeter, Tam-

worth, Chartley Castle, Tixall, Houndshill, Tutbury, *Blymhill*, *Hopwas* and *Burton*.

D. pilosus. Small Teazle. Flowers white. Stafford Castle, to the left hand ascending the avenue, Castle Ring, Eaton Woods near Uttoxeter, *Alton*, *Woodford Coppice*, *Blymhill*, *Hopwas*.

Knautia arvensis. Field Knautia. Flowers lilac-purple. Frequent in cornfields; with white flowers in Coton Field, Stafford.

Scabiosa succisa. Devil's-bit Scabious. Flowers purplish blue. Common in pastures and meadows.

S. columbaria. Small Scabious. Flowers purplish blue. Common on, but seldom found off, the limestone.

Galium verum. Yellow Bed-straw. Flowers yellow. Common. The root will afford a red dye.

G. cruciatum—*uliginosum*—*Aparine*. Common.

G. palustre. White water Bed-straw. Flowers white. Common. Var. β . Common.

G. erectum. Upright Bed-straw. Flowers white. *Swynfen* near *Lichfield*; *Miss Jackson*. *Burton*.

G. saxatile. Smooth Heath Bed-straw. Flowers white. Common in heathy places.

G. Mollugo. Great Hedge Bed-straw. Flowers white. *Dudley*, *Rowley*, *Stourbridge*. Rare in the north of the county.

G. pusillum. Least Mountain Bed-straw. Flowers white. General on the limestone.

G. Parisiense. Wall Bed-straw. Flowers white. Frequent on walls and limestone rocks.

Asperula odorata. Sweet Woodruff. Flowers white. Common in woods; *Trentham*, &c. Fragrant when dried.

Sherardia arvensis. Blue Sherardia. Flowers pale blue. Common in light soil.

Plantago major—lanceolata. Common.

P. media. Hoary Plantain. Most common on limestone or marl. Sometimes with striped leaves.

P. Coronopus. Buck's-horn Plantain. Sandy places, Trentham, &c.

Cornus sanguinea. Wild Cornel, Dogwood. Flowers white. Occasional in hedges. A shrub.

Parietaria officinalis. Wall Pellitory. Common on old ruins; Croxden Abbey, Burton Abbey, Tutbury, &c.

Alchemilla vulgaris. Lady's-mantle. Flowers yellowish green. Common in all parts of the county.

A. arvensis. Parsley-piert. Flowers green. Common in sandy places.

Sanguisorba officinalis. Great Burnet. Flowers dark purple. Common in all parts of Staffordshire. Cattle are fond of it, and it has been occasionally cultivated. It is not confined to a calcareous soil.

ORDER IV.—TETRAGYNIA. 4 STYLES.

Ilex Aquifolium. Holly. Flowers white. Very fine in Needwood, and it forms beautiful hedges of great height about Uttoxeter: of the bark, the curious substance, bird-lime is made; and we associate pleasantly its dark foliage and scarlet berries with Christmas.

Potamogeton densus — lucens — natans — perfoliatus. Common.

P. pectinatus. Fennel-leaved Pond-weed. In the canals, Stoke. *Porton.*

P. pusillus. Small Pond-weed. Common in canals at Stoke, &c.

P. gramineus. Grassy Pond-weed. Not uncommon.

P. zosteræfolius. Grass-wrack Pond-weed. In canals at Stoke. *P. cuspidatum*; Mr. Spark.

P. crispus. Curled Pond-weed. In canals at Stoke, Trentham Pool, &c.

P. heterophyllus. Various-leaved Pond-weed. Fenton Pool, &c.

P. fluitans. North Staffordshire, Mr. Spark.

Sagina procumbens—*apetala*. Common; the former frequent on bogs.

Moenchia erecta. Upright Moenchia. Flowers white. Sandy commons, Barlaston, Gravenhanger Moss. *Lichfield*.

Radiola Millegrana. Thyme-leaved Flax-seed. Flowers white. Barlaston common, Gravenhanger, Offley Hay.

CLASS V.—PENTANDRIA. 5 STAMENS.

ORDER I.—MONOGYNIA. 1 STYLE.

Echium vulgare. Viper's Bugloss. Flowers purple and blue. Dudley Castle walls, sandy fields south of Wombourne, Kinfare (about the old camp), Alsager, (Ches.) *Stafford*, *Weston-under-Lizard*, *Lichfield*. The spike of flowers is sometimes nearly two feet long and very handsome.

Pulmonaria officinalis. Needwood Forest, Dr. Hewgill.

Anchusa sempervirens. Evergreen Alkanet. Flowers blue. Not rare in several places in the south of the county.

Lithospermum officinale. Gromwell. Flowers pale yellow. On the walls of Alton and Tutbury Castle, *Burton*. Flowers fragrant, smelling like violets.

L. arvense. Corn Gromwell. Flowers white. Common.

Symphytum officinale. Comfrey. Flowers yellowish white, sometimes purple. Wombourne and Perry Hall, *Marchington*, *Burton*, and *Lichfield*. Rare in the north of the county.

S. patens. Occasional.

S. tuberosum. Tuberous-rooted Comfrey. Longnor, *Wetton Valley* and *Lichfield*.

Borago officinalis. Borage. Flowers bright blue. *Needwood*, *Cheadle*, *Burton*, *Lichfield*, *Dudley Castle*.

Lycopsis arvensis. Small Bugloss. Flowers blue. Common amongst corn.

Myosotis palustris. Forget-me-not. Flowers blue. Common in wet places, and frequently lasting in flower till winter; pretty. Var. *repens*. Common in bogs.

“That blue and bright eyed flow’ret of the brook,
Hope’s gentle gem, the sweet Forget-me-not!”

M. cæspitosa—*arvensis*. Common.

M. sylvatica. Upright wood Scorpion-grass. Flowers blue. Common in our woods. At *Ramsor* with pure white and also with lilac flowers.

M. collina. Early field Scorpion-grass. Flowers blue. Not rare on the limestone, &c.

M. versicolor. Yellow and Blue Scorpion-grass. Flowers blue, &c. Common. With white flowers at *Belmont*.

Cynoglossum officinale. Hound’s-tongue. Flowers dark red. Frequent, particularly on coal-pit-lows. *Betley*, and *Madeley*, *Burton*, *Dovedale*, &c.

Anagallis arvensis. Scarlet Pimpernel. Flowers scarlet. Common in cornfields.

A. tenella. Bog Pimpernel. Flowers pink. *Offley Hay*, *Gravenhanger*, *Chartley Park*, *Burton*, *Lichfield*.

Lysimachia vulgaris. Great Yellow Loose-strife. Flowers yellow. Marshes, *Trentham*, *Clayton*, *Wybunbury*, (*Ches.*) *Bewdley*, *Blymhill*, *Lichfield*.

L. nemorum. Yellow Pimpernel. Flowers yellow. Common in shady places.

L. nummularia. Money-wort. Flowers yellow. *Sideway*, *Eccleshall*, *Buttermilk Hill*, *Burton*, *Curbro’ Woods*.

Primula vulgaris. Primrose. Flowers cream-coloured, occasionally purple, or double. Common on banks and in woods. Sometimes with ten divisions of the corolla, ten stamens, &c.

P. elatior. Oxlip. Flowers varying in colour. Not uncommon; Croxden, Hollington, Oakamoor, Limestone district. Probably hybrid between the primrose and cowslip.

P. veris. Cowslip. Flowers yellow. Common in fields.

“ The plant whose pensile flowers
Bend to the earth their beauteous eyes,
In sunshine as in showers.”

Hottonia palustris. Water-violet. Flowers pale purple. In a ditch at Aqualate. *Newcastle, Mr. Spark; Elford, Barton, Dr. Hewgill; Walsall, Tamworth.* Handsome.

Menyanthes trifoliata. Buckbean. Flowers white. General in boggy places. Flowers beautifully fringed. A tonic bitter; “equal if not superior to any of the foreign bitters.”

Villarsia nymphæoides. Pool at Alton, &c. Introduced.

Erythraea Centaurium. Centaury. Flowers rose-coloured. Common in dry pastures. *A white variety of this species at Heyley Castle, Mr. Spark; and at Dudley, Mr. Bree.* A tonic in indigestion; frequently sold by herb collectors.

E. pulchella. Probably found.

Datura Stramonium. Thorn apple. Flowers white. In waste places. An American plant originally. This and the three following genera belong to the natural family *Solanææ*, Jussieu, or *Luridæ*, Linneus. Many of this tribe possess very deadly properties.

Hyoscyamus niger. Henbane. Flowers dingy yellow, with purplish lines. Waste places. Tutbury Castle, near

Tamworth one mile on the Lichfield road, *Four Crosses, Streetway, Lichfield*. Valuable in medicine.

Atropa Belladonna. Dwale or Deadly Nightshade. Flowers lurid purple. Dudley Castle, Alton Castle fosse, Tutbury Castle, Wren's Nest, Barrow Hill abundant, *Near Stourbridge*. This plant bears large dark poisonous berries; the juice of it rubbed on the brow dilates the pupil of the eye in a remarkable manner.

Solanum Dulcamara. Nightshade or Bittersweet. Flowers purple. Common in every hedge. Much used in eruptive diseases.

S. nigrum. Garden Nightshade. Flowers white. Much less common. Betley, *Lichfield, Burton*.

Verbascum Thapsus. High-taper. Flowers yellow. Common; particularly on limestone rocks; but in some districts absent.

V. Lychnitis. White Mullein. Flowers cream-coloured. *Wombourne, Burton, Hagley, Kinver*.

V. nigrum. Dark Mullein. Flowers yellow. Near *Wombourne, Hamstead near Birmingham, Perry Barr, Stourbridge*.

V. Blattaria. Moth Mullein. Flowers yellow. *Hill Ridware, Shaw; Dunsley and Kinver, Midl. Flora*.

Convolvulus arvensis. Small Bindweed. Flowers rose-coloured. Common in hedges.

C. sepium. Great Bindweed. Flowers white. Common in hedges, where its pure white flowers are very ornamental till late in autumn. Root purgative.

Polemonium cæruleum. Jacob's-ladder. Flowers blue, rarely white. Around Thor's Cavern, Ecton Hill, Glutton Bridge, Buxton, and Winnats near Castleton, (Derb.) In all cases plentiful on the north aspect of limestone preci-

pices. *Caverswall Meadows, Needwood Forest, Dovedale, Woodheaves near Ashbourn.* Flowers fragrant. Rare.

Vinca minor. Lesser Periwinkle. Flowers purple. By the rivulet below Biddulph Castle, abundant; *Holloway, Gosbrook, Smethwick, Ashbourn, by the Trent near Walton, near Newcastle,* Uttoxeter.*

V. major. Frequent; but near houses.

Samolus Valerandi. Brookweed. Flowers white. *Mott's Well near Smallwood Manor, Dr. Hewgill.*

Jasione montana. Sheep's-bit. Flowers blue. Common in sandy soil.

Campanula rotundifolia. Harebell. Flowers blue. Common on banks, flowers occasionally white.

“ Where feathery fern and golden broom
Increase the sand-rock cavern's gloom,
I've seen thee tangled;
'Mid tufts of purple heather bloom,
By the fell spider's treacherous loom,
With dewdrops spangled.”

C. patula. Spreading Bell-flower. Flowers purple. *Enville. About Lichfield, Burton, Water Orton, Hagley, Bewdley, near Birmingham.* Flowers sometimes white.

C. Rapunculus. Rampion Bell-flower. Flowers blue. *Blymhill, near the parsonage; Dudley, Enville.*

C. latifolia. Giant Bell-flower. Flowers blue. *Trent side at Stoke, Croxden, Tean, Darlaston, and on the limestone. Barton, Stafford, Lichfield, Rowley, Woodford.* Very handsome; with white flowers at Darlaston, Mr. Foster in Shaw; there in 1836.

C. Trachelium. Nettle-leaved Bell-flower. Flowers blue or whitish. Abundant in the Hamps valley; *Rowley, Wood Eaton, between Marchington and Houndhill, Barton, Perry Barr, Burton.*

C. glomerata. Clustered Bell-flower. Flowers blue. Buxton, (Derb.) close to the road a mile towards Bakewell.

C. hederacea. Ivy-leaved Bell-flower. Flowers pale purple-blue. Near Lichfield, Miss Jackson.

C. hybrida. Corn Bell-flower. Flowers purple. In a turnip field on Kingston Hill, near Stafford.

Lonicera Periclymenum. Honeysuckle, Woodbine. Flowers crimson or yellow. Common in woods or hedges.

L. Caprifolium. Pale perfoliate Honeysuckle. Flowers yellowish. In a wood near Elsfeld, Rev. T. Butt. Bot. Guide.

L. Xylosteum. Upright fly Honeysuckle. Flowers yellowish. Needwood Forest; Dr. Hewgill.

Rhamnus catharticus. Buckthorn. Flowers green. Dovedale, &c., Blymhill, Lichfield, and other places. Berries purgative.

R. Frangula. Berry-bearing Alder. Flowers whitish green. Wet thickets, Chartley Moss, Willowbridge, Maer, Gravenhanger, Oakamoor, Wybunbury, Bagnall.

Euonymus Europæus. Spindle-tree. Flowers white. Occasional. Plentiful in Dovedale and Wetton valley, and other places. Its crimson berries are beautiful but poisonous.

Impatiens Noli-me-tangere. In one or two spots in woods, profusely covering the ground; but originating from gardens. Ramsdell.

Claytonia alsinoides. Naturalized on a bank near Penk-hull.

Viola hirta. Hairy Violet. Flowers blue. Ecton and Wetton valley, Dovedale, Buxton, Matlock, (Derb.) Handsome but scentless.

V. odorata. Sweet Violet. Flowers purple. Frequent in the sandstone and marl districts; rare in the coal dis-

tricts; probably more common in the south of the county; on coal strata south of Wolverhampton, Heyley Castle, Betley, Croxden. With white flowers, Seabridge, Blythe Marsh. Variety with a dull lilac flower, large, and without hairy lines; Heyley Castle. The white variety is also common in the south, as about Dudley Castle; over by the time the Common Dog's Violet flowers. To this species Shakspeare alludes

“ Violets dim

But sweeter than the lids of Juno's eyes,

Or Cytherea's breath.”

V. palustris. Marsh Violet. Flowers pale blue. General in bogs.

V. canina. Dog's Violet. Flowers blue. Common on every bank.

V. flavicornis. Draycott, Cannock Chase.

V. tricolor. Pansy or Heart's-ease. Flowers varying. Common on light soil.

V. arcensis. Equally common.

V. lutea. Yellow Mountain Violet. Flowers yellow or purple. In high pastures, on limestone or limestone-shale. Butterton, Wetton, Alstonefield, Throwley, Wever Hills, Grindon, Longnor, Leek. *Var. β*. Dovedale.

Ribes rubrum. Red Currant. Occasional in remote woods. Introduced (?).

R. nigrum. Black Currant. Swamps along the Trent, &c. Introduced (?).

R. Grossularia. Gooseberry. Common, particularly about ruins. Introduced (?).

R. alpinum. Tasteless Mountain Currant. Flowers green. Abundant, and wild on limestone rocks, Wetton Valley. Plant green before any other shrub in the landscape. Berries red, tasteless. Male and female flowers (sometimes)

on separate plants; Shaw. Found in other spots in the county.

Hedera Helix. Ivy. Flowers greenish. Common on trees and walls. Berries black.

Glaux Maritima. Sea Milkwort. Flowers rose-coloured. *Salt Marsh near Tixall; Shaw.*

ORDER II.—DIGYNIA. 2 STYLES.

Gentiana Amarella. Autumnal Gentian. Flowers dingy, pale purple. Common in all hilly pastures: one hundred and twenty-five flowers on one plant. *Corolla* frequently four-cleft; only expanded in bright sunshine.

G. campestris. Field Gentian. Flowers purple. Frequent with the above. On *Axedge* often single-flowered, though sometimes one hundred blossoms may be counted on one plant.

Cuscuta Europæa. Greater Dodder. Flowers pale yellowish. Rare, but occurring occasionally; parasitical on nettles, flax, clover, &c.

Hydrocotyle vulgaris. White-rot, marsh Pennywort. Flowers reddish. General; considered poisonous to sheep; but probably it only indicates that the damp fields where it grows are unfit for their pasturage. This and the following genera to *Chenopodium* constitute the natural family *Umbelliferae*; plants having their flowers, like the parsley or carrot, collected into heads, bearing some resemblance to an open umbrella. Their properties are generally aromatic, and occasionally poisonous.

Sanicula Europæa. Wood Sanicle. Flowers white. General in woods.

Cicuta virosa. Water Hemlock or Cowbane. Flowers white. *Kingston pool; Dr. Stubbs in Shaw.* Fatal to cows,

though horses eat it with impunity. Fortunately a very rare plant in Staffordshire.

Apium graveolens. Wild Celery. Flowers yellow. By the salt brook, Shirleywich, Tamworth, Uttoxeter.

Petroselinum segetum. Corn Parsley. Flowers white or flesh coloured. Cornfields; Tamworth.

P. sativum. Common Parsley. Croxden Abbey walls. Introduced (?).

Helosciadium nodiflorum. Procumbent Marsh-wort. Flowers white. Common.

H. repens. Creeping Marsh-wort. Flowers white. Offley Hay, Tamworth.

H. inundatum. Least Marsh-wort. Flowers white. Wolstanton Marsh, Aqualate, Gravenhanger, Tamworth.

Ægopodium Podagraria. Gout-weed. Flowers white. Common in garden hedges.

Carum Carui. Carraway. Flowers white. Roadside between Wolverhampton and Sedgley, *Endon, near Newcastle, Dr. Howitt*.

Silauus pratensis. Meadow Pepper-saxifrage. Flowers yellow. Not common; abundant about Uttoxeter.

Bunium flexuosum. Earth-nut. Flowers white. Very common. Root pleasant to eat.

Pimpinella Saxifraga. Burnet-saxifrage. Flowers white. Not rare. Stoke upon Trent, &c.

P. magna. Greater Burnet-saxifrage. Flowers white, occasionally rose coloured. Not rare on mār and limestone; Stone, Stafford, Uttoxeter, Ilam, Dovedale, Alton.

Sium latifolium. Broad-leaved Water-parsnep. Flowers white. Watery places. Common.

S. angustifolium. Also common.

Ænanthe fistulosa. Water-dropwort. Flowers white. Frequent in ditches.

Æ. crocata. Hemlock Water-dropwort. Flowers white. About brooks in the south-west part of the county. *Willowbridge*.

Æ. Phellandrium. Fine-leaved Water-dropwort. Flowers white. Pools and ditches. Stone park, Alsager, Uttoxeter, *Church-Eaton, near Walton, Cheadle*.

Æthusa Cynapium. Fool's Parsley. Flowers white. Common in gardens and cornfields; poisonous; very like parsley, but may be known from it, and all other *Umbellifera*, by the narrow leaflets hanging from about the flowers.

Angelica Archangelica. Angelica. Flowers greenish white. Rare; *Broadmoor, Stratford road near Birmingham, near Hales Owen*.

A. sylvestris. Wild Angelica. Flowers whitish. Common in wet places.

Caucalis latifolia. Great Bur-parsley. Flowers red. Rare. *Dovedale, Dr. Johnson in Bot. Guide*.

Peucedanum Ostruthium. Master-wort. Flowers white. Rare. Endon, Axedge, Baddeley Edge, between Calton Moor House and Mayfield. In all cases in subalpine pastures.

Pastinaca sativa. Wild Parsnep. Flowers yellow. Rare. Near Longnor in plenty. South of the county.

Heraclium Spondylium. Cow-parsnep. Flowers white. Common. *Var. β.* not rare. Cattle are fond of this plant. Flowers crimson at Dudley Castle.

Daucus Carota. Wild Carrot. Flowers white. Common. The herb collectors gather it as a diuretic.

Torilis Anthriscus. Upright Hedge Parsley. Flowers white. Common.

T. infesta. Spreading Hedge Parsley. Flowers white. Less common; Betley, Stafford, High Offley, *Uttoxeter, Oldbury*.

T. nodosa. Knotted Hedge Parsley. Flowers reddish. Rocks in Dovedale, Tutbury Castle Hill, High Offley.

Scandix Pecten. Shepherd's Needle. Flowers white. Common amongst corn. Fruit remarkably long.

Anthriscus sylvestris. Wild Beaked-Parsley. Flowers white. Common. Cattle are fond of it.

A. vulgaris. Common Beaked-parsley. Flowers white. Rarer. Waste places near Stafford, Stourbridge, Astbury, Lichfield, Miss Jackson. Aromatic.

Charophyllum temulentum. Rough Chervil. Flowers white. Common. Aromatic; grateful to cattle.

Myrrhis odorata. Sweet Cicely. Flowers white. In high pastures, seldom far from old houses; Biddulph, Bagnall, Onecote, Wetley, Warslow, Forsbrook, and many other spots in plenty. Very handsome; with a strong flavour of anise.

Conium maculatum. Hemlock. Flowers white. Common about villages; also on limestone precipices. Stem smooth, spotted; very poisonous, but valuable in medicine, particularly as a poultice on scrophulous sores.

Smyrniolum Olusatrum. Alexanders. Flowers yellow green. Occasional in and near old gardens. Endon.

Chenopodium intermedium? Upright Goosefoot. By the road at Braunston, near Burton.

C. Bonus Henricus. Mercury Goosefoot. Not rare, particularly in church-yards. Stoke-upon-Trent.

C. album. White Goosefoot. Common. Var. β and Var. γ , common.

Ulmus campestris. Small-leaved Elm. Common. The wood is more valuable than that of the following. A noble tree of this species, very lofty and vigorous, stands in the village of Over Stonnall (1843).

U. montana. Wych Elm. Common. Frequently the





Inbury Elm.



Squitch Oak.

trees of this species are very large; as about Aston near Stone, and on Needwood Forest.

Plot says "a Witch Elm at Field fell 40 yards in length; stoole 5 yards, 2 feet in diameter; at the butt 17 yards in circumference; 8 yards, 18 inches about the girth, measured in the middle: attested by Sir H. Bagot, steward, bailiff, surveyor, cutters, and stokers."

"In a perambulation of the parish of Tutbury, in the reign of James I., or beginning of that of Charles I., mention is made of the Dun's Cross Elm. There is no doubt of its identity with what is now called the Big Elm, at the present time in a decaying state. In 1818, it measured at 3 feet, 19 feet in circumference; at 6 feet, 16 feet 9 inches. From the end of one bough to that of another, 108 feet. It contained 700 feet of timber. Its height 60 feet." History of Tutbury, Sir O. Mosley.

U. suberosa. Common Cork-bark Elm. Common. On the top of Berry Bank.

ORDER III.—TRIGYNIA. 3 STYLES.

Viburnum Opulus. Guelder Rose, Water Elder. Flowers white. Common in hedges near water. Berries red; leaves richly coloured in Autumn.

Sambucus Ebulus. Dwarf Elder, Dane-wort. Flowers white. Rare in Staffordshire, Braunston near Burton, near Newcastle, *Tutbury*, *Tamworth*, *Buxton*. Berries black; purgative,

S. nigra. Common Elder. Flowers whitish. Common. A variety with white berries occasionally; *Blymhill*, *Cambridge*, *Essington*, *Rocester*. Occasionally also with scarlet berries. The smell of the flowers sickly; their buds appearing early but a long time in expanding: berries usually black.

ORDER IV.—TETRAGYNIA. 4 STYLES.

Parnassia palustris. Grass of Parnassus. Flowers white. Frequent, though rare in some counties. Below Alton Castle, Calton Moor, Maer, Willowbridge, Offley Hay, Buxton, Blymhill, Lichfield, Wever Hills. Flowers curious and very beautiful. Stamens irritable.

ORDER V.—PENTAGYNIA. 5 STYLES.

Linum usitatissimum. Common Flax. Flowers blue. Rare. Once near Stoke, *Blymhill*, *Brome*, field between *Betley* and *Madeley*.

L. catharticum. Purging Flax. Flowers white. In every hilly pasture. Called Mountain-flax by the herb collectors, who sell it for the properties expressed in its proper name.

L. angustifolium. *Burton*; *Mr. Brown*.

ORDER VI.—HEXAGYNIA. 6 STYLES.

Drosera rotundifolia. Round-leaved Sun-dew. Flowers white. Common, and general in bogs. On Axedge common it grows at the altitude of 1800 feet. Many plants still in flower, Oct. 3rd. Stem sometimes divided.

D. longifolia. Spathulate-leaved Sun-dew. Flowers white. Gravenhanger, Fair Oak, Wybunbury, *Balterley*, near *Cheadle*, *Chartley Moss*, *Lichfield*. In water this has an elongated stem.

D. Anglica. Great Sun-dew. Flowers white. Rarer than the last. Gravenhanger, Wybunbury (Chesh.); pointed out to me by Mr. Spark. Petioles a little hairy. The *D. rotundifolia* generally grows on sphagnum; the *D. longifolia*, in bare, wet, muddy spots; the *D. anglica*, often in

dryish, grassy, rougher spots. The leaves of the last are erect.

ORDER VII.—POLYGYNIA. MANY STYLES.

Myosurus minimus. Mouse-tail. Flowers green. Occasional. *Barton, Mr. Dashwood, (specimens;) Elford, Hamstall Ridware, Burton.*

CLASS VI.—HEXANDRIA. 6 STAMENS.

ORDER I.—MONOGYNIA. 1 STYLE.

Berberis vulgaris. Barberry. Flowers yellow. Really wild in the valley of the Hamps, one mile below Waterhouses. The stamens move towards the stigma when touched at the base.

Peplis Portula. Water Purslane. Flowers reddish. Common in wet places.

Galanthus nivalis. Snowdrop. Flowers white. Norton, abundant in a field near the church; Eaves Lane, Checkley, Castern, *Congleton, Burton.*

“The first pale blossom of the unripened year.”

Narcissus Pseudo-narcissus. Daffodil. Flowers yellow. Abundant in rich fields. Eaves Lane, Stoke Meadows, Bagnall, Baddeley Edge, Stanley, Hill Chorlton, Madeley, Ashley, Horton, *Lichfield, Burton.* Generally single with light-coloured petals and yellow nectary; less frequently with double yellow flowers.

“Daffodils

That come before the swallow dares, and take
The winds of March with beauty.”

N. poeticus. In a field near Werrington, adjoining an old house; near Sandborough. Very fragrant. *A double variety near Thorpe Constantine.*

Convallaria majalis. Lily-of-the-Valley. Flowers white Dovedale; Wetton Valley, below Bincliff Mines, abundant. *Via Gellia*, (Derb.) *Curbro' Wood Lichfield, Rough Park Woods, Needwood Forest, Belmont, Yoxall*. Fragrant; berries red.

C. multiflora. Solomon's Seal. Flowers white. Rare. *Needwood Forest, Pitt; Belmont, Mr. Sneyd, in Shaw*.

Allium oleraceum. Streaked Field-Garlick. Flowers white. On a rock with the following in Wetton Valley; in St. Chad's church-yard, Lichfield.

A. vineale. Crow Garlic. Flowers purple. On limestone rocks at Wetton Mill and Beeston Tor.

A. ursinum. Ramsons. Flowers white. Common about rivers.

Scilla autumnalis. Near *Lichfield or Rugeley* (?).

Hyacinthus non-scriptus. Hyacinth, Bluebell. Flowers blue. Common; frequent with white flowers in the woods at Trentham: once with pinkish flowers on the limestone.

Narthecium ossifragum. Lancashire Bog-asphodel. Flowers yellow. Common in bogs. *Willowbridge, Ashley, Flash, Mow Cop, Lichfield, south of the county*.

Fritillaria Meleagris. Chequered Daffodil. Flowers purple spotted. *Uttoxeter, Blymhill, Wolseley Bridge, Wheaton Aston, Tamworth*. Flowers sometimes white.

Tulipa silvestris. Wild Tulip. Flowers yellow. *Near Statfold Hall, to the owner of which mansion we are indebted for this communication*.

Acorus Calamus. Sweet Flag. In wet places. In a pit near the Pottery Race-course, Longton, Betley, *Tamworth*. Root aromatic.

Juncus glaucus — *effusus* — *conglomeratus* — *acutiflorus* — *lampocarpus* — *uliginosus* — *bufonius*. Common.

J. compressus. Common. Var. *Bothnicus*, Kingston Pool.

J. squarrosus. On all our heaths.

Luzula sylvatica. Great hairy Wood-rush. Frequent in woods, and on shady limestone rocks.

L. pilosa. Small hairy Wood-rush. Common in woods.

L. Forsteri. Forster's Wood-rush. *Dymingsdale*; *Dr. Hewgill*. I have looked for it there in vain.

L. Campestris. Common; several varieties existing.

ORDER III.—TRIGYNIA. 3 STYLES.

Rumex Hydrolopathum—*crispus*—*acutus*—*obtusifolius*—*Acetosa*—*Acetosella*. Common.

R. sanguineus. Bloody-veined Dock. Fields, &c. Not rare.

R. pulcher. Fiddle Dock. Not rare. Stoke-upon-Trent.

R. maritimus. Golden Dock. Dam of Kingston Pool.

R. palustris. Yellow Marsh Dock. *Stafford, Burton*.

Scheuchzeria palustris. Marsh Scheuchzeria. Flowers green. *On Wybunbury Moss, (Chesh. on the Staffordshire border;) Mr. Pinder, who has favoured me with living specimens of this rare plant from this locality.*

Triglochin palustre. Arrow-grass. Common in wet places.

T. maritimum. Sea-side Arrow-grass. *Salt Marsh at Tixall, Mr. Wolseley in Shaw.*

Colchicum autumnale. Meadow Saffron. Flowers purple. *Blynhill, Dudley Old Park, Beaudesert, Burton, Weston Park, Marston Montgomery, Foremark, Sedgley, Barr; Shaw, &c. and Messrs. Brown and Chawner. Abundant at Barr; Mr. Edwards.* I have only seen it on the skirts of the eastern side of the county, but there in profusion. Formerly in meadows near Stoke-upon-Trent. Valuable in medicine.

ORDER. V.—POLYGNIA. MANY STYLES.

Alisma Plantago. Great water Plantain. Flowers pale rose-coloured. Common in ditches.

A. ranunculoides. Lesser water Plantain. Flowers whitish. Aqualate, near Forton. *Knightly Common, Motty Meadow, near Burton.*

Staffordshire does not possess the only British plant belonging to Class VII., HEPTANDRIA, *Trientalis Europæa.*

CLASS VIII.—OCTANDRIA. 8 STAMENS.

ORDER. I.—MONOGYNIA. 1 STYLE.

Acer Pseudo-platanus. Sycamore. Common, particularly about houses in hilly districts, where it grows well. Wood used in turnery, &c.

A. campestre. Maple. Very fine in the remains of Needwood Forest. Wood very beautiful.

Chlora perfoliata. Perfoliate Yellow-wort. Flowers orange. About Astbury Limeworks; and at the edge of the plantation Maer Heath. *Dudley Castle, Ranton Abbey, Lichfield, Apedale, near Betley.*

Erica Tetralix. Cross-leaved Heath. Flowers rose-coloured or white. Common on moist heaths; white variety occasional.

E. cinerea. Fine-leaved Heath. Flowers purple or white. Common on drier stony heaths.

“Gem of the Heath! whose modest bloom
Sheds beauty o’er the lonely moor;
Though thou dispense no rich perfume,
Nor yet with splendid tints allure,
Both valour’s crest and beauty’s bower
Oft hast thou decked, a favourite flower.”

Calluna vulgaris. Common Ling. Flowers reddish or

white. Common on heaths. Used for brooms and fuel; it also makes a beautiful border for the *parterre*. White variety at Froghall; a hoary variety occasional.

Vaccinium Myrtillus. Bilberry or Wortleberry. Flowers reddish. Frequent on grit or sandstone; rare on limestone. Berries black, glaucous, pleasant and wholesome, slightly astringent. Frequently ripe in June, and a second crop sometimes late in Autumn.

V. Vitis-idea. Cowberry, Red Wortleberry. Flowers pink. Common on all our heaths; seldom, if ever, on limestone. Flowers and fruit pretty. Berries red, acid, rather bitter; little inferior to the cranberry when preserved or in tarts. Cold water extracts the bitterness before cooking.

V. Oxycoccus. Cranberry, Marsh Wortleberry. Flowers rose-coloured. Common in all our bogs. The fruit is so valued as to obtain a high price. The cranberry when not fully ripe is spotted, whilst the cowberry is not so. Amongst the latter too, when on sale, we may generally discover a few of its leaves, much like those of the box: the fine fruit-stalks and stigmas also distinguish the cranberry.

Epilobium angustifolium. Rose-bay Willow-herb. Flowers purple. Frequent near houses; Whitmore, *Cotton*, *Pendeford*, *Oldbury*, *Gradbitch*. Spreading so much when present in gardens that it is almost impossible to extirpate it.

E. hirsutum — *parvifolium* — *tetragonum* — *palustre*. Common.

E. montanum. Broad-leaved smooth Willow-herb. Flowers purple. Common on banks and walls.

E. roseum. Pale Smooth-leaved Willow-herb. Flowers purple. Moddershall Pool, &c., *Uttoxeter*, *Pipe Marsh*.

Daphne Mezereum. Mezereon, Spurge-olive. Flowers

purple or white. *Needwood Forest, Withering and others, Matlock, (Derb.)* An early flower; very fragrant and beautiful. Root medicinal; but the Derbyshire herb collectors sell the root of the following for it.

D. Laureola. Spurge-Laurel. Flowers yellowish green. *Buttermilk Hill, near Uttoxeter; Matlock, (Derb.) Needwood Forest, Shaw.*

ORDER II.—TRIGYNIA. 3 STYLES.

Polygonum aviculare—Fagopyrum—Convolvulus—Persicaria—lapathifolium—Hydropiper. Common.

P. Bistorta. Bistort. Common. Root astringent.

P. amphibium. Amphibious Persicaria. Common in large pools, or on dry land; spikes handsome; flowers rose-coloured.

P. minus. Small creeping Persicaria. Wet places near *Woore, Wolstanton, Beam Heath, (Chesh.)*

ORDER III.—TETRAGYNIA. 4 STYLES.

Paris quadrifolia. Herb Paris. Flowers yellowish. Common in our retired shady woods; berries purple; plant curious.

Adoxal Moschatellina. Tuberos Moschatel. Flowers green. Common under hedges; springing early. Flowers musky when the dew is on them.

CLASS IX. ENNEANDRIA. 9 STAMENS.

ORDER I.—HEXAGYNIA. 6 STYLES.

Butomus umbellatus. Flowering Rush. Flowers purple. *Trent near Stoke, Trentham Pools, Rickerscote, Bridgeford,*

Burton, Repton, Lichfield, Netherwood, Stretton. In many other places. Handsome.

CLASS X.—DECANDRIA. 10 STAMENS.

ORDER I.—MONOGYNIA. 1 STYLE.

Monotropa Hypopitys. Yellow Bird's-nest. Flowers yellow. In beech and fir woods, *Earl of Stamford's woods, Enville, Withering; formerly at Gospel End, Mr. Wainwright.*

Pyrola rotundifolia. Round-leaved Winter-green. Flowers white. *Chartley; Dr. Hewgill (specimens). Wyre Forest; Rev. T. Butt, Corresp. of Sir J. E. Smith; the plant found however being probably the following. Wood near Cotton Hall and Belmont; Messrs. Sneyd and Dickenson. Perhaps in the last cases P. minor was only found.*

P. media. Intermediate Winter-green. Flowers white and pink. *Wyre Forest, Cradley Park; Midl. Flora.*

P. minor. Lesser Winter-green. Flowers pinkish. *Cotton Hall, Alton, Belmont, Basford, Wyre Forest. All the Pyrolas are rare and beautiful, generally growing in mossy woods.*

Andromeda polifolia. Marsh Andromeda. Flowers rose-coloured. *Chartley Moss, Whitmore, Craddock's Moss, Alsager, Congleton Moss, Axedge. Flowers beautiful. A broad-leaved variety at Axedge.*

Arbutus Uva Ursi. Red Bear-berry. Flowers rose-coloured. Rare; on rocky heaths. *Burbage. The berries are devoured by grouse. The leaves are valuable in medicine, but those of Vaccinium Vitis-Idæa are sometimes substituted.*

ORDER II.—DIGYNIA. 2 STYLES.

Scleranthus annuus. Annual Knawel. Sandy soil, general.

S. perennis. Perennial Knawel. *Lichfield, Miss Jackson.*

Chrysosplenium alternifolium. Alternate-leaved Golden-saxifrage. Flowers yellow. Occasional in shady woods. Near Ramsor, Wootton Park, Belmont Woods, near *Yoxall Lodge, Snowdon Pool, near Birmingham, Madeley.*

C. oppositifolia. Common Golden Saxifrage. Flowers yellow. General in springy places.

Saxifraga granulata. White Meadow Saxifrage. Flowers white. Frequent on limestone. Two feet high on elevated fields on grit. *Mowcop, Axedge, Roaches, Tamworth, Lichfield.*

S. tridactylites. Rue-leaved Saxifrage. Flowers white. General on the limestone, and old ruins.

S. hypnoides. Mossy Saxifrage. Flowers white or pink. General on the limestone. Var. α and β common.

S. elongella. Common.

S. umbrosa. London Pride. Flowers white and spotted. Belmont Woods, with *Pyrola minor*, 1837; rocky dell below Upper Cotton, in abundance; about Poole's Hole, near Buxton. This pretty plant, though a native of wild mountain spots, will, as it is well known, flourish in close towns.

Mitella diphylla. An American plant, originally escaped from a garden, on a bank near Stoke-upon-Trent.

Saponaria officinalis. Soapwort. Flowers rose-coloured. Roadside near Hixon, Mavesyn Ridware, *Blymhill, Hedgeford, Burton, Hamstall Ridware.*

Dianthus Armeria. Deptford Pink. Flowers rose-

coloured with white dots. *Lichfield, Miss Jackson; Morry Hills, near Yoxall.*

D. deltoides. Maiden Pink. Flowers rose-coloured with a white eye, spotted. Pastures on the limestone at Glutton, *Trysull and Swindon.*

ORDER III.—TRIGYNIA. 3 STYLES.

Silene inflata. Bladder Campion. Flowers white. Common. Var. β occasionally.

S. Anglica. English Catchfly. Flowers white. *In corn fields at Upper Areley, and occasionally in the south of the county.*

S. noctiflora. Night-flowering Catchfly. Flowers pale red. *Near Lichfield, Miss Jackson.*

S. conica. Striated Corn Catchfly. Flowers purple. *Stourbridge, Dr. Hastings.*

S. nutans. Nottingham Catchfly. Flowers white. Limestone rocks, abundant in Dovedale, about Thor's Cavern, Hartington Dale.

Stellaria media — *holostea* — *graminea* — *glauca* — *uliginosa.* Common.

Arenaria trinervis. Three-veined Sandwort. Flowers white. Common in moist places.

A. Serpyllifolia. Thyme-leaved Sandwort. Flowers white. Most common on limestone.

A. verna. Vernal Sandwort. Flowers white. Upon fragments of spar near lead mines. Ecton Hill, Dovedale, with Mr. Quekett; very abundant near Tissington, at Matlock, and Castleton, (Derb.)

A. tenuifolia. Fine-leaved Sandwort. Flowers white. *Wever Hills, Mr. Carter.*

A. rubra. Purple Sandwort. Flowers pink. Fre-

quent on sand or gravel. Stoke, Newcastle, Ashley, Hopwas, Tittensor, &c.

A. marina. Sea-side Sandwort. Flowers red. Abundant in a salt marsh near Kingston Pool; Rickerscote, covering the ground; near *Shirleywich*.

ORDER IV.—PENTAGYNIA. 5 STYLES.

Cotyledon Umbilicus. Navel-wort. Flowers yellow. Abundant on a bank between Endon and Leek, and in the dark fosse of Heyley Castle, and the neighbourhood; plentifully in flower as late as October; *Dovedale, Ilam*. A variety with the stipules very large.

Sedum Telephium. Orpine. Flowers purple. Very common and ornamental on limestone rocks, and ruins. Wetton Valley, Dovedale, Croxden Abbey, *Tettenhall, Lichfield*.

S. album. White Stone-crop. Flowers white. *Roof at Yoxall, Dr. Hewgill. Wild (?)*.

S. acre. Biting Stone-crop. Flowers yellow. Abundant on limestone. A great ornament in June and July to the roofs of cottages, particularly in a limestone district. Betley and Stone on sand.

S. reflexum. Crooked Stone-crop. Flowers yellow. Occasional. Burton Abbey walls, Biddulph Castle, Croxden Abbey, rocks near Newport; cottage walls; *Tutbury Castle; Dr. Hewgill*. The stone-crops are very acrid.

Oxalis Acetosella. Wood Sorrel. Flowers white. Common and beautiful. Its delicate flower is pencilled with purple, and in the centre with orange, and elegantly drooping on its hairy stalk. An early flowerer.

Agrostemma Githago. Corn Cockle. Flowers purple. Common. Looking handsome among corn, but not desired by the farmer.

Lychnis Flos-cuculi. Ragged Robin. Flowers rose coloured. Common in wet fields. *With double flowers, Norton, Pitt.*

L. dioica. Campion. Flowers red, white, or flesh coloured. Frequent. Var. with red or white diœcious flowers. Frequent in woods or fields. With stamens and pistils together in flesh-coloured flowers, occasional. Var. corolla wanting.

Cerastium tetrandrum. Four-cleft Mouse-ear Chickweed. Not rare in waste places; Mr. Spark.

C. vulgatum—*semidecandrum*—*viscosum*. Common.

C. arvense. Field Chickweed. Flowers white. Rare. Occasionally on limestone.

C. aquaticum. Water Chickweed. Flowers white. Not rare. Stoke-upon-Trent. A fine species.

Spergula arvensis. Corn Spurrey. Flowers white. Flowers small but pretty, choking the crops in wet fields.

S. subulata. Awl-shaped Spurrey. Flowers white. Less common. Tittensor and Whitmore Heaths.

S. nodosa. Knotted Spurrey. Flowers white. In wet fields. Offley Hay, Oakamoor, Cannock Chase; also in the south of the county.

CLASS XI.—DODECANDRIA. FROM 12 TO 19 STAMENS.

ORDER I.—MONOGYNIA. 1 STYLE.

Lythrum Salicaria. Spiked purple Loose-strife. Flowers purple. By water, common. Very handsome.

L. hyssopifolium. Hyssop-leaved purple Loose-strife. Flowers purple. *Tamworth, Miss Jackson.*

ORDER II.—DIGYNIA. 2 STYLES.

Agrimonia Eupatoria. Agrimony. Flowers yellow-

Common. Supposed to possess strong medicinal virtues ; but probably this is not the case.

ORDER III.—DIGYNIA. 3 STYLES.

Reseda lutea. Wild Mignonette. Flowers yellow. Occasional, but rare. *South of the county, in several spots.*

R. fruticulosa. Near Stourbridge, but a garden escape.

R. Luteola. Dyer's Rocket. Leycett, Heyley Castle, Barrow Hill, Dudley Castle, and on coal-pit banks frequently ; *Red Street, near Stafford, Forton.*

ORDER IV.—DODECAGYNIA. 12 STYLES.

Sempervivum tectorum. House Leek. Flowers purple. Common on walls and cottage roofs.

CLASS XII.—ICOSANDRIA. 20 OR MORE STAMENS PLACED ON THE CALYX.

ORDER I.—MONOGYNIA. 1 STYLE.

Prunus domestica. Wild Plum. Flowers white. Rare, if ever, wild.

P. insititia. Bullace. Flowers white. Common. Trent Meadows, &c.

P. spinosa. Sloe, Blackthorn. Flowers white. Common. Fruit austere.

P. Padus. Bird Cherry. Flowers white. Very common, though rare in some counties. Flowers elegant ; fruit black, unpleasant to the taste.

P. Cerasus. Wild Cherry. Flowers white. Frequently wild in woods.

ORDER II.—PENTAGYNIA. 5 STYLES (VARIABLE IN MOST OF THE GENERA).

Crataegus Oxyacantha. Hawthorn, or May. Flowers white. Common. It is not in North Staffordshire always entitled to its name May, as it frequently flowers in June. Flowers fragrant; and, from the number of insects they attract, a favourite place of search for the entomologist. Pink-flowered varieties occasional in gardens. Very large trees on limestone hills:—

“Gives not the Hawthorn bush a sweeter shade,
To shepherds looking on their silly sheep,
Than doth a rich embroidered canopy
To kings that fear their subjects' treachery?”

Pyrus communis. Wild Pear. Flowers white. Occasional, near houses: not wild.

P. Malus. Crab. Flowers white and rose-coloured. Common in woods. Nothing is more delicate and handsome than the flowers. The juice of the crab is called verjuice.

P. torminalis. Wild Service. Flowers white. Not common. Some very large and ancient trees in Trentham Park, towards Nowall; near Longton (old trees); near Upper Areley, about Rolleston, Sir O. Mosley; Pendeford, Uttoxeter. Fruit, a large berry.

P. domestica. True Service, Whitten, Whitten Pear. Flowers white. “Wild in many parts of the moorlands, whence it is frequently transplanted into gardens.”—*Plot*. I have many times searched for it but in vain, though I have two or three times found it in gardens attached to old houses. *Plot* describes the tree, and appears to have been acquainted with it. It is well known that a very old tree of this species exists in Wyre Forest, between Mopson's Cross and Dowles Brook. It had fruit on it in 1838. A

cottage is said to have existed here formerly, but there is now no sign of one. This tree is figured in "Loudon's Arboretum." Fruit, a small pear.

P. aucuparia. Quicken, Mountain Ash. Flowers white. Frequently wild on limestone and grit. Berries pretty; devoured greedily by birds.

P. Aria. White Beam. Flowers white. On high limestone rocks. Several trees on Beeston Tor; fine trees at Berresford, Mill Dale; abundant in Dovedale. Fruit a large berry; not nauseous like the preceding.

Spiræa Filipendula. Dropwort. Flowers white. Rare. High pastures, Gradbitch, *Walton Bridge, Wever Hills*.

S. Ulmaria. Meadow Sweet. Flowers white. Common by rivers. Flowers fragrant.

S. Salicifolia. Willow-leaved Spiræa. Flowers rose-coloured. *Needwood, Miss Jackson; thickets on Cannock Chase, Mr. Dashwood*.

ORDER III.—POLYGYNIA. MANY STYLES.

Rosa spinosissima. Burnet-leaved Rose. Flowers yellowish. *South of the county, and has been found in the north on sandy hills*.

R. villosa. Villous Rose. Flowers deep pink. Not rare. Between Stone and Stafford.

R. tomentosa. Downy-leaved Rose. Flowers reddish. Not rare.

R. rubiginosa. True Sweet Briar. Flowers pink. *Darlaston, Willowbridge, Whitmore, Hill Chorlton, Maer, Belmont; specimens like Rosa sepium at some of these places*.

R. canina. Dog Rose. Flowers pink. Var. α , *canina*; β , *sarmentacea*; γ , *surculosa*; δ , *dumetorum*; ϵ , *Forsteri*.

R. arvensis. Trailing Dog Rose. Flowers white. Fre-

quent ; flowers till as late as October, though it comes out a week or two earlier than *R. canina*. A double red rose, with deep-coloured twigs, and nearly smooth eglandulose leaves, is common in every hedge at Maer, Willowbridge, Whitmore, and Madeley. This answers to *R. cinnamomea* β , with double flowers of Smith.

Rubus idæus. Raspberry. Flowers white. Common. We have found it at Clayton, and one or two other spots, with white fruit.

R. Chamæmorus. Cloudberry. Flowers white. Abundant on the moors of Axedge. Fruit orange ; pleasant.

R. saxatilis. Stone Bramble. Flowers greenish. Abundant on broken limestone in the valleys of the Hamps and Manyfold. Fruit red.

R. cæsius. Dewberry. Flowers white or pinkish. The most common bramble on limestone ground, and occasionally seen on grit. Berries “juicy, black, with a fine glaucous bloom, and very agreeably acid.” In shady places it approaches the last in appearance ; and at Alton, on the contrary, the following. Flowers early.

R. corylifolius. Hazel-leaved Bramble. Flowers white. Not very common. About Stone, Stafford, Muclestone, &c. Foliage handsome. Fruit ripening early ; juicy ; sweet when ripe, but not so insipid as *R. fruticosus*. Some of the drupes large. The species is well marked by the foliage and stem.

R. Koehleri. Flowers commonly white. The most common bramble in North Staffordshire. A very well marked species ; nevertheless it is seen sometimes to approach the following. A variety, with three leaflets only to all the leaves, may likewise be seen ; and in tall hedges this last puts on the characters somewhat of *R. macrophyllus*, with a very large compound panicle and ample

leaves. Fruit seedy; sweet when quite ripe, otherwise sour.

R. rhamnifolius. Flowers white or pinkish. Almost as common as the last in the north of Staffordshire. Fruit not so large, and of fewer grains; sweet. Prickles straight. The stems vary as to their degree of smoothness.

R. fruticosus. Blackberry. Flowers pink; sometimes white. This is much rarer than the last, and is seen in more sunny and exposed situations. It differs from it principally in the panicle being larger, simpler, and more downy, though less hairy; the leaves also are white below.

R. plicatus. Flowers generally white. Occasionally in hedges in the north of Staffordshire; more general on high moors. Leaves somewhat cut and sharply serrate, shining above; stems smooth, green, suberect; prickles weak below, stronger and more numerous above. Probably a variety of one of the preceding.

Tormentilla officinalis. Tormentil. Flowers yellow. Common in heathy places. Root astringent. Occasionally with five or more petals.

Geum urbanum. Avens, Herb Bennet. Flowers yellow. Common in hedges.

G. rivale. Water Avens. Flowers dull orange purple. Caverswall, Onecote, Morredge, &c.; *Ilam, Moreton, Lichfield*. Var. β , with semi-double flowers; *Caverswall*.

Dryas octopetala. White Dryas, or Mountain Avens. Flowers white. *Mow Cop, on the authority of the late Dr. Davidson*. Several gardeners show the plant as obtained there. I have not found it, but the ground is likely and extensive.

CLASS XIII.—POLYANDRIA. MANY STAMENS INSERTED UPON
THE RECEPTACLE.

ORDER I.—MONOGYNIA. 1 STYLE.

Papaver Argemone. Long Prickly-headed Poppy. Flowers scarlet. Corn fields, not rare. Booths, Cotton Field, &c.

P. dubium. Long Smooth-headed Poppy. Flowers scarlet. The most common species in the north of the county.

P. Rhæas. Common Red Poppy. Flowers deep scarlet. Rare in the north; but the most abundant species in the south of the county. Handsome.

P. somniferum. White Poppy. Flowers white, with purple centre. Below Tutbury Castle, with the character of the wild plant.

Chelidonium majus. Celandine. Flowers yellow. Frequent and general near cottages.

Helianthemum canum. Hoary Dwarf Rock-rose. Flowers yellow. *Wever Hills; Shaw.*

H. vulgare. Common Rock-rose. Flowers yellow. Abundant on, but quite confined to the limestone.

Tilia Europæa. Lime or Linden Tree. Flowers yellow. Fine about old mansions. One at Hamstead near Birmingham measured 22 feet in girth at 3 feet from the ground, and its height 75 feet. "The wood served Gibbons for his inimitable carvings of flowers, dead game, &c." The flowers of the lime are fragrant, and attract innumerable bees. Of the bark, ropes were formerly made.

T. parvifolia. Small-leaved Lime Tree. Flowers yellow. Frequent and fine in Needwood Forest, and also in the south of the county.

Nymphaea alba. White Water Lily. Flowers white. Aqualate, Betley, Barlaston, Alton, Maer, very small boggy pits at Alsager, *Sow near Stafford, Snowdon Pool, Tamworth, Trent near Burton*. The flowers seem much eaten by some aquatic bird.

“The water-lily to the light
Her chalice rears of silver bright.”

Nuphar lutea. Yellow Water Lily. Flowers yellow. More common than the last. In the Trent at Stoke.

ORDER II.—PENTAGYNIA. STYLES VARIABLE 2—6.

Helleborus viridis. Green Hellebore. Flowers green. Biddulph Castle; by the Dove below Thorpe; by the Manyfold, under Castern.

H. foetidus. Fetid Hellebore. Flowers greenish. *Moorlands, Belmont Woods; Shaw. Matlock, (Derb.)*

Delphinium Consolida. Larkspur. Flowers blue. *Needwood Forest; Dr. Hewgill's list.*

Aconitum Napellus. Wolf's Bane. Flowers dark blue. On the banks of the Churnet, two miles below Cheddleton. *Near Birmingham; Mr. Ick.* A rare plant really wild.

Aquilegia vulgaris. Columbine. Flowers blue or rose. In a little meadow north of Yoxall, Ashley Heath, Wyre Forest with rose-coloured flowers. *Moorlands, Buxton, Seabridge.*

ORDER III.—POLYGYNIA. MANY STYLES.

Thalictrum flavum. Meadow Rue. Flowers yellow. Meadows on the north side of Aqualate Mere, and in osier-beds at the south-western part of the county; *Blymhill, Barton, banks of the Tame, Perry Barr, Burton.*

Clematis Vitalba. Traveller's Joy. An uncommon plant in the northern counties. Four Ashes; on trees in Shugborough grounds; *between Dudley and Wolverhampton, Yoxall Lodge*.

Anemone nemorosa. Wood Anemone. Flowers white or purple. Common. The petals vary in tint and number. Poisonous to sheep. From its early appearance the botanist meets it with delight.

———"Thickly strewn in woods and bowers
Anemones their stars unfold."

A. ranunculoides. Growing plentifully about the lawn at Stapenhill Vicarage, with *Galanthus nivalis*; Mr. Brown.

Ranunculus aquatilis. Water Crowfoot. Flowers white. Common with its varieties.

R. hederaceus. Ivy Crowfoot. Flowers white. Equally common.

R. Lingua. Great Spearwort. Flowers yellow. In a ditch on the north side of Aqualate Pool, 1838, Kingston Pool, Audlem, and Wybunbury, (Chesh.) *High Onn, Eccleshall*. Handsome.

R. Flammula. Lesser Spearwort. Flowers yellow. Common. Var. β of Smith, Belmont.

R. Ficaria. Pilewort. Flowers yellow. Common in fields and woods.

"Ere a leaf is on the bush,
In the time before the thrush
Has a thought about his nest,
Thou wilt come with half a call,
Spreading out thy glossy breast,
Like a careless prodigal;
Telling tales about the sun
When there's little warmth or none."

R. auricomus. Wood Crowfoot. Flowers yellow. Common in dry bushy places. This species has little of the

acridity that most of this class, constituting the natural family *Ranunculaceæ*, are possessed of.

R. sceleratus. Celery-leaved Crowfoot. Flowers yellow. Common, particularly about bogs.

R. acris. Upright Meadow Crowfoot. Flowers yellow. Common in fields. Acrid and poisonous, yet cattle will eat it; and it is thought that this and the other species act beneficially on their digestive organs.

R. repens. Creeping Crowfoot. Flowers yellow. Common; handsomer than the last.

R. bulbosus. Bulbous Crowfoot. Flowers yellow. Common in fields. *Double variety in Burton Meadows.*

R. hirsutus. Pale hairy Crowfoot. Flowers yellow. Not very general; in clayey fields. Abundant about Stafford and High Offley, *Newcastle, Burton.*

R. arvensis. Corn Crowfoot. Flowers pale yellow. General in cornfields.

R. parviflorus. Small-flowered Crowfoot. Flowers yellow. On the banks of the Sandon road, half a mile from Stone, *Tutbury, Blymhill, Lawton, (Chesh.)*

Trollius Europæus. Mountain Globe-flower. Flowers yellow. Near Throwley, Cowdale Buxton, *Belmont, Longnor, Newhaven, and Via Gellia, (Derb.)* Flowers in early summer, and again in autumn.

Caltha palustris. Marsh Marigold. Flowers yellow. Common: one of the earliest favourites of rustic children.

CLASS XIV.—DIDYNAMIA. 4 STAMENS; TWO LONGER THAN THE OTHER TWO.

ORDER I.—GYMNOSPERMIA. SEEDS APPARENTLY NAKED. LABIATE OF THE NATURAL SYSTEM.

Mentha sylvestris. Horse Mint. *Occasional; Messrs. Brown, Spark, &c.*

M. viridis. Spear Mint. Flowers light-purple. Common, but introduced. Under Heyley Castle bank.

M. hirsuta. Hairy Mint. Flowers light purple. Very common. Var. β , Smith. Flowers whorled; leaves oval-heart-shaped, unbranched. In every ditch about Eccles-hall. There is a similar variety with longer pointed leaves. Var. purple and very hairy.

M. piperita. Pepper Mint. Flowers purplish. Roadside at Boothen, Clayton, and many other places. The calyx is hairy all over.

M. citrata. Near old houses; introduced.

M. rubra. Tall Red Mint. Flowers reddish. Occasional in rivers and wet places; Onecote.

M. arvensis. Corn Mint. Flowers pale purplish. Common in every cornfield.

M. gracilis. Narrow-leaved Mint. Occasional.

M. Pulegium. Penny Royal. Flowers purple or white. Plentiful on commons on the Cheshire borders of Staffordshire, Audlem, *Craddock's Moss*, *Blymhill*, *Beam Heath*, (*Chesh.*) &c. We find the above genus equally difficult with *Rubus*.

Thymus Serpyllum. Thyme. Flowers purple. Common, particularly on limestone. Bees delight in it; sheep eat it.

Origanum vulgare. Marjoram. Flowers purple. Tutbury, Croxden Abbey, Heyley Castle. General on the limestone. Fragrant, as are nearly all this order.

“The Thyme strong-scented 'neath one's feet,
And Marjoram so doubly sweet.”

Teucrium Scorodonia. Wood Germander. Flowers yellowish white. Common on walls.

Ajuga reptans. Bugle. Flowers blue; sometimes white, or pink. Common.

Ballota nigra. Black Horehound. Flowers purple. Common in dry places.

Leonurus Cardiaca. Mother-wort. Flowers whitish. Gornall Wood, Pitt; a narrow shady lane at the back of Perry Barr Park, Mr. Ick.

Galeobdolon luteum. Yellow Weasel-snout, or Archangel. Flowers yellow. General in shady woods. Handsome.

Galeopsis Ladanum. Red Hemp-nettle. Flowers rose-coloured. In a bean-field near the toll-bar between Stone and Stafford, 1839 and 1841. Rocks in Dovedale, Mr. Spark; near Buxton.

G. Tetrahit. Common Hemp-nettle. Flowers purple, or white. Common.

G. versicolor. Large-flowered Hemp-nettle. Flowers yellow and purple. General. Very handsome.

Lamium album. White Dead-nettle. Flowers white. Common. This and the following sometimes very early flowerers.

L. purpureum. Red Dead-nettle. Flowers purple. Common.

L. incisum. Cut-leaved Dead-nettle. Flowers purple. Frequent. Stoke.

L. amplexicaule. Henbit Dead-nettle. Flowers rose-coloured. Not rare. Kinver, Betley.

L. maculatum. Burton, Mr. Brown.

Betonica officinalis. Betony. Flowers purple, or white. Common. With white flowers frequently. Gathered by herbalists, but of no remarkable virtues.

Stachys Sylvatica—ambigua—palustris—arvensis. Common.

Nepeta Cataria. Cat Mint. Flowers spotted with rose-colour. Croxden, Heyley Castle, near Stourbridge, Perry Barr, Lichfield.

Glechoma hederacea. Ground Ivy. Flowers blue. Common. Roadsides. An early flowerer, and pretty. A white flowered variety near Ashbourn.

Marrubium vulgare. White Horehound. Flowers white. In waste places. Near Lichfield, Miss Jackson. I never saw it wild. Prized as an expectorant.

Acinos vulgaris. Basil Thyme. Flowers purple. Common on limestone, and in sandy fields in the south of the county. White flowers at Kinver, &c.

Calamintha officinalis. Calamint. Flowers purple. Dudley, Heyley and Tutbury Castles, Wolseley Bridge, Lichfield, near Birmingham. Common on the limestone. Aromatic: makes a pleasant tea.

Melittis Melissophyllum. Near Stourbridge, Scott (?).

Prunella vulgaris. Self-heal. Flowers violet blue. Common. Occasionally the flowers are white; Heyley Castle.

Scutellaria galericulata. Skull-cap. Flowers blue. Common near water.

S. minor. Lesser Skull-cap. Flowers blue. Near Swinnerton, Lichfield, Sutton Coldfield, near Birmingham.

ORDER II.—ANGIOSPERMIA. SEEDS INCLOSED IN A DISTINCT CAPSULE.

Bartsia Odontites. Bartsia. Flowers purple. Common in dry fields. A variety with white flowers.

Euphrasia officinalis. Eyebright. Flowers white; streaked. Common.

Rhinanthus Crista-galli. Yellow-rattle. Flowers yellow. Common.

R. major. Great Yellow-rattle. Flowers yellow. Not uncommon on peaty soil. Wetley, Ashley.

Melampyrum pratense. Yellow Cow-wheat. Flowers

yellow. Common in woods and on heaths. Flowers sometimes nearly white.

Lathræa squamaria. Greater Toothwort. Flowers yellow, like the whole plant. Woods below Castern, on both sides of the river, on the roots of the hazel, *Dudley Castle, on the elm, Rev. F. F. Clark; Caldon Low, Mr. Carter; Langley Meadows, King's Bromley, Woodford, Matlock, (Derb.)* I cannot perceive stomata in this plant.

Pedicularis sylvatica. Pasture Lousewort. Flowers rose-coloured. Common on heathy places.

P. palustris. Marsh Lousewort. Flowers rose-coloured. Boggy places. Stoke Meadows, Betley, Kingsley, &c.

Linaria Cymbalaria. Ivy-leaved Toadflax. Flowers purplish. On old walls at Mayfield, Burton, ruins of Shugborough Old Hall, Dudley Castle, *Lapley, Aston, Matlock, (Derb.)*

L. vulgaris. Yellow Toadflax. Flowers yellow. Common in fields and hedges.

L. minor. Least Toadflax. Flowers purplish yellow. *Amongst wheat in the pit-down, Blymhill.*

Antirrhinum majus. Great Snap-dragon. Flowers purplish. *On the walls of Rushall House, and on Burton Abbey wall, Matlock, (Derb.)*

A. Orontium. Lesser Snap-dragon. Flowers purple. *Himley and Burton.*

Digitalis purpurea. Foxglove. Flowers purple. Common, though absent in many counties. Flowers frequently light flesh-coloured; and occasionally white, as at Bagnall; The leaves are very powerfully sedative and diuretic. Seldom found on limestone in Staffordshire.

Scrophularia nodosa—aquatica.

Limosella aquatica. Mudwort. Flowers rose-coloured. Muddy places. *Stourbridge; New Bot. Guide.*

Verbena officinalis. Vervain. Flowers blue. About Tutbury Castle, and at Stowe, *Lichfield, Tatenhill.*

Orobanche major. Greater Broom-rape. Flowers brown, like the whole plant. Parasitical on gorse or broom. Heyley Castle. *Blymhill, Matlock, (Derb.)*

O. elatior. Tall Broom-rape. Flowers brown. *Alton; Mr. Carter.*

CLASS XV.—TETRADYNAMIA. 6 STAMENS: FOUR LONG AND TWO SHORT.

ORDER I.—SILICULOSA. FRUIT, A SHORT POD OR POUCH.

The class *Tetradynamia* is constituted by an important and natural family of plants, to which the name of *Cruciferae* is given in the Natural System. They (as this name implies) have their petals disposed in a cruciform manner: they possess frequently a degree of pungency in taste, are antiscorbutic, and their seeds yield a fixed oil, very valuable.

Coronopus Ruellii. Wart-cress. Flowers white. Near Cradley Forge, between Stafford and Kingston Pool, *Uttoxeter, Barton.*

C. didyma. *Yoxall Lodge, Mr. C. Babington; New Bot. Guide.*

Thlaspi arvense. Penny-cress. Flowers white. Near Stourbridge on dunghills, and near Bewdley. *At Stone, Ray; Barton.*

T. alpestre. A common weed, at Matlock, (Derb.) 1840.

T. Bursa-pastoris. Shepherd's Purse. Flowers white. Everywhere.

Hutchinsia petræa. Rock Hutchinsia. Flowers whitish. Berresford, Wever Hills, Dovedale, Wetton Mill, Beeston Tor, Alsop Dale, very luxuriantly on an old mill below Buxton. This pretty little plant, never found off limestone, is one of the earliest productions of spring the botanist meets with.

Teesdalia nudicaulis. Naked-stalked Teesdalia. Flowers white. Lawton, Alsager, and Astbury, (Chesh.) Tittensor, Swinnerton, Shooters Hills, near Stourbridge, Blymhill, Lichfield, Betley. Generally in sandy places.

Iberis amara. Candy-tuft. Flowers white. By the roadside on a common between Cheadle and Oakamoor; Shaw.

Lepidium campestre. Mithridate Pepperwort. Flowers white. Common in corn-fields.

L. Smithii. Smooth Field Pepperwort. Flowers white. Leycett, Swinnerton, Betley, Willowbridge, Maer, Tittensor.

Draba verna. Whitlow Grass. Flowers white. Common. On the top of Mow Cop.

D. incana. Twisted-podded Whitlow Grass. Flowers white. On limestone rocks by Thor's Cavern, high rocks north of Glutton Bridge, and one mile below Buxton; perhaps the most southern English localities. Pod curiously twisted. Rare.

D. muralis. Speedwell-leaved Whitlow Grass. Flowers white. On every limestone rock.

Camelina sativa. Gold-of-pleasure. Flowers yellow. Blymhill, Shaw. Id. loc. in a corn-field near the parsonage; several times in Cheddleton parish.

ORDER II.—SILIKUOSA. FRUIT, A LONG NARROW POD.

Dentaria bulbifera. Bulbiferous Coral Root. Grove by the church-yard, Blithefield; Mr. Stanmers, who has sent me specimens; Pendeford, Needwood Forest.

Cardamine amara. Bitter Lady's-smock. Flowers whitish. Pretty common.

C. pratensis. Lady's-smock. Flowers purple. Common in meadows.

C. impatiens. Narrow-leaved Bitter-cress. Flowers white. Dovedale, on limestone shiver; Shaw, Hamps Valley, Ecton Hill, *Rowley*, *Sedgley*, *Poole's Hole*, and *Matlock*, (*Derb.*) This, like the following, discharges its seeds suddenly when touched.

C. hirsuta. Hairy Bitter-cress. Flowers white. Common.

Arabis hirsuta. Hairy Rock-cress. Flowers white. On limestone, everywhere; Tutbury, on sandstone.

A. thaliana. Wall Cress. Flowers white. Common.

Turritis glabra. Long-podded Tower Mustard. Flowers yellow. The road side under Himley Park wall, between Kinver and Enville, about Stourbridge, *Weston-under-Lizard*, *Dosthill*, *Lichfield*, *Tamworth*, *Burton*.

Barbarea vulgaris. Yellow Rocket. Flowers yellow. Common in moist waste places. Bitter.

B. præcox. Early Winter Cress. Near Stoke, introduced; *Burton*.

Nasturtium officinale. Water Cress. Flowers white. Common in clear water. Grateful and wholesome.

N. sylvestre. Creeping Nasturtium. Flowers yellow. Occasionally. *Tamworth*. *Blymhill*, *Burton*.

N. terrestre. Marsh Nasturtium. Flowers yellow. Common in damp places. *Stoke*.

N. amphibium. Amphibious Nasturtium. Flowers yellow. Canals near Stourbridge, *Tamworth*, *Weston-upon-Trent*, *Stoke*, *Barton*, *Burton*, &c.

Sisymbrium officinale. Hedge Mustard. Flowers yellow. Common. *Roadsides*.

S. Sophia. Fine-leaved Hedge Mustard. Flowers

yellow. Coton Field, on a bank at the lower part, near some cottages; *Tutbury Castle, near Stourbridge, Burton.*

Erysimum cheiranthoides. Worm-seed Treacle Mustard. Flowers yellow. *Ashbourn, road-side near Mayfield; Caledonia, near Stourbridge.*

E. Alliaria. Sauce-alone. Flowers white. Common in hedges.

Cheiranthus Cheiri. Wall-flower. Flowers yellow. On the walls of Dudley Castle, Burton Abbey walls, the ruins of Rugeley Old Church.

“ Why loves my flower, the sweetest flower
That swells the golden breast of May,
Thrown rudely o'er this ruined tower,
To waste her solitary day ?”

Hesperis matronalis. Dame's Violet. Flowers purple. *Near Cheadle, Mr. Carter;* occasionally near cottages. Flowers fragrant in the evening.

Brassica Napus. Wild Navew, Rape, or Cole Seed. Flowers yellow. Common in corn-fields and on rocks. The seeds yield rape oil; and the roots, having a powerful turnip flavour, are used in French cookery.

B. Rapa. Turnip. Flowers yellow. Less common than the preceding.

B. campestris. Common Wild Navew. Flowers yellow. Common along rivers. Trent at Stoke.

Sinapis arvensis. Charlock. Flowers yellow. Very common in corn-fields.

S. alba. White Mustard. Flowers yellow. Occasionally on rubbish. The seeds make a fine mustard.

S. nigra. Common Mustard. Flowers yellow. Common about Stafford, *Tutbury, Barton.*

S. tenuifolia. Fine-leaved Mustard. Flowers yellow. *Walls of Lichfield Close, Ray.*

Raphanus Raphanistrum. Radish or Jointed Charlock. Flowers yellow. Frequent in corn-fields and on rubbish.

CLASS XVI.—MONADELPHIA. FILAMENTS COMBINED IN ONE SET.

ORDER I.—PENTANDRIA. 5 PERFECT STAMENS.

Erodium Cicutarium. Hemlock Stork's-bill. Flowers purple or white. Common on sandy soil.

E. moschatum. Musky Stork's-bill. Flowers rose-coloured. Rowley, Dudley, Stourbridge.

E. maritimum. Sea Stork's-bill. Flowers reddish. Sandy fields, Wombourne, Orton, Kinver, Stourbridge, Lichfield, &c.

ORDER II.—DECANDRIA. 10 STAMENS.

Geranium sanguineum. Bloody Crane's-bill. Flowers purple. Abundant about Dowles Brook, in Wyre Forest. Buxton, (Derb.)

G. phæum. Dusky Crane's-bill. Flowers purplish-black. Rowley Hills towards Cradley. Cradley Park.

G. sylvaticum. Wood Crane's-bill. Flowers purple. Plentiful about Dowles Brook. Burton; Matlock, (Derb.)

G. pratense. Blue meadow Crane's-bill. Flowers blue. Frequent in the north of the county, Stoke, &c. A variety with the flowers nearly white, beautifully marked with dark blue veins, Ilam. D. T.; Bot. Guide.

G. Pyrenaicum. Mountain Crane's-bill. Flowers purple. Walton near Stone, Enville, Stramshall, Lichfield, Barton under Needwood.

G. lucidum. Shining Crane's-bill. Flowers rose-coloured. General on limestone; frequent on sandstone.

G. Robertianum. Herb Robert. Flowers purple. Common. With white flowers near Madeley; Mr. Pinder.

G. molle. Dove's foot Crane's-bill. Flowers purple. Common. Stamens sometimes changed into petals.

G. pusillum. Small-flowered Crane's-bill. Flowers purple. Common. Var. β . About roadsides, Stafford.

G. dissectum. Jagged-leaved Crane's-bill. Flowers pink. Common.

G. columbinum. Long-stalked Crane's-bill. Flowers purple. Common, particularly on limestone rocks. Dove-dale, Wetton, Beeston Tor, Thor's Cavern, *Barr*, *Lichfield*.

ORDER III.—POLYANDRIA. MANY STAMENS.

Malva sylvestris. Mallow. Flowers purplish rose-coloured. Common.

M. rotundifolia. Dwarf Mallow. Flowers purple. Common.

M. moschata. Musk Mallow. Flowers rose-coloured. Common.

CLASS XVII.—DIADELPHIA. FILAMENTS COMBINED IN TWO SETS (EXCEPT IN THE FIVE FIRST GENERA OF THE THIRD ORDER).

Many of the genera of this class constitute the Natural Family, *Papilionaceæ*; so called from the butterfly-form of their flowers. They are important on many accounts; particularly as affording food for man and animals. These remarks, however, do not apply to the two first orders.

ORDER I.—HEXANDRIA. 6 STAMENS.

Corydalis solida. Solid-rooted Corydalis. Flowers purple. *Perry Hall, With. Grove near the Rectory, Muxton, Shaw.*

C. lutea. Frequent on walls near houses.

C. claviculata. White Climbing Corydalis. Flowers white. Common, particularly on high grit rocks.

Fumaria capreolata. Ramping Fumitory. Flowers red. Frequent.

F. officinalis. Common Fumitory. Flowers red. Common. Vars. α and β , common.

ORDER II.—OCTANDRIA. 8 STAMENS.

Polygala vulgaris. Milkwort. Flowers blue, purple, pink or white. Common on heaths. Pretty.

ORDER III.—DECANDRIA. 10 STAMENS.

Ulex Europæus. Furze, Whin, Gorse. Flowers yellow. Common. Valuable for fodder when chopped. In seasons of scarcity, the stock of large farms has been fed with it for months.

U. nanus. Dwarf Furze. Flowers yellow. Near Lichfield, Kinver, *Needwood*, *Dovedale*.

Genista tinctoria. Dyer's Greenwood. Flowers yellow. Common and general.

G. pilosa. *Pendeford*; *Shaw*.

G. Anglica. Needle Greenwood. Flowers yellow. Fenton Park, Grindon Moor, Willowbridge, *Archford Moor*, *Lichfield*.

G. scoparium. Broom. Flowers yellow. Common. Tops medicinal, tonic, and diuretic.

“The memorial flower of a princely race.”

Ononis arvensis. Rest-harrow. Flowers rose or white. Var. *O. inermis*; common. *O. spinosa*, less common.

Anthyllis vulneraria. Kidney Vetch, or Lady's-finger. Flowers yellow. Common on the limestone, and only there.

Orobus tuberosus. Tuberos Bitter Vetch. Flowers purple. Common with both narrow and broad leaves.

Lathyrus Nissolia. Crimson Vetchling. Flowers crimson, purple, and white. *Coton Field; Stafford; Belmont, near Barton.*

L. pratensis. Meadow Vetch. Flowers yellow. Common. Liked by cattle.

L. sylvestris. Narrow-leaved Everlasting Pea. Flowers purple. Red Hill, Stone Park; Mr. Foster in Shaw. There in 1840. *Tatenhill*. Flowers when old as described by Hooker; but when young, of an uniform rose-colour.

Vicia sylvatica. Wood Vetch. Flowers lilac. Near Stone; Mr. Foster. About Stone and Oulton in plenty, and frequently with white flowers; Tittensor, Moddershall; most abundant on the limestone, where it colours the hill-sides by the profusion of its beautiful blossoms; *Tamworth, Ashbourne, Dovedale, Matlock, (Derb.)*

V. Cracca. Tufted Vetch. Flowers blue. Common in hedges and meadows. Beautiful.

V. sativa, Var. *angustifolia—sepium*. Common.

Ervum tetraspermum. Smooth Tare. Flowers grey. *Stafford, Lichfield, Barton.*

E. hirsutum. Hairy Tare. Flowers white. Common in fields.

Astragalus glycyphyllus. Sweet Milk-vetch. Flowers yellow. In the bushes at the top of Coton field, Stafford, *between Stafford and Penkridge, King's Bromley; Shaw.*

Ornithopus perpusillus. Bird's-foot. Flowers white with red lines. Common on sandy soils. *Trentham, &c.*

Hippocrepis comosa. Horse-shoe Vetch. Flowers yellow. On a rock, up the dell, behind the house in Wetton Valley. *A mile or two up Dovedale; New. Bot. Guide.*

Melilotus officinalis. Yellow Melilot. Flowers yellow. *Tutbury, Yarlet Hill, Uttoxeter, Yoxall; generally on red marl. Stoke; Mr. Davis.* This has strongly the smell of

new hay, when dried. Sometimes cultivated, and although an annual, lasts several years, if cut before flowering.

Trifolium repens. Dutch Clover. Flowers white. Common. Partial flower-stalks, often remarkably elongated.

T. incarnatum. Not British, but occasional amongst wheat; Barlaston, &c.

T. pratense—*medium*—*procumbens*, Var. β .—*filiforme*, Var. *major* and *microphyllum*.

T. ochroleucum. Goscott, near Walsall; Shaw.

T. arvense. Hare's-foot Trefoil. Flowers white. Occasional in the north of the county, Betley; abundant in sandy fields of the south, Kinver, Lichfield.

T. striatum. Soft knotted Trefoil. Flowers purple. Limestone pastures, road-side, Shirleywich, *Stafford, Lichfield*.

Lotus corniculatus. Bird's-foot Trefoil. Flowers yellow. Common in pastures.

L. tenuis. Slender Bird's-foot Trefoil. Flowers yellow. Roadside, Willowbridge; Dovedale.

L. major. Narrow-leaved Bird's-foot Trefoil. Flowers yellow. Common in moist bushy places.

Medicago falcata. Yellow Sickle Medick. Flowers yellow. About Stafford Castle and Yarlet Hill.

M. lupulina. Black Medick. Flowers yellow. Frequent.

M. sativa. Purple Medick. Flowers purple. *Cheadle, Dudley, Burton, Cheshire borders*.

CLASS XVIII.—POLYADELPHIA. FILAMENTS COMBINED IN MORE THAN TWO SETS.

ORDER I.—POLYANDRIA. MANY STAMENS.

Hypericum Androsæmum. Tutsan. Flowers yellow.

Lane leading down to the Ferry, Upper Areley, *Leycett*,
Rev. F. F. Clark. Broadwell Woods, Pendeford, Hopwas,
Woodroffe Cliff, Matlock, (Derb.) Very handsome.

H. quadrangulum. Square stalked St. John's-wort.
 Flowers yellow. In moist places; common.

H. perforatum. Perforated St. John's-wort. Flowers
 yellow. Frequent in hedges.

H. dubium. Imperforate St. John's-wort. Flowers
 yellow. *Stretton, Barton, Matlock, (Derb.)*

H. humifusum. Trailing St. John's-wort. Flowers yel-
 low. Frequent.

H. montanum. Mountain St. John's-wort. Flowers
 yellow. *Wyre Forest, Burton, Matlock, (Derb.)*

H. hirsutum. Hairy St. John's-wort. Flowers yellow.
 Frequent on marl and on limestone.

H. pulchrum. Small upright St. John's-wort. Flowers
 yellow. Common on heaths; very pretty.

H. elodes. Marsh St. John's-wort. Flowers pale yellow.
 In all our bogs and mosses.

CLASS XIX.—SYNGENESIA. ANTHERS UNITED INTO A TUBE.
 FLOWERS COMPOUND.

The plants of this large class constitute the great natural family *Compositæ*. In the flowers of this class, many small florets are collected into one head, so that, as we may see in the dandelion, a quantity of florets apparently form but one flower. The seeds are commonly furnished with a feathery *pappus*, by means of which beautiful contrivance they are, as in the plant mentioned, dispersed by the winds in every direction.

ORDER I.—ÆQUALIS. ALL THE FLORETS PERFECT.

Tragopogon pratensis. Yellow Goat's-beard. Flowers yellow. Common, particularly on clay or limestone. The flowers close every day before noon.

T. major. Greater Goat's-beard. Flowers yellow. Equally common. Lime kiln near Caldon Place, &c.

T. porrifolius. Purple Goat's-beard. Flowers yellow. Near Weston-under-Lizard. *Meadows at Rolleston; Sir O. Mosley. Matlock, (Derb.)*

Picris hieracioides. Hawkweed Picris. Flowers yellow. About Tutbury, Ecton Hill, Dovedale, Matlock.

Sonchus palustris. Tall Marsh Sow-thistle. Flowers yellow. About Stafford.

S. arvensis. Corn Sow-thistle. Flowers yellow. Common in corn-fields. Flowers handsome.

S. oleracea. Common Sow-thistle. Flowers pale yellow. Common. Var. β , common.

Lactuca virosa. Strong-scented Lettuce. Flowers yellow. Common about Tutbury, *Charlley, Hamstall Ridware.*

Prenanthes muralis. Ivy-leaved Wall Lettuce. Flowers yellow. Common, and general on walls.

Crepis virens. Smooth Hawk's-beard. Flowers yellow. Common on roofs, &c.

C. biennis. Rough Hawk's-beard. Flowers yellow. *Derbyshire, near the Staffordshire borders, Dr. Hewgill.*

C. paludosa. Marsh Hawk's-beard. Flowers yellow. *On the banks of a rivulet, Biddulph; Shaw.*

Leontodon Taraxacum. Dandelion. Flowers yellow. Common. The root is valuable in dropsies and liver complaints. Var. β . Occasional.

Apargia hispida. Rough Hawkbit. Flowers yellow. Common in meadows.

A. autumnalis. Autumnal Hawkbit. Flowers yellow. Common.

Thrincia hirta. Hairy Thrincia. Flowers yellow. Common. Bagnall, Barlaston Common, Wolstanton Marsh.

Hieracium Pilosella. Mouse-ear Hawkweed. Flowers pale yellow. Common on banks, &c.

H. murorum (Smith). Wall Hawkweed. Flowers yellow. Common on limestone rocks; flowering in May and June. Flowers large; handsome. No appearance of a leaf on the stem on any specimens; in this respect, and in the time of flowering, it does not answer to Hooker's description.

H. sylvaticum. Wood Hawkweed. Flowers yellow. Common. Vars. α , β , γ .

H. Sabaudum. Shrubby broad-leaved Hawkweed. Flowers yellow. Common, and frequently, with the preceding on coal-shale.

H. umbellatum. Narrow-leaved Hawkweed. Flowers yellow. Common in stony places. A small species of Cynips, or some allied insect, forms a gall by depositing its eggs in the stems of this plant: this remains all the winter, and in the following summer the insects issue from the dead stems, and again deposit their eggs on the succeeding ones.

Hypochoeris glabra. Smooth Cat's-ear. Flowers yellow. Gravelly places.

H. radicata. Long-rooted Cat's-ear. Flowers yellow. Common in fields, &c.

Lapsana communis. Nipple-wort. Flowers yellow. Common in waste or cultivated ground.

Cichorium Intybus. Wild Succory. Flowers blue. Near *Knight's-land*, *Dr. Hewgill*; *Tamworth Castle*, *Lichfield*, *Burton*, *Blymhill*. Flowers beautiful, and sometimes white.

Arctium Lappa. Burdock. Flowers purple. Common in waste places. The hooked scales of the *involucrum* most pertinaciously fasten themselves to clothes or the coats of animals.

Serratula tinctoria. Saw-wort. Flowers purple. Common in woods. Dyes yellow.

Carduus nutans. Musk Thistle. Flowers purple. Frequent, but not general. Flowers handsome. Musky in the evening.

C. acanthoides. Welshed Thistle. Flowers purple, or white. *Burton*, *Dudley*, *Chartley*, *Stone*, *Stafford*, *Kinfares*, &c.; with white flowers, *Mr. Brown*.

C. Marianus. Milk Thistle. Flowers purple. Waste places. *Alton*, near *Stone*, *Burton*.

Cnicus lanceolatus—palustris—arcensis. Too common.

C. eriophorus. Woolly-headed Plume-thistle. Flowers purple. *Wren's-nest*, *Sedgley limeworks*, *Barrow Hill*, between *Wednesbury* and *Bilston*, *Burlington*, *Thorpe*, *Cromford*, and *Matlock*, (*Derb.*)

C. Forsteri. *Burton*, *Mr. Brown*.

C. heterophyllus. Melancholy Plume-Thistle. Flowers purple. *Mixon*, near *Longnor*, *Warslow*, *Hamps Valley*, *Buxton*. On limestone and limestone shale. Handsome.

C. pratensis. Meadow Plume-thistle. Flowers purple. In boggy places. *Willowbridge*, *Aqualate*, *Blymhill*, *Needwood*.

Onopordum Acanthium. Cotton Thistle, or Scotch Thistle. Flowers purple. *Aqualate*, in the park; *Brome*, near *Birmingham*.

Carlina vulgaris. Carline Thistle. Flowers purple. Hilly pastures; abundant on limestone. Sandy fields at Kinver and Enville.

Bidens cernua. Nodding Bur-marigold. Flowers dirty yellow. Frequent; ditches.

B. tripartita. Trifid Bur-marigold. Flowers dirty yellow. Frequent. *Flowers occasionally rayed*; *Wolstanton Marsh*; *Mr. Spark*.

Eupatorium cannabinum. Hemp Agrimony. Flowers pale purple. Wet places and limestone hills. Frequent.

ORDER II.—SUPERFLUA.

Tanacetum vulgare. Tansy. Flowers yellow. Common in hedges.

Artemisia Absinthium. Wormwood. Flowers dingy yellow. Between Rickerscote and Coppenhall, Willowbridge Lodge. This plant is rare in the county.

A. vulgaris. Mugwort. Flowers brown. In hedges and waste places. Common.

Gnaphalium dioicum. Mountain Cudweed. Flowers white. Limestone hills, Wetton Valley. *Buxton, Mr. Gisborne*; *Arbor Low, Mr. Bree*.

G. margaritaceum. American Cudweed. Flowers white. *Wyre Forest, Rev. T. Butt*; *meadow at Longdon*; *Bot. Guide*.

G. sylvaticum. Highland Cudweed. Flowers yellow. Common in gravelly places. Var. β .

G. uliginosum—*Germanicum*. Common.

G. minimum. Least Cudweed. Flowers yellowish. In gravelly places. Tittensor.

Petasites vulgaris. Butter-bur. Flowers flesh-coloured. Common. Leaves sometimes three feet across. An injurious weed in meadows.

Tussilago Farfara. Colt's-foot. Flowers yellow. Common on clay, and land too much ploughed.

Erigeron Canadensis. Canada Flea-bane. Flowers yellowish white. *Ashwood, Wainwright.*

E. acris. Blue Flea-bane. Flowers yellow, with purple rays. Tutbury Castle, and sandy ground near Kinver, *Dudley Castle, Stretton Bridge, Lichfield.*

Aster Tripolium. Sea Starwort. Flowers yellow and lilac. *Near Tixall and Shirleywich, Brawnston; Shaw.*

Senecio sylvaticus. Mountain Groundsel. Flowers yellow. *Bagnall, Uttoxeter, Stafford. Lichfield, Aston.*

S. vulgaris—Jacobæa—aquaticus. Common.

S. viscosus. Strong-scented Groundsel. Flowers yellow. Common. *Stoke.*

S. tenuifolius. Hoary Ragwort. Flowers yellow. *Uttoxeter, Madeley, Blymhill.*

S. Saracenicus. Broad-leaved Ragwort. Flowers yellow. *Near Compton Mill, Bradwell, Needwood Forest.*

Cineraria palustris. *Staffordshire, Mr. Spark.*

Solidago Virgaurea. Golden-rod. Flowers yellow. Common on rocky ground.

Inula Helenium. Elecampane. Flowers yellow. *Bidulph Castle, Himley.* Flowers large.

I. Conyza. Ploughman's Spikenard. Flowers yellow. *Wombourne, roadside; Dudley Castle, Matlock, (Derb.)*

Pulicaria dysenterica. Flea-bane. Flowers yellow. Common in wet places.

Doronicum Pardalianches. *Dimsdale; Mr. Spark.*

Bellis perennis. Daisy. Flowers yellow and white. Common.

“ 'Tis Flora's page—in every place—
In every season—fresh and fair,
It opens with perennial grace,
And blossoms everywhere.”

Chrysanthemum Leucanthemum. Ox-eye. Flowers yellow and white. Common in fields and by roadsides.

C. segetum. Corn Marigold. Flowers yellow. Common in cornfields, Stoke-upon-Trent.

Pyrethrum Parthenium. Feverfew. Flowers yellow and white. Common in waste places. Bitter; tonic.

P. inodorum. Corn Feverfew. Flowers yellow and white. Common.

Matricaria Chamomilla. Wild Chamomile. Flowers yellow and white. Common in cornfields.

Anthemis nobilis. Chamomile. Flowers yellow and white. Not common. *Between Hedgeford and Stafford, Blymhill, Lichfield.*

A. Cotula. Strong-scented Chamomile. Flowers yellow and white. Frequent.

Achillæa Ptarmica. Sneezewort, Yarrow. Flowers white. Common.

A. Millefolium. Common Yarrow, Milfoil. Flowers whitish. Common in fields, Flowers sometimes of a beautiful rose-colour. Valuable as a medicine.

ORDER III.—FRUSTRANEA.

Centaurea nigra. Black Knapweed. Flowers purple. Common. Sometimes with a ray.

C. Jacea. Brown Radiant Knapweed. Flowers purple. *Cradley Park.*

C. Cyanus. Corn Blue-bottle. Flowers purple and blue. Batchacre, along the railway about Walsall, Betley, Mear.

C. Scabiosa. Greater Knapweed. Flowers purple, or white. Kinver, Stafford, Barr, Tutbury. Frequent on high limestone rocks, Glutton.

C. solstitialis. In waste ground.

C. montana. In a high pasture near Gradbitch.

CLASS XX.—GYNANDRIA. STAMENS SITUATED UPON THE
STYLE, ABOVE THE GERMEN.

ORDER I.—MONANDRIA. 1 STAMEN. THIS ORDER CONSTITUTES THE NATURAL FAMILY ORCHIDÆ—CURIOUS PLANTS, WITH FREQUENTLY VERY BEAUTIFUL FLOWERS.

Orchis Morio. Green-winged Meadow Orchis. Flowers purple; pale in the middle, spotted. Common, but less so than the following.

O. mascula. Early purple Orchis. Flowers purple, spotted; centre whitish. In woods and pastures, flowering in April, or even March; and not usually so late as June, as Hooker observes. Fragrant. Sometimes white.

O. ustulata. *Kingswinford; Midl. Flora; Matlock, (Derb.)*

O. pyramidalis. Pyramidal Orchis. Flowers rose-coloured. *Plantations near Uttoxeter; Catholin Lane, Barton, Dr. Hewgill.* Abundant at Matlock, (Derb.) and with white flowers.

O. latifolia. Marsh Orchis. Flowers white, rose-coloured, or purple. *Barlaston, Willowbridge, Froghall, Kingston Pool, Blazing Star;* very handsome.

O. maculata. Spotted palmate Orchis. Flowers white, or purple, or spotted. Common.

Gymnadenia conopsea. Fragrant *Gymnadenia.* Flowers white, or rose-coloured. *Grindon, Caldon, Waterhouses, Matlock, (Derb.) Blymhill, Cotton, Farley, Barr Beacon.*

Habenaria viridis. Green *Habenaria.* Flowers green. *Hills at Moddershall, Barlaston, Wetley, Froghall, Wil-*

lowbridge, Longnor, Swithamley, *Blymhill*, *Cheadle*, *Needwood*.

H. albida. *Cradley Park*, *Hagley*.

H. bifolia. Butterfly *Habenaria*. Flowers yellowish white. Common in meadows and pastures. Fragrant.

H. chlorantha. *Lichfield*, *Miss Jackson*.

Ophrys apifera. Bee *Ophrys*. Flowers dark. *Yoxall Lodge*, *Wren's Nest*, *Rev. F. F. Clark*, and — *Fletcher, Esq.*, *Matlock*, (*Derb.*)

O. muscifera. Fly *Ophrys*. *Matlock*.

Neottia spiralis. *Meadows at Kingswinford*; *Midl. Flora*.

Listera ovata. Twayblade. Flowers yellowish green. Common in woods and fields.

Epipactis latifolia. Broad-leaved *Helleborine*. Flowers purple green. Common in most woods.

E. palustris. Flowers green and white, with rose-coloured streaks. *Fair Oak*, *meadow at the foot of Barr Beacon*; *Mr. Ick*. *Moreton*, *Ashbourn*.

E. ensifolia. *In deep retired glens, Wyre Forest*; *Rev. T. Butt*, and *Dr. Hastings*.

Malaxis paludosa. Marsh Bog *Orchis*. Flowers greenish. *Lichfield*; *Miss Jackson*. Very small.

CLASS XXI.—MONOECIA. STAMENS AND PISTILS IN SEPARATE FLOWERS ON THE SAME PLANT.

ORDER I.—MONANDRIA. 1 STAMEN.

Euphorbia helioscopia—*Peplus*—*exigua*. Common.

E. Cyparissias. Cypress Spurge. *Woods at Enville, With.*

E. amygdaloides. Wood Spurge. Abundant near Forest

Church, Needwood, and in Wyre Forest, *Bagot's Park*, *King's Standing*, *Burton*.

E. Characias. Red shrubby Spurge. What I think is this, in a hedge between Newborough and Forest Church; *Heywood Park*, *Ray*; *Needwood*, *Eng. Flora*.

E. Lathyris. *Needwood*; *Dr. Hewgill*.

Callitriche verna. Vernal Water-Starwort. Common in water.

C. autumnalis. Autumnal Water-Starwort. Near *Whitmore*.

Zannichellia palustris. Horned Pondweed. On the stream at *Stretton*, and in the river at *Tamworth*.

ORDER III.—TRIANDRIA. 3 STAMENS.

Typha latifolia. Great Reed-Mace, or Cat's-tail. Common.

T. angustifolia. Lesser Reed-Mace. Aqualate, Copmere, *Betley*, *Balterley*, *Whitmore*, *Kingston Pool*.

Sparganium ramosum. Branched Bur Reed. Common in ditches. Two varieties.

S. simplex. Unbranched upright Bur Reed. Somewhat less common.

S. natans. Floating Bur Reed. *Lin-pits*, *Whitmore*; Aqualate.

Carex dioica. Bogs, *Wybunbury*, (*Chesh.*) *Weston under Lizard*.

C. pulicaris. Bogs, *Wybunbury*, (*Chesh.*) *Chartley*, *Blymhill*.

C. stellulata. Common.

C. ovalis. Every pasture, *Stoke-upon-Trent*.

C. curta. *Stoke Meadows*, *Wetley Moor*, Aqualate, *Weston under Lizard*, *Pitmoor Pool*, *Brewood*.

- C. remota.* Whitmore; common on the limestone.
C. intermedia. Common.
C. muricata. Willowbridge.
C. Vulpina. Common. Boothen.
C. teretiuscula. Common.
C. paniculata. Common. Trentham Pool.
C. cæspitosa. Common. Stoke-upon-Trent.
C. acuta. Common. Stoke Meadows.
C. stricta. Common. *Pitmoor Pool.*
C. flava. Bogs, as at Whitmore; common.
C. Oederi. Common in bogs.
C. fulva. Wetley Moor. Common.
C. pallescens. Wetley Moor.
C. distans. *Wever Hills; Blymhill, Shaw.*
C. binervis. Wetley Moor.
C. lævigata. Not rare.
C. panicea. Fields at Stoke-upon-Trent. Common.
C. limosa. *Moreton, Pitmoor Pool, Wichbury Hill.*
C. strigosa. Not rare.
C. sylvatica. Belmont, Wetton, Cheadle, *Blymhill.*
C. pendula. Belmont and Madeley Woods, *Cheadle, Brewood.*
C. Pseudo-cyperus. Whitmore, Ashley. Lower scales frequently very long; lower fruit proliferous, bearing smaller spikes or single fruit. Barren spikes frequently half fertile.
C. recurva. Common. Stoke.
C. præcox. Common on hills; *Wever Hills, &c.*
C. pilulifera. Not rare.
C. filiformis. Madeley.
C. hirta. Common in Stoke Meadows.
C. ampullacea. Belmont, Stoke Meadows.
C. vesicaria. Belmont, Stoke, *Moreton, Pitmoor, Aquilate, near Birmingham.*

C. paludosa. Common by water.

C. riparia. Common.

ORDER IV.—TETRANDRIA. 4 STAMENS.

Littorella lacustris. Plantain Shore-weed. Reservoir at Rudyard, Trentham Pool, Calf Heath, Hednesford Pool.

Alnus glutinosa. Alder. Common about rivers. The wood does not easily split. In the parish of Blymhill there grew an alder of the following dimensions: circumference, one foot from the ground, four yards; four feet from the ground three yards; twenty-five feet from the ground, two yards, one foot; height fifty feet.

Urtica urens. Small Nettle. Common in waste places.

U. dioica. Great Nettle. Common.

U. pilulifera. In Staffordshire; Mr. Spark.

ORDER V.—PENTANDRIA. 5 STAMENS.

Bryonia dioica. Red-Berried Bryony. Flowers greenish. Lichfield, Barr, Burton, Enville, &c. On the remains of the walls of Etocetum at Wall. Not in the north of the county.

ORDER VII.—POLYANDRIA. MANY STAMENS.

Ceratophyllum demersum. Hornwort. Common in streams and pools.

Myriophyllum spicatum. Spiked Water Milfoil. In ditches, pools, &c. In rapid rivers, Dove.

M. verticillatum. Whorled Water Milfoil. *Forton*; *Shaw*. *Aqualate Mere*; *Mr. Darby*.

Sagittaria sagittifolia. Arrow Head. Flowers violet. Newcastle, Trunk, and Caldon Canals, near Stoke-upon-Trent, Foul Hay Brook, *Burton*, *Tamworth*, *Cheadle*. Submerged leaves very different from the other arrow-shaped ones.

Arum maculatum. Cuckoo-pint, or Wake-robin. Common in groves and hedges. The scarlet fruit remains after the plant is withered. Though very acrid in the fresh state, the root will afford an excellent flour. Bruised fresh it has been applied with advantage in local palsy. The plant is curious in its structure.

“ Arum that in a mantling hood conceals
Her sanguine club, and spreads her spotted leaf
Armed with keen tortures for the unwary tongue.”

Poterium Sanguisorba. Salad-burnet. Flowers purplish. Common on the limestone and confined to it. In flower at the end of May.

Quercus Robor. Oak. Common, and formerly covering much of the hilly part of the county. In hilly places the oak is small, but makes the stoutest timber. It is partial to clay, where it is fine, as on the deep strong clay of Needwood. It, with the holly, abounds too on the clay of coal districts; but both are killed in great quantities by the increase of the smoke of manufactures. The Swilcar Lawn Oak in Needwood Forest, measured (1830) at 6 feet, 21 feet $4\frac{1}{2}$ inches in circumference. Its height is 65 feet, and it contains 1000 feet of timber. It is celebrated by Dr. Darwin, and the author of “Needwood and its Fall.” The Squitch Oak in Bagot’s Park, has the butt 33 feet high, and contains 660 feet 9 inches of timber in the butt alone, or 1012 feet 10 inches total. It is 61 feet high, and its circumference at 5 feet is 21 feet 9 inches; near the ground 43 feet. The Rakes’ Wood Oak is 30 feet in circumference at 5 feet from the ground. The Cliff Oak in the same place is less than the last. The Beggar’s Oak is a noble old tree; its branches extend 48 feet in every direction. Other great ancient oaks existing, or formerly existing at

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Swilcar Oak.



Chestnut at Torley



Bagot's Park, are the Long Coppice Oak, Bett's Pool Oak, and the Lodge Yard Oak.

In Plot's time, there was an oak at Norbury of six yards girth; and Fair Oak, on Cannock Chase, was nine yards and a half girth. One existed at Wrottesley fifteen yards round. "In Beaudesert Park there is a very large oak, the trunk of which is now a mere shell, sufficiently roomy to allow eight people to stand within it. The late Lady Uxbridge often sat within this tree; and there is a circular hole in the back, through which she used to place a telescope, in order to amuse herself by looking at objects in the surrounding country. Near New Gate, in the same park, stands the Roan Oak, the branches of which are almost all partially decayed, and distorted, and twisted into the most fantastic forms. One of these resembles a writhing serpent, and another forms no bad representation of a lion couching and just ready to spring on his prey. The trunk of this tree is twenty-six feet in circumference. The Magic Oak, which is supposed by the country people to be haunted by evil spirits, has a hollow open trunk, and is nearly thirty feet in circumference. Another, situated in a ravine, called the Gutter Oak, is also hollow, and has a trunk nearly forty feet in circumference." (See Gard. Mag., vol. xii., p. 312, and Loudon's Arboretum Britannicum.) In 1842, we noticed an oak near Shugborough Hall, twenty-one feet in circumference at the smallest part of the trunk.

The Shire Oak is still (1842) standing by the side of the road from Walsall to Lichfield, about four miles and a half from the former place. It is a very old and large tree; but in a state of decay, and hollowed out in the trunk.

Oates' Oak, at Tixall, is a fine tree, and has its denomination from the notorious character, in English history, of that

name; but we do not know how he is connected with it. But a more celebrated tree than any of these, was the Royal Oak, at Boscobel, in Shropshire (but on the very edge of the county), where the fugitive monarch, Charles, found shelter from his pursuers. The original pollard tree has, however, given place to a successor, raised from one of its acorns, planted in the exact spot. I add the subjoined extract from the county newspaper, 1841:—

“The following note was sent by Edward Jesse, Esq., Surveyor of her Majesty’s Parks and Palaces, author of *Gleanings in Natural History*, *an Angler’s Rambles*, and other works:—

‘INDEFATIGABLE SIR,—You may like to add to your Staffordshire Collectanea the following fact:—

‘The two oak chairs on each side of the altar table, in Windsor Church, were carved out of Blithfield oak, and were presented by the late Lord Bagot to Queen Charlotte, who gave them to the Princess Augusta, and by whom they were transferred to the Church.

‘Your great admirer,

EDWD. JESSE.’

‘To Captain Ferneyhough,
Military Knight of Windsor.’”

Q. sessiliflora. Sessile-fruited Oak. Abundant at Sandon. *Himley, Kingswinford, Swinnerton*.

Fagus sylvatica. Beech. Common. Very fine about Barr, and at Trentham. Not indigenous, according to Cæsar. The smooth bark of the beech often tempts the lover to carve the initials of his fair one upon it.

“Not a beech but bears some cypher,
Tender word, or amorous text.”

Castanea vulgaris. Chestnut. Common, planted. We measured an old tree of this species at Terley Castle, in

1842, and found it to be twenty-four feet in circumference at the narrowest part of the trunk. It is much shattered, and the trunk hollow, so that probably it will not be standing long. Another nearly as large exists near Haunch Hall (1842). The chestnut grows better than even the larch on a poor gravelly soil.

Betula alba. Birch. Common. Fragrant and elegant. Leaves sometimes red.

Carpinus Betulus. Hornbeam. Some fine old trees at Bagnall. Wood tough.

Corylus Avellana. Hasel-nut. Common. Makes fine charcoal.

ORDER VIII.—MONODELPHIA. STAMENS UNITED INTO ONE SET.

Pinus sylvestris. Scotch Fir. Frequent. Flourishes well in bogs. According to Cæsar there were no firs in England in his time; and it has been supposed that the Danes or Norwegians planted them. Fir wood appears, however, to be frequently found in peat.

CLASS XXII.—DICECIA. STAMENS AND PISTILS ON SEPARATE FLOWERS AND ON SEPARATE PLANTS.

ORDER I.—DIANDRIA. STAMENS GENERALLY 2.

Salix triandra. Long-leaved triandrous Willow. In osier beds below Stoke-upon-Trent. A valuable osier.

S. pentandra. Sweet bay-leaved Willow. Common. Abundant, and certainly wild all over the moorlands. Handford Bridge. Fragrant.

S. fragilis. Crack Willow. Not uncommon, but rarer than the following. Trent Valley, above Stoke. Brittle at the joints. Bark bitter. Handsome.

S. Russelliana. Bedford Willow. Common. Stoke

Meadows. Dr. Johnson's Willow, at Lichfield, was of this species. "He (Dr. Johnson) never failed to visit it whenever he went to Lichfield; and during his visit to that city, in the year 1781, he desired Dr. Trevor Jones, a physician of that place, to give him a description of it, saying it was much the largest tree of the kind he had ever seen or heard of, and therefore wished to give an account of it in the Philosophical Transactions, that its size might be recorded. Dr. Jones, in compliance with his request, furnished him with the particular dimensions of the tree, which were as follows:—The trunk rose to the height of 12 feet 8 inches, and then divided into 15 large ascending branches, which, in very numerous and crowded subdivisions, spread at the top in a circular form, not unlike the appearance of a shady oak, inclining a little towards the east. The circumference of the trunk at the bottom was 15 feet 9 inches; in the middle, 11 feet 10 inches; and at the top, immediately below the branches, 13 feet. The entire height of the trunk was 19 feet; and the circumference of the branches, at their extremities, upwards of 200 feet, overshadowing a plane not far short of 4000 feet. The surface of the trunk was very uneven, and the bark much furrowed. The tree had then (Nov. 29, 1781) a vigorous and thriving appearance. From this period the tree appears gradually to have increased in size, till April, 1810, when Dr. Withering found the trunk to girt 21 feet at 6 feet from the ground, and to extend 20 feet in height, before dividing into enormous ramifications: the trunk and branches were then perfectly sound, and the very extensive head showed unimpaired vigour. In November of the same year, however, many of the branches were swept away in a violent storm; and nearly half of what remained of the tree fell to the ground in August, 1815, leaving little more than its stupendous

trunk, and a few side boughs. This decay was accelerated by a fire made in the hollow of the trunk by some boys, in 1825, and which would probably have consumed the tree, had not Mr. Stringer, whose garden adjoins it, seen flames proceeding from the trunk, and sent some of his men for the town engine to extinguish the fire. In April, 1829, the tree was blown down in a violent storm, which took place on the 29th of that month, about three o'clock in the afternoon. A drawing was taken of the tree, as it lay on the ground, from which a lithograph was published." There are views of it also in Loudon's Arboretum and Lomax's Lichfield. Bark bitter, and valuable medicinally and for tanning. Wood useful. Brittle like the preceding.

S. alba. White Willow. Common. Plentiful about Uttoxeter. A handsome tree, with silky leaves.

S. Helix. Rose Willow. Frequent. Trent side, Stoke. Bark bitter. Valuable as an osier.

S. purpurea. Bitter purple Willow. Handford. Very bitter.

S. vitellina. Yellow Willow. Pretty Common. Handsome; and forming often a large tree, of which the branches are yellow, and frequently drooping. Valuable.

S. fusca. Dwarf Silky Willow. Abundant, with several varieties, at Aqualate and Wybunbury.

S. viminalis. Common Osier, Withy. Abundant in osier bed, &c. Handford. Valuable.

S. acuminata. Long-leaved Willow. Common. My every specimens from near Madeley.

S. cinerea. Grey Sallow. Frequent. Trent meadows. Veins of the leaves below reddish.

S. aquatica. Water Sallow. Common along the Trent.

S. aurita. Round-eared Sallow. Common in waste wet places, &c. Straggling in growth.

S. caprea. Great Round-leaved Sallow. Common in hedges. May be known by its large roundish leaves, white below.

ORDER II.—TRIANDRIA. 3 STAMENS.

Empetrum nigrum. Crowberry, or Crakeberry. Flowers purplish. On all our heaths, high and low. Moor-game devour the berries.

ORDER III.—TETRANDRIA. 4 STAMENS.

Viscum album. Misseltoe. On the apple and thorn about Upper Areley. Formerly in the north of the county. *Needwood, Dr. Hewgill; on the thorn at Rolleston; now or lately near Elmhurst.* As is well known, this plant was sacred to the ancient Britons.

Myrica Gale. Gale, or Dutch Myrtle. Aqualate. *Forton and Moreton; Shaw.* Fragrant.

ORDER IV.—PENTANDRIA. 5 STAMENS.

Humulus Lupulus. Hop. Flowers greenish white. Frequent in the north of Staffordshire in hedges; cultivated in the south-west part of the county, now or lately.

Tamus communis. Black Bryony. Flowers whitish green. Common, particularly on hills.

ORDER VI.—OCTANDRIA. 8 STAMENS.

Populus alba. Abele. A fine tree at Stow (1842), near the site of Johnson's Willow. Betley, Stafford. Leaves very white beneath; wood soft.

P. canescens. Grey Poplar. Large trees at Handford Bridge.

P. tremula. Aspen. Common, particularly in the moorlands and in wet places. The leaves are tremulous in the slightest breeze, owing to the slenderness and flatness of their stalks.

P. nigra. Black poplar. Common. Rapid in growth. Wood of little value.

ORDER VII.—ENNEANDRIA. 9 STAMENS.

Mercurialis perennis. Dog's Mercury. Flowers green. Common.

Hydrocharis Morsus Ranæ. Frog-bit. Flowers white. Aqualate, Balterley. Handsome. Floating.

ORDER VIII.—MONODELPHIA. STAMENS COMBINED.

Juniperus communis. Juniper. Old trees frequent about very ancient houses; in *Wyre Forest*; *Mag. Nat. Hist.*

Taxus baccata. Yew. Wild on limestone rocks, as in Dovedale. Leaves fatal to cattle, sometimes yellow. There are remarkable yews at Himley, Caverswall, Tixall, &c. At Himley, a yew, one foot from the ground, measures 20 feet 10 inches in circumference. Another is 80 feet high; at 2 feet from the ground it is 12 feet 6 inches in circumference; and, at 27 feet 6 inches, 11 feet. At Hanchurch, a spacious quadrangle, formed by many old yews, appears to have been the site of an ancient church. There is a remarkable avenue of yews near Cheadle, at Hales Hall.



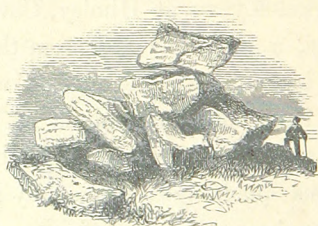
CLASS XXIII.—POLYGAMIA. STAMENS AND PISTILS SEPARATE OR UNITED, ON THE SAME OR ON DIFFERENT PLANTS, WITH TWO KINDS OF PERIANTH.

ORDER I.—MONECIA. FLOWERS DIFFERENT ON THE SAME PLANT.

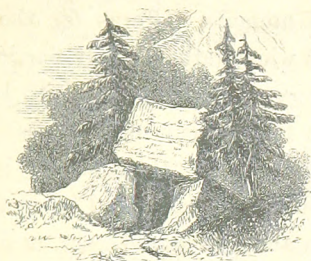
Atriplex patula. Spreading Halbert-leaved Orache. Common; particularly in saline places at Shirleywich, &c. In the latter case, however, the leaves are more entire, glaucous, and fleshy.

A. angustifolia. Spreading Narrow-leaved Orache. Common in waste ground.*

* We regret our not having seen Mr. Babington's Manual of British Botany till after the above list was compiled.



CROMLECH, NEAR FLASH.



THE GAWTON STONE.

CHAPTER X.

CRYPTOGAMIC BOTANY—FERNS, MOSSES, LIVERWORTS, LICHENS, FUNGI, &c.

“The bleakest rock upon the loneliest heath
 Feels, in its barrenness, some touch of spring ;
 And in the April dew, or beam of May,
 Its moss and lichen freshen and revive.”

THE plants forming this great division are sometimes called Acotyledonous, from their growing from *sporules* and not from true seeds. They are also called Cellular Plants, from their being generally, but certainly not in the case of Ferns, composed entirely of cellular tissue, without any trace of the curious spiral vessels of Flowering Plants.

ORDER I.—FILICES, OR FERNS.

These are generally large, handsome, leafy plants, springing from the earth curled up in a spiral manner. Their seeds, or sporules, are commonly produced in little cases called *thecæ*, seated on the back of the leaf. They are fond of shade and moisture ; some small ones, however, cling to the bare rock, or crumbling ruin. As to their properties, some, as the common male-fern and brake, are medicinal. When burnt they furnish great quantities of potash, which

is sometimes made into balls for sale. Other uses might be mentioned, as that of affording shelter to a multitude of large and small animals. Ferns for the *herbarium* dry beautifully; but when gathered they particularly require to be carried in very close boxes, and to be laid between the drying paper before their moisture can evaporate; for, if once allowed to droop, their beauty is gone for ever. Ferns may be pleasingly cultivated in a parlour—even in a smoky town—in air-tight glazed cases, or even in glass jars.

Grammitis Ceterach. Wetton, Glutton, Berresford, Beeston Tor, Dovedale. On limestone rocks.

Polypodium vulgare. Polypodies. Common. Frequently seen high up on trees.

P. Phegopteris. Abundant above Astbury limeworks. Ridge Hill and Madeley Manor; Mr. Pinder.

P. Dryopteris. Trentham, Basford, Quarnford, Oakamoor, Alton. Very beautiful.

P. calcareum. Buxton and Matlock, (Derb.) abundantly; Alton, Mr. Carter.

Aspidium lobatum. Shield Ferns. Common, with Var. *lonchitidoides*.

A. angulare. On the limestone.

A. Oreopteris. Froghall, Offley Hay. Not rare.

A. Thelypteris. Offley Hay, &c.

A. cristatum. Wybunbury Moss (Chesh.); Mr. Pinder, and Rev. J. W. Daltry.

A. spinulosum. Common. Var. α (*spinulosum*), Hook. In boggy thickets. Var. γ , a monstrosity of this. Both light green in colour. Var. β (*dilatatum*), light-coloured, drooping; pinnules convex; found on banks about the roots of trees. Var. strong, dark green; in woods.

A. Filix mas. Male Fern. Common.

Cistopteris dentata. Common on the limestone.

C. fragilis. About Buxton, Poole's Hole, (Derb.) Butterton Park walls; Mr. Pinder.

Asplenium viride. Spleenworts. Buxton, (Derb.) Dovedale; at the top of the ravine above Peveril Castle; Mr. Pinder.

A. Trichomanes. Heyley Castle, walls of Lichfield Cathedral, Dovedale, &c.

A. Ruta muraria. Frequent. Lichfield Cathedral, &c.

A. Adiantum nigrum. Frequent. Heyley Castle, &c.

A. Filix fœmina. Lady Fern. Common in damp thickets. Var. β common.

“Where the copse wood is the greenest,
Where the fountain glistens sheenest,
Where the morning dew lies longest,
There the Lady Fern grows strongest.”

Scolopendrium vulgare. Hart's-tongue. Common in damp places. Var. divided in its frond; Mr. Pinder.

Pteris aquilina. Brake. Common.

Blechnum boreale. Common on stony moors.

Osmunda regalis. Fern Royal. In boggy thickets. Willowbridge, Balterley, Chartley, Gravenhanger, Aquilate. Very handsome, and sometimes six feet high.

Botrychium Lunaria. Moon-wort. Axedge, Whiston, summit of Mow Cop, Alsager Heath (a low situation), Belmont, Cheadle; Maer, Mr. Pinder; the Mear, Mr. Blair.

Ophioglossum vulgatum. Adder's-tongue. Common in hilly pastures.

Adiantum Capillus Veneris. Dovedale; on the authority of Messrs. Butt and Foster, Corresp. of Sir. J. Smith: not there now.

Hymenophyllum Wilsoni. Clefts of the rocks at Gradbitch near Flash; Dr. Hewgill.

H. Tunbridgense. Bot. Guide, as found in a spot near the last locality.

Lycopodium clavatum. Club-mosses. Barr, Cheadle, Cannock Chase, Axedge, Mow Cop, Wetley, Whiston. This is sometimes seen in village fire-places, as an ornament during summer.

L. inundatum. Offley Hay. Dimsdale, near Cheadle; Mr. Carter.

L. Selago. Offley Hay, Axedge, and Maer Heath.

Pilularia globulifera. Hatherton, Offley Hay, &c.; Gravenhanger, Mr. Pinder.

Equisetum fluviatile — *arvense* — *limosum* — *palustre*. Horsetails. Common.

E. sylvaticum. Frequent on coal strata. Graceful in its figure.

E. hyemale. Lichfield, Prestwood; Shaw.

ORDER II.—MUSCI, OR MOSSES.

These miniature vegetables abound on every rock and bank, on the trunks of trees (particularly on the north side of them), on heaths, and in marshes. Few people would suppose that we have as many as three hundred species of mosses in Great Britain. They are most numerous and in the greatest perfection in winter, and in wet and damp situations.

They shrivel up and appear devoid of life in the dry air of summer, but quickly expand in the night dew, or during rain. This property of restoration they retain even when they have been gathered for years; and when their form is thus developed, few productions of nature shew equal beauty: small as they are, in nothing, perhaps, do we see more plainly the divine touch of Nature's Artificer. It was a little moss, common in North Staffordshire on every bank, whose exquisite beauty is mentioned by Mungo Park as rivetting his attention, when fainting under fatigue and dis-

appointment during his expedition in Africa. "Would the kind Being," he exclaimed, "who exercised such skill in the creation of that little vegetable inhabitant of the desert, forget one of his much more perfect beings in its necessity.*"

The mosses have leaves much like flowering plants; but instead of the flowers and seed-vessels of the latter, produce generally on a long stalk a sort of cup or *capsule*, containing little seeds or *sporules*, which if sown will produce young plants. This cup is furnished with a lid or *operculum*, which commonly falls off when the sporules are ripe; but before this occurs it is protected also with a veil or *calyptra*, which covers it as an extinguisher does the top of a candle. The mouth of the cup is likewise generally furnished with a circle of teeth or *peristome*, which in damp weather close up the cup, but in dry, they expand and frequently become everted in a beautiful star-like manner; allowing the loose sporules to escape from the cup, when they are dispersed by the wind.

Andræa rupestris. Mountainous rocks. In plenty on a few grit rocks on Axedge, overhanging the road from Leek to Buxton.

A. alpina. Near the preceding locality; Bot. Guide.

Phascum subulatum. Earth Moss. Sandy banks at Trentham.

P. crispum. Banks in Stoke Meadows.

Sphagnum palustre. Bog Moss. All the species or varieties are common, but rarer in fruit. No bad material to stuff birds with.

Gymnostomum pyriforme. Beardless Moss. About pools, frequent; Stoke.

G. truncatulum. Equally common.

Anictangium ciliatum. Rocks. Some specimens from Cloud.

* Travels.

Schistostega pennata. Sandstone cavern near Lightwood, grotto at Belmont, Abbey near Leek, hollow rocks at Frog-hall, gravel pits at Ashley. Brought to me from the last place by the Rev. F. F. Clark. A rare and beautiful moss. In obscure situations it reflects a golden green light, of the same tint as that of the glow-worm. The leaves, which always turn their upper surfaces to the light, reflect this colour, as well as the shoots. I find fructification most of the year. The conferva-like shoots are figured, Mag. Nat. Hist. iii. 463, with a different explanation of this light.

Splachnum sphericum. On dung upon the heath, on the summit of Axedge.

S. ampullaceum. This elegant plant I have found in the bog above Hednesford Pool, and on Alsager Heath.

Encalypta streptocarpa. Extinguisher Moss. Walls, Via Gellia, and Matlock; Mr. Valentine.

E. vulgaris. Thorpe Cloud, on the ground, with Mr. Quekett. Seldom found off limestone.

Weissia striata. Crevices of rocks, Roaches.

W. crispula. Rocks on Cloud.

W. cirrata and *controversa*. Common.

W. curvirostra. Bridge between Ashbourne and Thorpe; Mr. Valentine.

W. pusilla. Occasional on limestone rocks.

Grimmia apocarpa. Common on the limestone. The elongated variety on stones in the bed of the Manyfold.

G. pulvinata. Common.

Didymodon purpureus and *trifarius*. Common.

D. rigidulus. Rocks. Mow Cop. Matlock, (Derb.) Mr. Valentine.

Trichostomum lanuginosum. Fringe Moss. Dovedale, on limestone; Cloud and Mow Cop, on grit; Alton and Weston Park on sandstone.

T. canescens. Stony places. Dovedale, Cloud. Rarer than the last.

T. aciculare. Wet rocks. Mow Cop, Roaches.

T. fasciculare. Cromford; Mr. Valentine. Mow Cop, Roaches.

T. polyphyllum. Basaltic rocks at Rowley and Barrow Hill, Mow Cop, Dovedale.

Dicranum bryoides. Fork Moss. On every bank. The moss alluded to as noticed by Park on his journey.

D. taxifolium. Common on limestone.

D. adiantoides. On limestone rocks. Plentiful.

D. glaucum. This moss and sphagnum contribute to the formation of peat.

D. cerviculatum. Abundant in Whitmore Bog.

D. flexuosum. Wet places, Biddulph, Astbury, Mow Cop.

D. flavescens. Wet sandy places, Dovedale.

D. pellucidum. Burnt-wood, &c., Shaw.

D. scoparium—varium—heteromallum—and fulvellum. Common.

Tortula muralis—ruralis—fallax—and unguiculata. Screw Mosses. Common.

T. subulata. Maer, &c. Most common on the limestone.

T. tortuosa. Very common on limestone rocks.

T. laxipila. Trunks of trees near Thorpe. A distinct species; Mr. Valentine.

Cinclidotus fontinaloides. Lattice Moss. Common in the Hamps, Dove, Manyfold, Wye and Derwent.

Polytrichum undulatum—piliferum—juniperinum—commune—aloides—and nanum. Common.

P. urnigerum. In more hilly places, Biddulph, Mow Cop.

Funaria hygrometrica. Cord Moss. Very common; particularly where anything has been burnt.

F. Muhlenbergii. Pointed out to me by Mr. Valentine in Dovedale. Common in the limestone district. Distinct from the preceding in form and habit.

Orthotrichum cupulatum. Bristle Moss. Boothem, Trentham, Cheddleton, &c.

O. anomalum. Abundant on limestone, and only there.

O. crispum. On small oaks and hasels. Trentham, Dovedale, Wetton.

O. striatum. Between Ashbourne and Thorpe; Mr. Valentine.

O. affine. About Mayfield.

O. diaphanum. Banks, Stoke-upon-Trent. Common on limestone.

O. Lyellii. Thorpe; Mr. Valentine.

Bryum palustre. Thread Moss. Whitmore and other bogs.

B. carneum—argenteum—capillare—caspitium. Common.

B. pyriforme. Sandstone rocks at Alton, Whitmore.

B. turbinatum. On the rocks near Thor's cavern.

B. nutans. Heaths, Mow Cop, Cloud, Axedge, Whitmore, Trentham.

B. ventricosum. Wet rocks in the limestone district.

B. ligulatum. Woods at Trentham, Wetton, Cromford and Matlock, (Derb.) &c. This and the following are very handsome.

B. punctatum. Common. Trentham Woods.

B. rostratum. Rocks in Wetton Valley.

B. marginatum. In the same place.

B. hornum. Wet woods. Trentham, &c.

B. cuspidatum. Not rare. Belmont.

Bartramia pomiformis. Apple Moss. Heaths, common. Ashley.

B. fontana. Springy places. Caverswall, &c.

B. arcuata. Plentiful in Dovedale; Mr. Valentine. Handsome,

Neckera crispa. Common on rocks in Dovedale and Wetton Valley.

Anomodon curtispiculum. Rocks. Cloud, scarce there.

A. viticulosum. Common on rocks and trees at Heyley Castle, Trentham, Berresford, Wetton Valley, Dovedale, &c.

Daltonia heteromalla. Trunks of trees. Ashbourne; Mr. Valentine.

Fontinalis antipyretica. Water Moss. Trent, Dove, Manyfold, Hednesford Pool. Very large in small deep pools at Alsager. In fruit in Dovedale.

F. squarrosa. I find, what I suppose this species, plentiful, and in fruit in Dovedale. Some *Phryganea* or other similar insect, in the larva state, forms a tube of its leaves, which are very regularly disposed and agglutinated together for that purpose.

Hypnum trichomanoides. Old trees at Trentham.

H. complanatum. Trees. Rocks (not trees), Dovedale, &c.

H. undulatum. Heathy places. Frequent. Ripe capsules, August 14.

H. denticulatum. Frequent. Stoke-upon-Trent. Fruit plentiful in winter.

H. tenellum. Common in the limestone district.

H. sericeum. Roaches, Dovedale. Fruit in winter.

H. alopecurum. Woods, Trentham, &c. Fruit in spring and autumn. Handsome.

H. dendroides. Woods. Frequent. Handsome.

H. curvatum. Common on trees. Trentham.

H. myosuroides. Frequent on trees.

H. splendens. Heaths, &c. Dovedale, Cloud, &c.

H. proliferum. Woods. Common. Trentham.

- H. prælongum.* Woods. Wetton Valley.
H. rusCIFOLIUM. Common. Trentham rivulet, &c.
H. stellatum. Wet places, &c.; Dovedale.
H. loreum. Heathy places, Astbury, Dovedale.
H. triquetrum. Woods, Trentham, Wetton Valley, Dovedale.
H. squarrosUM. Woods and heaths, Trentham, &c.
H. filicinUM. Wet places. Blymhill; Mr. Shaw: Via Gellia (Derb.); Mr. Valentine.
H. fluitans. Pools. Stoke-upon-Trent.
H. rugulosUM. Dovedale. Plentiful. In fruit in December. Messrs. Valentine and Quekett.
H. commutatUM. Wet places in Astbury woods.
H. crista-castrensis. Rare. Blymhill; Mr. Dickenson. "In small patches on the turf near Restlars Pits, in a marley soil."
H. molluscUM. Very common on limestone rocks. Dovedale, &c.

H. aduncum.

cordifolium.

cupressiforme.

cuspidatum.

lutescens.

medium.

murale.

palustre.

plumosum.

H. populeum.

purum.

riparium.

rutabulum.

Schreberi.

scorpioides.

striatum.

serpens.

velutinum.

ORDER III.—HEPATICÆ, OR LIVERWORTS.

These curious and beautiful little plants grow in plenty on rocks, banks, trunks of trees, &c., in damp situations. They occasionally have leaves appearing much like mosses; at other times they consist of a fleshy *thallus*, or membra-

nous expansion, creeping on the earth and throwing out roots from its lower surface. They are green, brown, white, or purple. When dry and shrivelled they revive like mosses on the application of moisture. In the common *Marchantia*, or liverwort, of our damp walls, we see that the cells, which compose the plant, are furnished with pores.

The fructification of these plants is very various. In the *Jungermannia epiphylla*, growing in profusion in moist places—around wells, for instance—the globular capsule is seen, borne on a long crystalline stalk: the capsule splits into four segments when ripe, and discloses the seeds or sporules mixed with remarkable spiral filaments, which are seen adhering in little feathery tufts to the top of the stalk.

When pressed and dried they are not so pretty as mosses, as they shrink more. The properties, neither of *Hepaticæ* nor of mosses, are medicinal or poisonous; which indeed, with the exception of *Fungi*, may be said of cryptogamic plants in general. *Marchantia* is, however, frequently used for its real or supposed virtues by old people. Both mosses and liverworts furnish food and shelter to innumerable insects, &c.; and protect tender vegetation from cold, heat, and drought.

Riccia crystallina. On banks; Stoke-upon-Trent. Pelucid in appearance; the capsules round, immersed in the plant.

Anthoceros punctatus. Ditch-sides; Little Fenton. Capsule of a lengthened form.

Marchantia polymorpha. Rocks at Trentham, Stoke Bridge, &c.

M. conica. Rarer. Moist, shady banks; Trentham.

M. hemispherica. Frequent on limestone, and only there. In fructification in May, on the Wever Hills.

Jungermannia asplenoides. Abundant. Trentham woods. Handsome.

J. Sphagni. Common at Whitmore, &c.

J. affinis. In the limestone district.

J. excisa. In the same district.

J. ventricosa. Shady places; Trentham, &c.

J. nemorosa. Rocks; Cloud.

J. undulata. Covering the stones with a bright green clothing in the Dove, near its source.

J. albicans. Stoke-upon-Trent; Mow Cop.

J. complanata. Trees; Trentham and Hanchurch.

J. Trichomanis. Cloud, Mow Cop, Stoke-upon-Trent.

J. barbata. Covering the ground on Mow Cop, &c. β . Common.

J. dilatata. Trees; Trentham, &c.

J. Mackaii. Wetton Valley.

J. Tamarisci. Most common on the limestone. Dove-dale, Swinnerton Park.

J. multifida. Abundant. Astbury and Swinnerton Woods.

J. epiphylla. On most moist clayey banks.

J. furcata. Frequent on trunks of trees. Trentham, Throwley, &c.

J. pubescens. Abundant on rocks about Thor's Cavern.

ORDER IV.—LICHENES—LICHENS.

These plants are composed of a *crust, thallus, or frond*, spreading upon, or attached by means of fibres, to the ground, to stones, or rocks, or to the bark of trees. They derive their nourishment principally from the air; and expand in all their beauty in moist weather, and amidst the mist of the hills, or the moist shade of woods. They are increased by means of seeds or sporules, collected or

not into distinct masses; and, in the higher genera, into what are called *apothecia*, which are of various forms, *shields*, *knobs*, *spangles*, *pustules*, &c. In the plates of the *apothecia* the sporules are imbedded inclosed in little tubes.

Most lichens may be readily dried; and in the *hortus siccus* show their characters well, if not too much pressed. *Collema*, however, and some others, shrivel up very much. Many of them are merely stains upon the rocks, &c., and must be studied as they grow, or collected by breaking off the pieces of rock to which they are attached.

The uses and properties of lichens are probably imperfectly known. *Lecanora Parella*, a not uncommon species, produces a beautiful dye; as does also *L. tartarea* (Cudbear), which is found on our moors. Orchill is produced by a species of *Roccella*. *Parmelia saxatilis* is sometimes used by mountaineers to dye yarn; and *Squamaria candelaria*, according to Linnæus, is used in Sweden to stain candles employed in religious ceremonies. *Variolaria faginea*, common on our old beeches, is intensely bitter, and contains a great proportion of oxalic acid. *Cetraria Islandica* is the valuable Iceland moss; and the little plant *Cladonia rangiferina*, common on all our heaths, is of the greatest value to the Laplanders, though known to few but botanists in England. The virtues attributed to *Peltidea*, as a remedy in the thrush and in hydrophobia, are probably imaginary. A few other species, however, appear to have medicinal power.

Lichens are more numerous even than mosses. A notice, therefore, of a tithe of them only, such as are rather rare or interesting, and which we have distinguished ourselves, can be given here. Some of the lower lichens, as *Bæomyces*, of which one species (*rufus*) is common on the top of grit stones, are rather like some of the *Fungi* in appear-

ance; their round apothecia being borne on stems like minute mushrooms. *Calicium*, of which one species (*fulfuraceum*) forms a sulphur-coloured powdery appearance on banks, roots, and sandstone rocks, has the same thin crust, but the apothecia goblet-shaped.

C. hyperellum has a similar appearance, and is found in the fissures of oak bark, at Trentham.

In *Opegrapha* the apothecia are fixed closely on the crust, and are of a lengthened figure; and, from their dark bent form, often present, as in *O. scripta*, the appearance of Oriental characters. Several are common on the bark of trees.

In *Verrucaria*, *Pertusaria*, and *Thelotrema*, the thallus is still not leafy, but an uniform crust adhering to rocks, &c., with the apothecia like warts or tubercles. *Ver. rupestris* and *nigrescens* are common, as is *Pert. communis*.

Endocarpon, however, commonly arranged with them, has frequently a leafy shield-like thallus attached by the centre. Such is *E. minutum*, a remarkable grey round lichen, adhering in plenty to limestone rocks, at Wetton Mill, Dovedale, and Ilam, with a scorched-like appearance underneath; and *E. Hedwigii*, found upon mosses in Dove-dale, (Bohler.)

The genera *Lepraria*, *Variolaria*, and *Spiloma* differ from the latter, principally in the form of the apothecia. *Lep. viridis* produces the green coating seen on trees around towns: we may add, *Var. discoidea* and *faginea*.

In *Urceolaria*, *Lecidea*, and *Lecanora* the apothecia are spangles (*patellulæ*) seated on the crust, and with a distinct border. The following occur in the county:—

U. scruposa.

Lecid. petræa, geographica, incana, viridescens, aurantiaca.

Lecan. ventosa, Parella, vitellina, chlorolenca.

In the three following genera the crust is more or less leafy. Apothecia similar to the last.

Psora cærulea-nigricans. Not rare on limestone.

Squamaria crassa. Common on the rocks; limestone district.

S. hypnorum. With the preceding, on mosses.

S. saxicola. Not rare.

S. candelaria. Frequent.

S. murorum. On limestone rocks.

Placodium canescens. Frequent on trees, walls, &c.

In the following genus the thallus is much more leafy, and only attached by fibres growing from most of the surface below.

Parmelia saxatilis. Grit rocks on Mow Cop. Grey, dotted; rather crimson occasionally.

P. omphalodes. With the above. Purplish brown; shining.

P. olivacea. Common on trees; Trentham.

P. stellaris, pulverulenta, parietina, and *physodes*, may be added. The latter is very common on new red sandstone.

In *Collema* the thallus is gelatinous when moist. Several of the species abound on our limestone rocks, as *C. multipartitum, cristatum,* and *nigrum*, the latter forming a black stain on them; but some of them are very difficultly distinguished. Indeed it is easy to confound *Collema* with the curious Nostocs belonging to the tribe of *Algæ*. The microscope, however, distinguishes them directly, showing the extraordinary beaded filaments which are seen in the tissue of the Nostocs. They frequently grow in similar situations among mosses, and on limestone rocks.

Solorina saccata. Very common on the limestone, Wetton Valley. Handsome.

APOTHECIA IN DEEP PITS ON THE LEAFY THALLUS.

The following four species are the large lichens seen growing horizontally on the ground. Rocks or banks in mossy places.

APOTHECIA LIKE THE HUMAN NAIL.

Peltidea horizontalis—*canina*—*rufescens*—*spuria*.

The following genus is attached by the centre only. Alpine.

Gyrophora polyphylla. On rocks upon Axedge.

G. proboscidea. Rocks with the preceding.

G. erosa. On rocks.

G. pellita. On one rock in the plantation on Cloud.

The following differ from the preceding families in having generally the thallus of the same colour and appearance above and below. They are frequently lobed, leafy, or branched.

Cetraria glauca. Plentiful on rocks and trees, above Astbury lime-works.

Borreria ciliaris—*flavicans*.

Evernia prunastri. Common on trees. This has been used in calico-printing instead of gum.

Ramalina fraxinea—*fastigiata*—*farinacea*. These are all common on trees, branched, branches flat, hoary. In the following the branches of the thallus are cylindrical or thready.

Usnea plicata. Common on trees.

U. florida. Rarer. Bishop's and Burnt woods; Shaw. But we have not found this beautiful lichen.

Alectoria jubata. On the rocks at Cloud.

Cornicularia tristis. Species dark coloured. Axedge, Cloud, Mow Cop; also on limestone.

C. aculeata. In the same places.

C. lanata (?). With the above.

Isidium corallinum. Frequent on the Staffordshire rocks.

Sphærophoron coralloides. Frequent on rocks, &c. Vars.

Stereocaulon paschale. Rocks, limestone district. Common.

Cladonia uncialis. Common on moors.

C. rangiferina. Heaths and bogs; common. Swinerton, Whitmore, &c. This is the Reindeer Moss.

C. furcata. Common on heaths.

C. pungens (?). Common on high grounds.

The following genus bears cups, whence its name Cup-Moss. Many of the species have bright scarlet apothecia.

Scyphophorus pyxidatus—*fimbriatus*—*cornutus*—*digitatus*—*cocciferus*—*deformis*: *alcicornis*, once.

ORDER V.—CHARACEÆ.

The proper place of the *Characeæ* in the vegetable system is rather doubtful. Their reproductive organs are extremely curious, and though minute, are frequently found in a fossil state (Gyrogonites). They are aquatic plants; and some species are encrusted with calcareous matter, which appears to be formed by the plant itself, and not a deposit from the water (Brewster). Some of them give out an unpleasant odour. The stem is formed of a single-jointed tube, or of one large one surrounded by several small ones, with branches given off at the joints all around. The vegetable circulation may be easily seen in the *Characeæ*. The best plan is to grow a young plant in a phial of thin glass, and of course the transparent species are best. It may be submitted to the microscope (single lens), through the glass. The nucules or seeds if put in a phial of water in Autumn, will produce young plants the following Spring. *Chara vulgaris* is sometimes so highly incrustated, that it may be dug in large masses; such a state has occurred to Prof.

Henslow; and I have lumps from Morredge, &c. When so incrustated the plant does not seem to be killed.

Chara translucens. Deep boggy pools at Hatherton and Alsager, (Chesh.) Rare. The finest species: stem of only one clear tube, soon losing its contained fluid when taken from the water.

C. flexilis. Common in ditches about Stoke-upon-Trent.

C. vulgaris. Equally common, incrustated, or not.

C. hispida. Boggy ditches. Betley and Aqualate. Plentiful.

ORDER VI.—ALGÆ.

Of the *Algæ* many are found in salt water, others in fresh, and a few on the ground, &c. Of course the two latter divisions only, from our inland situation, will have a place here. The forms of *Algæ* are very diversified; many of them, *Tetraspora*, *Conferva*, *Oscillatoria*, *Batrachospermum*, *Nostoc*, and *Diatoma*, form extremely beautiful objects under the microscope. Some of them are also very pretty when dried in the *herbarium*; for this purpose they should be placed in a dish of water; after well washing, a piece of paper should be introduced under them, and they must be carefully raised out of the water upon the paper, to which many of them will be found to adhere when dry.

Many of these lower plants are with difficulty distinguished from objects belonging to the animal kingdom of the lowest organization; and there is doubt as to the proper classification of some, whether they should be placed amongst plants or animals. Some of the lowest *Algæ* as the *Oscillatories*, have a very evident movement, but it does not appear like the locomotion of animalcules. Other *Algæ* have been supposed to become animalcules when disjointed, being thus, at one period, fixed plants, at another moving animalcules.

It is the marine Algæ which are principally of use to mankind. The Carrageen, or Irish Moss, is the *Chondrus crispus*. Many others are also used as food, &c. Algæ are greedily eaten by cattle on the coasts, and are likewise used as manure. Iodine and soda are obtained from seaweed. No important use is attributable to the Algæ of fresh water—to animalcules however they afford food and shelter, and so perform a part in the economy of nature. No plants can form a more delightful study to the botanist; they exercise his mind in the observation and classification of them, and lead him to the contemplation of the skill of the Maker—equally exquisite in the formation of these frequently microscopic beings, as in the creation of the giant of the forest, or of the lord of Creation himself. In number of species the Algæ perhaps equal or exceed the mosses or lichens.

UNJOINTED OR UNARTICULATED ALGÆ.



Ulva bullosa. In a well, Stoke-upon-Trent.

U. crispa. Very common on sandstone walls.

Enteromorpha intestinalis. Stream at Uttoxeter, salt brook at Shirleywich, Dove at Burton, &c. In the form of long green floating tubes, attached below.

Vaucheria Dillwynii. Common on the damp ground, as a green stratum.

Lemania fluviatilis. Abundant in the Dove, Manyfold, and Trent at Burton. Large, dark-coloured, with a peculiar unpleasant taste and smell.

CONFEROID, JOINTED ALGÆ.

Conferva purpurascens. Whitmore and Congleton bogs, in water.

C. bombycina. Stagnant water; also on the face of a trickling rock in Dovedale.

C. zonata. Frequent. Beautifully green and silky on paper.

C. rivularis. Common.

C. flavescens. Fenton Pool, rivulet at Trentham, &c.

C. glomerata. Trent at Handford Mill, &c.

C. agagropila. Rare. Said to exist in Whitesitch Pool; With.

Zygnema quininum. Common.

Lyngbya ———. Common on sandstone walls, with *Ulva crispa*.

Oscillatoria ———. Stratum dark brown; slightly slimy; filaments very fine, interwoven, long, tortuous. Common on the oozing surface of calcareous rocks in Dovedale.

O. ———. A species occasionally covering, in summer, the surface of canals with a scum to a considerable extent. The oscillation of the filaments distinct.

Mycinema ———. Alga arising from a fibrous stratum formed by the growth of the plant. Branches about $1\frac{1}{2}$ inch long, and a line wide, orange, compressed, not much divided above, but becoming, below or at the root, fibrous and branched: these fibres are whiter and apparently jointed. Depending from dark wood-work above water, and in damp vaults.

Chroolepus aureus. Common on rocks in many places.

Trentepohlia ilicicola. On holly-bark, Trentham. Distinct from the preceding (?).

Protonema Orthotrichi. Common on mosses. A species on *Bryum palustre*.

Hygrocrocis ———. Filaments branched, brown, forming, amidst a cloudy pellicle, blackish spots. In a phial containing solution of nitre.

Leptomitus lacteus. Rivulets, Trentham.

L. clavatus. Sprouting from the head of the stickleback.

ALGÆ FORMED OF GLOBULES OR FILAMENTS, enveloped in a jelly.

Batrachospermum moniliforme. I have observed at least three varieties of this very beautiful plant. Var. pale brown, becoming purple when dried, found in very pure wells. Var. larger, dark olive; found in the Dove and other rapid streams, growing to the length of a foot or more. Var. black, much stronger, whorls more distant; in brooks.

Chatophora endiviaefolia. Abundant in the pools near Stoke-upon-Trent, on stones, sticks, &c.

C. tuberculosa. Common.

C. elegans. Pool near Stoke-upon-Trent.

Rivularia angulosa. Common.

Palmella protuberans. Is not this a *Nostoc* in an advanced state? Irregular in form, gelatinous, pale green, globules oval. On mosses and *jungermannia*; Dovedale, &c.

P. botryoides. Common.

P. cruenta. On walls at Stoke-upon-Trent. Purple.

P.———. Frond gelatinous, wrinkled, pale green; granules globular. On a wet grit rock in a wood.

P. picea (nobis). Frond or crust amorphous, dark olive or black, viscid, globules round. Adhering to the walls, tombs, and effigies of a very ancient cemetery.

Nostoc commune. Calcareous rocks at Wetton Mill.

N. muscorum. Aggregated, approaching to globular, smaller grains flattened or plano-convex, pale green, filaments finer than in the preceding. Upon mosses.

N. pruniforme. In the Dove on stones, in May. Filaments very crowded.

N. foliaceum (?). Dull amber-coloured, one inch and a half broad, flattened, plicate, not hollow. On a calcareous dripping rock, Dovedale.

DIATOMACEÆ.

Diatoma truncata, &c. In canals at Stoke-upon-Trent.

ORDER VII.—FUNGI, OR THE MUSHROOM TRIBE.

Fungi differ remarkably from the rest of plants. They are never green, and have a very rapid growth; they frequently attain a large size in a few hours; appearing particularly where organic matter is undergoing decomposition, after storms, and in hot and moist states of the atmosphere, especially in autumn. Their chemical composition and the gaseous elements which they exhale, are also different from those of plants, and peculiar to themselves.

There are probably, in Great Britain, more than two thousand species of these plants. Nothing can exceed the beauty of many of them, diversified and frequently graceful in form, and of vivid colours. They never grow in water. A botanist writes, "Their sporules are so infinite (in a single individual I have counted above 10,000,000), so subtle (they are scarcely visible to the naked eye, and resemble thin smoke), so light (raised perhaps by evaporation into the atmosphere), and are dispersed in so many ways (by the attraction of the sun, by insects, wind, elasticity, adhesion, &c.), that it is difficult to conceive a place from which they can be excluded." We can hence readily believe that these sporules or seeds are floating every where, and have no necessity to suppose that the fungi arise by equivocal generation, or from mere organic matter in a state of decomposition. In fact wherever there is a suitable *matrix*, the sporules germinate, and often surprise us much by their appearance.

More fungi than we eat in England are really edible, as is well known on the continent. Even the poisonous and acrid properties, which fungi, frequently in a remarkable degree, possess, may in many cases be destroyed by particular modes of cookery.

In England, we eat principally, mushrooms, morells, truffles, and more rarely *Agaricus Georgii*, and one or two others. But many besides these, some *Boleti*, for instance, are edible; whilst a great many, as the common Fly-agaric, are really dangerous.

But one of the most curious and useful fungi, as an article of food, is one found in Van Diemen's Land, the *Mytilita Australis* or Native Bread, of which a specimen is at present before me. It is a large species, the size of a child's head, found a little under the surface of the ground, on dry sandy hills, in early summer. Its taste resembles boiled rice; and it is pleasant in flavour when dried, and apparently wholesome.

A few years since one of the most remarkable medicinal properties known to exist in any substance, was discovered in a fungus not rare in England, the Ergot of rye. How useful would be an extended series of experiments upon the virtues and properties of native plants, fungi amongst the rest!

Some fungi are extremely hurtful to man on other accounts than by reason of their poisonous properties. The dry-rot is a fungus affecting timber and ruining it. A few years back a new church in this neighbourhood had to be re-timbered on account of its ravages. Ventilation prevents its invasion, as does the steeping of the wood in a solution of corrosive sublimate, or Kyanizing. Wood cut at improper seasons is most liable to it.

Those diseases of wheat, oats, and rye, called *blight*, *smut*, *rust*, *brand*, *red gum*, and *mildew*, are likewise produced by minute fungi. The germs of these diseases probably float in the air, and exist also in the soil, whence they are taken into the vessels and cells of the plants. They sometimes exist in the seed. They are prevented by

steeping the grain sown, in some saline fluid, by a careful choice of it, and by proper change of crop. They are most common in wet seasons, in low situations, and in forced ground.

Fungi are preserved for the botanist with more difficulty than other plants. Many may be hung up in a warm, airy room, and dried, and afterwards kept in a box in a dry situation. Others may be sliced and pressed, keeping enough of the cap, gills, and stem to give an idea of the plant in its texture and outline. Those should only be preserved which are not old or worm-eaten; and Hooker recommends them to be brushed over with oil of turpentine to which a little powdered sublimate has been added.

PILEATE OR MUSHROOM-SHAPED AGARICUS—with gills below the Pileus or cap.

A. campestris. Common Mushroom.

A. deliciosus. Barr, Blymhill; Rev. S. Dickenson. Gills flame-coloured, edible.

A. oreades. Fairy-ring Agaric. This, and other species, form fairy-rings on hill sides.

A. giganteus. Blymhill; Rev. S. D. Rare.

A. emeticus. Crimson, pink, lemon, white, and olive green. Common.

A. nebularis. Little Wyrley; Rev. S. D.

A. rutilans. Fir plantations. Tettenhall; With.

A. muscarius. Varying in colour; common. Maer. Beautiful.

A. torminosus; *Necator*; Bull. Blymhill; Rev. S. D. Acrid.

A. piperatus. Not rare.

A. latus. Bolt. Blymhill.

A. squarrosus. Bishop's Woods, and Burnt Woods, &c.

A. anomalus; *araneosus*; Bull. 431. Weston-under-Lizard; Rev. S. D.

A. gentilis. Weston Park ; Rev. S. D.

A. fusco-flavus. With. Weston Park ; Rev. S. D.

A. subcæruleus. With. Blymhill ; Rev. S. D.

A. violaceus. Wyrley Hall ; Shaw.

A. androsaceus. Weston-under-Lizard ; Rev. S. D. On leaves.

A. ærginosus.

fascicularis.

pratensis.

virginus.

alutaceus.

castaneus.

laccatus.

ovatus.

procerus.

vellereus.

cinereus.

A. clypeolarius.

galericulatus.

personatus.

semiovatus.

semiglobatus.

conicus.

comatus.

multiformis.

plicatilis.

velutipes.

R. G.

CANTHARELLUS.—Gills divided, radiating.

C. aurantiacus. Swinnerton Woods ; abundant.

C. cibarius. Trentham Woods. Smell pleasant.

C. lobatus. Boggy places at Betley.

MERULIUS. With veins instead of gills. The pileate form here, and in other cases, less apparent.

M. corium. Timber ; common.

M. lachrymans. Dry-rot. Common ; on timber in coal mines, &c.

DÆDALEA.—Elongated pores under the pileus instead of gills.

D. quercina. Frequent. Froghall.

POLYPORUS.—With numerous round pores.

P. squamosus. Very large. On the sycamore ; Stoke Rectory, Lawton.

P. varius. In Wetton Valley.

P. frondosus. At the foot of an oak ; Trentham.

P. sulphureus (?). Rectory, Stoke. Covered with the crystals of binoxalate of potass, so that the colour of black cloth, &c., with which it comes into contact, is reddened.

P. hispidus. On the ash ; Trentham Park.

P. betulinus. Stoke-upon-Trent.

P. abietinus. On timber ; Swinnerton Woods.

P. Scoticus. On the roots of birch ; Swinnerton Woods, Ramsdell. Large.

P. ———. White ; tabular, round, with the pores and tubes superior, centrally pedicellate. On timber in coal mines.

P. igniarius. Hard Amadou Polyporus. Common on the *Salix Russelliana*, along the Trent ; Uttoxeter.

P. dryadeus. *Himley Park ; Purton.*

BOLETUS.—With tubes.

B. luteus.

B. bovinus. Maer Woods.

B. Grevillei.

B. edulis. Trentham Woods.

B. scaber. Woods near Wetley Moor.

FISTULINA.—Tubes, at first wart-like.

F. hepatica. On the Beggar's Oak, 1839. Trentham Park. Large ; with red juice, and tinged with vermillion.

HYDNUM.—With spines.

H. membranaceum. Under-sides of dead sticks ; Trentham.

Phlebia mesenterica. On timber.

Thelephora rubiginosa, purpurea, &c.

T. cinerea. In the hollow of an old ash ; Wetton Valley.

CLAVATI.—More or less club-shaped.

Clavaria inæqualis. Hills; Wetton.

C. helvola. Common. Maer and Trentham.

C. pistillaris.

C. rugosa.

Calocera cornea. Timber; Whitmore.

Geoglossum hirsutum. Lanes near Stoke.

Spathularia flavida. In a ditch amongst leaves at Gra-
venhanger. Pretty.

MITRATI.

Frequently more or less pileate or mushroom-shaped, but the seeds or sporules are produced on the upper surface; whilst in the pileati they are produced below, as on the gills in the agarics.

Morchella esculenta. Morell. Not rare on the lime-
stone.

Helvella crispa.

Leotia lubrica. Plentiful in Swinnerton Woods.

CUPULATI.—Cup-shaped.

Peziza aurantia. Banks, and on tree stumps; Wom-
bourne, &c. Six inches across on moist sandstone rocks.
Beautiful and wax-like; orange.

P. rutilans—*humosa* (gravel pit, Trentham Park)—*coch-
leata*—*granulata*—*coccinea*—*stercorea*. A pretty tribe.

Bulgaria inquinans. Felled trees; Trentham Park.
Dark-coloured; top-shaped.

TREMELLINI.—Gelatinous.

Tremella albidia. Palings at Stoke-upon-Trent.

T. cerebrina.

Egidia glandulosa. Witches'-butter. On trees.

Sclerotium Pustula (?). On the under surface of oak
leaves. Round; depressed, with a pit in the centre. Ex-
ternally brown, fibrous; internally white, horny: a line or
two across. A somewhat similar little body also occurs

on the under surface of oak leaves, which contains a maggot; these are flatter, with minute tufts. Both are loosely attached to the leaf.

GASTEROMYCETES.

Sporules enclosed within the fungus, on a proper receptacle or not, and being emitted from it in various ways.

Phallus impudicus. Stinkhorn. Common.

P. caninus. Rarer. Swinnerton Woods, 1843. This has no unpleasant smell, or little.

Rhytisma — (?). Forming black blotches, surrounded by a light margin, on every sycamore leaf.

Geaster limbatus. Starry Puff-ball. Heaths.

Bovista nigrescens. Common on heaths and banks.

B. plumbea. On heaths and in meadows; Stoke-upon-Trent.

Lycoperdon giganteum. Occasional.

L. pusillum—*gemmatum*. Common.

Scleroderma vulgare—*verrucosum*—*cepa*.

Onygena equina. Found on the hoofs of horses and other animal substances; Shaw.

HYPHOMYCETES.

Sporules attached to fine filaments or *flocci*, which are separate or woven into other forms. Moulds, &c.

Racodium cellare. Covering all the barrels in a wine cellar, Stoke-upon-Trent.

Ascophora Mucedo. On bread.

Mucor Mucedo. Common Mould. Fruit, paste, &c.

Eurotium herbariorum. In herbaria; on plants.

Botrytis — (?). Covering with a white down branches of the sloe.

Cladosporium herbarum. On decaying substances.

Erineum — (?). Tufts on the under-side of the leaves of the lime—perhaps a morbid growth of the natural hairs.

CONIOMYCETES.

Generally developed under the cuticle of plants. Frequently appearing as mere discolorations.

Tubercularia vulgaris. Common on sticks. Vermilion-coloured; pretty.

Puccinia Graminis. Mildew. Injurious to leaves and the stems of corn and grasses.

Æcidium Grossularia. Common on the leaves and fruit of the gooseberry.

Uredo segetum. Smut. Injurious to wheat, oats, barley, &c. Common.

U. caries. Bunt. Common and injurious to wheat.

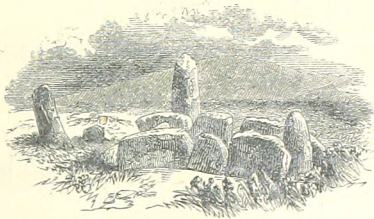
U. longissima. Common on *Poa aquatica*.

U. linearis. On the leaves and sheaths of corn and grasses.

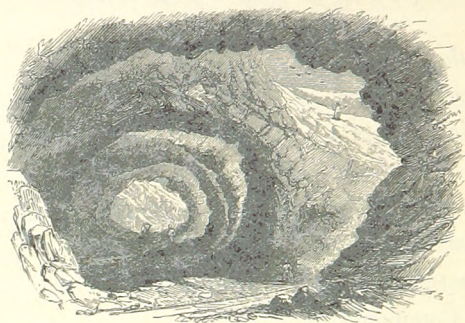
U. Rubigo. Rust. Grasses and corn.

U. — (?). Filling the involucrem of the common *Tragopogon* with a sooty matter.

“What, though I trace each herb and flower,
That drinks the morning dew,
Did I not own Jehovah’s power,
How vain were all I knew!”



BRIDESTONES.



CAVERN AT WREN'S NEST.

CHAPTER XI.

FOSSILS—CALENDAR OF NATURAL PHENOMENA.

FOSSILS.

FISHES OF THE COAL STRATA.

Megalichthys Hibberti. The teeth are not rare in the coal strata of both North and South Staffordshire; and there is a specimen of the fish, nearly entire, in the Dudley Museum, with some other unnamed species, from Mr. Blackwell.—See Lithograph E, 10.

M. Sauroides. North and South Staffordshire.

Diplodus gibbus. The curious double teeth are common in North Staffordshire.—E, 11.

Holoptychus ——. A new species, found by the author.—See the Silurian System, vol. i. 474.

Scales of *Holoptychus*, &c.—E, 14, 15, 16.

Gyracanthus formosus. Bilston, Dudley Museum.

Ctenoptychius apicalis. A tooth found by the author in ironstone, at Shelton.—E, 12.

Helodus simplex.

Palæoniscus Egertoni.

Teeth, &c., from Shelton.—E, 13, 17. Vertebrae, Dudley Museum.

SHELLS.

Cephalopoda. Marine shells, which, in former states of the ocean, were very abundant, and diversified in form; but now less so. Many of them, as *Nautilus*, *Goniatites*, and *Ammonites*, are of a *spiral* form; *Phragmoceras* and *Cyrtoceras* are only *curved*: in the latter the aperture being round, in the former contracted, and produced towards the convex side into a subcylindrical beak, through which, probably, was protruded the funnel of the animal. *Orthoceras* and *Conularia* are *straight*; and the latter appears to want the perforation or *siphonic* opening, which is seen in the *septa*, which divide the interior of almost all these shells into separate chambers. The following species are, in the case of the fossils of South Staffordshire, given partly on the authority of Mr. Murchison, or from specimens in the Birmingham and Dudley Museums; and in a few cases in private collections: in the case of the fossils from North Staffordshire, from specimens in the author's collection.

UPPER LUDLOW ROCK.

Cyrtoceras læve. Birm. Museum.

LOWER LUDLOW ROCK.

Orthoceras distans. Hay Head.

O. pyriforme. Dudley.

Phragmoceras ventricosum.

WENLOCK LIMESTONE.

Orthoceras annulatum. Hay Head.

Conularia quadrisulcata. Dudley.

WENLOCK SHALE.

Orthoceras canaliculicatum.

O. attenuatum.

MOUNTAIN LIMESTONE.

Orthoceras laterale. Near Glutton.—B, 1.

Goniatites sphericus. Caldou Low.—B, 2.

Nautilus pentagonus. In chert. Bakewell.

Gasteropoda. Probably all the species of the Silurian and mountain limestone rocks were marine. The nature of the *Microconchus carbonarius* might have been similar to that of the common *Planorbis*, the little flat spiral shells seen in fresh water, and which we think can breathe both air and water.

UPPER LUDLOW ROCK.

Natica parva. Dudley.

Turritella conica. Sedgley. Birm. and Dudley Museums.

Bellerophon expansus. Sedgley limeworks, abundant.
R. G.

Bellerophon — (?). Dudley.—B, 17.

AYMESTRY LIMESTONE.

Pleurotoma corallii. Birm. Museum.

Turbo corallii. Id. loc.

Euomphalus carinatus. A fine shell.

LOWER LUDLOW ROCK.

Pleurotomaria Lloydii. Birm. Museum.

Turbo cirrhosus. Dudley and Birm. Museums.

T. carinatus. Dudley.

WENLOCK LIMESTONE.

Nerita Haliotis. Wren's Nest. Variable.

Euomphalus discors. Dudley and Walsall. Pretty.

E. rugosus. Dudley.

E. funatus. Dudley.

WENLOCK SHALE.

Euomphalus alatus. Delves Green, &c.

E. tenuistriatus. Dudley.

MOUNTAIN LIMESTONE.

Bellerophon apertus. Plentiful at Caldon Low.

Euomphalus Skenea. Caldon Low.

E. pentangulatus. Dovedale.

E. catillus. Dovedale.

E. (Cirus) acutus. From a stone fence at Pilsbury.
—B, 3.

E. (Trochus).—B, 5.

Natica plicistria. Common. Caldon Low.

N. lirata. Near Glutton.—B, 6.

Pleurotomaria flammigera (?). Id. loc.—B, 4.

P. conica. Id. loc.

Turritella taniata (?). Caldon Low.—F, 7.

COAL MEASURES.

Microconchus carbonarius. Almost microscopic. In bass; also attached to bivalve shells in the coal measures at Shelton, &c.—E, 19.

Conchifera. These are divided into ordinary bivalves, such as the oyster, cockle, or mussel, and a peculiar family *Brachiopoda*, formerly very numerous in the ancient seas. Many of the latter were attached by pedicles to rocks, &c.; and they had frequently spiral arms, which they could protrude a considerable distance from the shells, and which served for respiration, and to collect their food. We sometimes see these arms fossilized in *Spirifers*, particularly when occurring in chert; and perhaps the fossils called *Tentaculites* and *Cornulites* have this origin. The hole seen at the beak of many of the shells is for the passage of the pedicle. In *Lingula*, the pedicle was long; in *Terebratula*, smaller and shorter, entering the shell by the minute aperture at the beak. *Spirifer* has a notch for its passage, situated in a long flattened space at the beak, and

spiral bodies within. *Atrypa* differs from the last, in having no flattened space, and not always a notch or foramen; the shell is also generally rounded, and wants the furrows of *Spirifer*. *Orthis* has a long straight hinge; the shell circular, flat, and striated. In *Leptaena* there are no spiral bodies, no perforations; one valve being convex, the other flat or concave. In *Pentamerus*, the beaks are imperforate and incurved, both valves convex, and internally divided by partitions or septa.

UPPER LUDLOW ROCK.

Orbicula rugata. Dudley Museum: a fine specimen.

Orthis lunata.

O. orbicularis.

Terebratula Nucula.

Avicula retroflexa. Birm. Museum.

Cypricardia impressa. Dudley.

AYMESTRY LIMESTONE.

Atrypa affinis.

A. —. B, 16. This specimen presents the appearance of *strice*, produced without the shell on the mud or body on which it lay, probably by the protrusion of the tentacles of the animal.

Pentamerus Knightii. Sedgley. A fine shell.

Terebratula Wilsoni. Sedgley limeworks.—R. G.

Lingula Lewisii.

Avicula reticulata. Birm. and Dudley Museums.

Cucullæa quadrisulcata.

LOWER LUDLOW ROCK.

Leptaena depressa. Dudley.

Atrypa affinis. Turner's Hill.

Terebratula Wilsoni. Turner's Hill.

Lingula lata. Birm. and Dudley Museums.

Orthis hybrida.

Cardium striatum.

WENLOCK LIMESTONE.

Leptaena euglypha and *depressa*. Dudley.

Spirifer radiatus, *interlineatus*, *trapezoidalis*, *octoplicatus*,
and *crispus*. Dudley.

Terebratula lacunosa. Walsall.

T. crispata and *deflexa*. Birm. Museum.

T. cuneata, *bidentata*, and *Nucula*. Dudley.

Cornulites serpularius. Dudley.

Tentaculites ornatus. Dudley.

WENLOCK SHALE.

Leptaena transversalis. Walsall. Specimens also from
Dudley.

L. depressa. Hay Head.

Atrypa depressa, *linguifera*, and *galeata*. Delves
Green, &c.

A. affinis. Delves Green. Abundant in the walks at
Dudley Castle.

A. aspera.

A. tenuistriata. Dudley.—R. G.

Spirifer radiatus. Hay Head and Dudley.

S. crispus. Walsall.

S. sinuatus. Hay Head.

Orthis canalis. Delves Green, &c.

O. compressa. Birm. Museum.

Terebratula interplicata, *sphærica*, and *imbricata*. Dud-
ley, Hay Head, &c.

T. Stricklandii.—R. G.

Modiola antiqua. Dudley, Birm. Museum.

Avicula orbicularis.

MOUNTAIN LIMESTONE.

Pecten ellipticus (?). Castern.—B. 8. The specimen only
shows the inner surface of the valve.

Inoceramus vetustus. Dovedale. Also a cast of the interior.—B, 10.

Placuna ——. Astbury limeworks. Inner surface of the valve.

Pleurorhynchus minax (?). Near Glutton. A curious little shell.—B, 9.

Productus antiquatus. Buxton.

P. punctatus. Near Ilam.—B, 14, 15.

P. mesolobus. Near Glutton.

P. scabriusculus. Dovedale.

Pentamerus levis (?). Plentiful at Caldon Low.—B, 11.

Other species.

Spirifer striatus. Caldon Low. A large species.

S. pinguis. Id. loc.

S. resupinatus. Id. loc. Some large specimens have loose crystals of carbonate of lime and bitumen in their hollow interior.

S. scabriusculus, *semireticulatus*, &c.

Terebratula acuminata, or *sacculus* (?).—B, 13.

T. hastata (?).—B, 12.

T. crumena.

COAL MEASURES.

Unio. Several species in North Staffordshire.—E, 18, 19, 20, 21, 22, 23.

TRILOBITES.

Crustaceous animals, now extinct, which were not, in all probability, parasitical on other animals, as some have supposed, and as some allied existing creatures are; but swimming in the sea, or creeping upon submarine rocks. Some species, as *Calymene Blumenbachii*, *Downingia*, &c., could roll themselves up into a ball, and are often so found. Dudley has given its name to them, as they are frequently

called the Dudley fossils: they are, however, larger in some other Silurian rocks. The eyes in some species, as in the common *Asaphus caudatus*, are very beautiful, composed of numerous eyelets, somewhat like those of a dragon-fly.

Homalonatus delphinocephalus. Wenlock limestone at Dudley Castle. A fine fossil, of which many specimens have been found of late. In this genus the body can scarcely be said to have the three-lobed or three-ridged appearance, from which the family have their name.—A, 16.

Calymene Blumenbachii. Ludlow and Wenlock formations at Dudley. Common. *Calymene*, unlike the following genus, has no lengthened tail, is more convex, with round tuberosities on the head, and the margin of the animal entire. This species is covered with small tubercles; and the sides of the middle lobe have often a row of eminences each.

C. variolaris. Murch. Wenlock formation. Dudley Castle. Not rare. In this species the head is prettily tuberculated. There are probably varieties or allied species. *C. variolaris*, Brongn., rarer.

C. ——. “A species with the head resembling *C. variolaris*, but with a shield like that of *Asaphus*.”—Mr. Fletcher.

C. macrophthalma. Wenlock formation at Dudley. Not common. Eyes proportionally large; central lobe of the head, plain and round. Dudley Museum.

C. Downingiæ. Dudley. Common. Three furrows on each side the middle lobe of the head. An interesting specimen, with the under or inner surface of the plates exposed, is deposited in the Dudley Museum from Mr. Gray.

C. tuberculata. Dudley. A small species. Central lobe of the head more tuberculated than in *C. macrophthalmia*.

C. punctata. Dudley. In the museum, from Mr. Bennett.

Asaphus caudatus. Dudley. Common. Body broad and flat, with a membranous expansion at the sides.

A. longicaudatus. Dudley. The name expresses the curious characteristic.

A. tuberculato-caudatus. Several specimens in the Dudley collection from that place. Differs from *A. caudatus* in its tuberculated head, central lobe of the body, and caudal portion, by an additional frontal protuberance, and by the tail and body being inseparable.

A. Stokesii. Dudley. Rare. A small species.

A. ——. “Central lobe of the head very large; animal small, but broader than *A. Stokesii*; prominences within the eyes.” Mr. Fletcher’s collection.

Bumastus Barriensis. The Barr Trilobite. Dudley and Hay Head. Rare; but there are several specimens in the Dudley collection. The genus is marked by the anterior and posterior part of the body being smooth, convex, and unlobed; the middle only having the transverse armour, or plates. The eyes are smooth, lunate, and distant.—A, 15.

Paradoxides quadrimucronatus. Dudley. This genus has the ribs prolonged laterally into spines, and the tail four-forked. Figured by Mr. Murchison.

Acidaspis —— (?). Dudley collection.

Trilobites, or allied animals, have been found in the mountain limestone and coal measures of Salop and Derbyshire.

ENCERINITES, ETC.

Crinoidal animals were fixed by a jointed column or stalk; branched and rayed above (perhaps *Pentremites* is an exception); stony; and with a plant-like appearance. Very beautiful species are found at Dudley, but they are not so peculiar to Silurian rocks as the *trilobites*, one or two species existing even in the present sea. The disjointed columns and arms of *crinoidal* animals, are the little bodies so frequently seen in limestone and marble, and sometimes called St. Cuthbert's beads, screw-stones, entrochi, &c.

“ On a rock by Lindisfarn
St. Cuthbert sits, and toils to frame
The sea-born beads that bear his name.”

The physiology of the animals is ill understood—whether they took into the stomach, situated in the centre, at the junction of the arms, rather bulky food, like the common star-fish, or collected their nourishment of small floating animalcules by a system of vibratile cilia, exciting currents in the water. We may notice, that we have seen the star-fish protrude its membranous stomach from its body upon its food; and there is in it an internal rudiment of the stem seen in the *Crinoidal* animals; as well as a circulation of the water through a system of vessels in the anterior of the animal; and, perhaps, this last circumstance was the case with *Crinoidea*; which will account for certain openings, and the tubular structure sometimes visible in them. The jointed column has occasionally side branches, as in the *Cyathocrinites goniodactylus*. The stomach, at the origin of the arms, was surrounded by a set of plates called the *pelvis*, *costals*, *intercostals*, *scapulae*, *arms*, &c. To these *hands*, *fingers*, and *side pinnules* succeed, forming the beautiful rays of the family, as is seen in perfection in the *Actinocrinites moniliformis*.

Actinocrinites moniliformis. Dudley. Common. There is a large slab with impressions of this, in the Museum, also sections, shewing the tubular mouth of the animal, situated in the centre of the arms, A, 4. : there is a specimen also of the root, by which the animal is attached.

A. expansus. Dudley. Engraved in Mr. Murchison's work, without the stem. There is a fine one, in which the pelvis plates are well shewn, in the Dudley collection from Mr. Gray.

A. simplex. In the Dudley Museum, from that place.

A. arthriticus. Ditto.

A. retiaris.

Cyathocrinites goniodactylus—*pyriformis*—*tuberculatus tubulatus*—*capillaris*—*radiatus*.

C. rugosus. The pelvis only of this is figured by Mr. Murchison, and we have a similar specimen; but very perfect ones exist in the Dudley Museum (from Messrs. Cartwright and Bennett), and the "Report of the Dudley and Midland Geological Society, 1843," contains some remarks upon this, or the similar pelvis, A, 6, (*C. globosus*.) of a Crinoidal animal, which we take the liberty of transcribing. The specimen alluded to is, we believe, in Mr. Gray's possession.

"The Society's museum has, ever since its commencement, contained the body of an encrinite of a remarkably globular form, the plates of which approach very much to the character of the *Cyathocrinites rugosus* of Miller; but, although several specimens of this peculiar encrinite were known, showing the body, none had been found which gave any idea of the character of the column, or of the rays. As these specimens were evidently portions of a new species, they were looked upon as valuable, because they added yet another to the great variety of the Crinoidea which our

Silurian rocks contain; but no idea could be formed of their real importance; nor was there anything to lead to the supposition that they belonged to an entirely new form, possessing peculiarities distinguishing it from all previously known species. The discovery of a specimen perfect, as far as regards the body and upper portion of this encrinite, has, however, now disclosed this important fact; while it has added, not merely a new form to the almost infinite variety with which we were before acquainted, but has presented us with one which may perhaps be said to surpass all others in the beauty of its shape, and the extreme delicacy of its structure. To the naked eye, the rays which proceed from the upper portion of the body appear to form a beautiful kind of coral net-work; but the microscope enables the observer to detect, in the threads which apparently run across the specimen, small tubercles on each side of the branches of the ray, so regularly placed, at equal distances, as to correspond on a perfect line with one another, though, most probably, really divided, and each pair of tubercles is attached to a separate joint of the ray. Some idea may be formed of the minute subdivisions of the beautiful structure composing the upper portion of this encrinite, when it is stated that there are about seventy-three joints to each branch of the ray, twenty-five branches to each ray, and five separate rays; and that thus, in this single specimen, there are upwards of 10,000 joints. Neither the joints of the body or column are taken into this calculation; and as the rays themselves are somewhat crushed together, and the ends broken off, while the number of the branches increase as the rays lengthen, it is probable that this number is much under-rated, and that the skeleton of the animal, when alive, consisted of upwards of 20,000 joints. When it is remembered too, that each joint, judging from analogy,

must have had two muscles at least,—probably four,—the extraordinary number and delicacy of the several parts, and the wonderful adaptation of each to accomplish the intention of the GREAT AUTHOR of all things, even in providing for an animal so low in the scale of creation, must call forth our unmingled admiration and praise.

“It is almost impossible to form an adequate conception of the extreme beauty of appearance which this encrinite must have possessed in its living state. If, however, the curators are right in presuming that the column which is connected with this specimen really belonged to it, and which in all probability it did, as it was found lying in the same bed, and very near to it, some idea may be formed of its imposing appearance. Rising from the top of a long flexible column, possessing an immense number of joints, we must imagine an almost perfectly globular cup, composed of a number of plates, each marked with delicate flutings. From the upper margin of these plates swells out the beautiful net-like tissue, formed by the innumerable subdivisions of the rays and their branches, the whole spreading into a magnificent cup or bowl, upwards of eight or nine inches in width at its upper surface, endowed with the most exquisite flexibility, and during the periods of the animal’s activity, in a constantly undulating motion.”

Hypanthocrinites decorus. Dudley and Hurst Hill.—A, 1; horizontal section, 2; longitudinal ditto, 3. The head of this fossil is curious in form, cylindrical; the plates being ornamental in disposition at the base; and the mouth being raised above the united rays, and its conical prominence formed by a set of plates: but, in the Report to which we are indebted above, is also an account of the structure of this animal, which we shall likewise transcribe.

“This curious and anomalous genus was first of all de-

scribed and named by Professor Phillips, in Mr. Murchison's "Silurian System." Its outward appearance is essentially different from that of any other known genus. The whole of the pinnæ which proceed from the rays, in all the specimens hitherto discovered, are closely packed up, and nearly, or entirely, concealed from view. The encrinite in this closed state assumes an almost perfectly round shape, somewhat cylindrical, the surface of which is entirely composed of the rays and the solid ribs, alternating between each pair of rays, and which, as will afterwards be seen, constitute such an important peculiarity in its structure; while the whole is surmounted at the crown by the mouth of the encrinite. It would naturally be expected that the general arrangement of the mouth, with the rays enveloping it, would be such that the food, after being collected and secured by the reticulated fingers, or rays, could be easily conveyed to it. But in this genus, the mouth, being elevated above the rays, seems carefully put out of their reach; and it is difficult to discover how the food was conveyed to it, except by supposing a great degree of flexibility in the long bony structure of the tube, at the extremity of which the mouth is placed, and of the plates supporting it. These bony plates, or ribs, rise between each pair of rays, proceeding alternately from single and double plates. They reach nearly to the top of the rays in one solid piece, where they are further continued by other plates of a similar substance, until they terminate around and immediately underneath the mouth. The cross section shows that these ribs are of a wedge shape, and run in nearly to the centre of the specimen, where they are united to a tube about one-eighth of an inch in diameter, and which is seen in the vertical section to connect the mouth with the stomach. Thus the plates which surround the mouth are supported upon a strong

scaffold, composed of ten upright ribs, united together in the centre by the tube which connects the mouth with the stomach, and from the length both of this tube, and of the ribs as well, the mouth must have been kept out of the reach of the rays, except by supposing, (as previously suggested,) that the whole of this curious structure possessed a great degree of flexibility. The principal objection to this is furnished by the apparent strength of this scaffolding, which is so strong, that in some specimens, where the pressure has been sufficiently great even to compress the sides of the stomach, the body of the encrinite has still preserved its round form."

Marsupiocrinites calatus. Dudley, in the Museum.

Dimerocrinites icosidactylus.

D. decadactylus.

D. ———. Figured in a fine lithograph by Miss H. S. T.; and we take the liberty of copying it, in a humble style, as it gives a good idea of the form of these interesting animals, A, 7.

Pseudocrinites bicopuladigiti. Specimens of this new fossil are in the Dudley collection, from that place, deposited by Messrs. Bennett and Pearce; and the latter gentleman has furnished an account of this and the following species, *vide* Athenæum, No. 803. His figures we beg leave to copy with this acknowledgment.—A, 8, 9, 10, 11, 12, 13.

P. quadracopuladigiti.—A, 14. We likewise borrow the following extract from the Report, twice quoted before.

"During the past quarter, several very beautiful and perfect specimens have been discovered of that peculiar fossil to which your curators alluded in the first Report, as partaking of characters allied both to the pentremite and encrinite, although essentially different from either. From the specimens which were laid before the meeting, it was

seen that the body is composed of irregularly-shaped plates. It is divided into four parts, by bands apparently running down from the top of the body, and reaching nearly,—in some specimens fully,—to the point where the column and body join. In some instances, two of these divisions are larger than the others, and may be called the front and back of the fossil; the two smaller divisions forming the sides. It is, however, possible that this apparent irregularity, which is not evident in every specimen, may result merely from unequal compression. Each of the four bands possesses a double row of small rays; and one of the great peculiarities of this fossil is the presence of some curious slits, or openings, in the plates of which the body is composed. One of these slits is to be found in each of the four parts into which it is divided, situated alternately in the upper and lower portions of the divisions. What purpose these openings may have answered it is difficult fully to understand, but they are evident in all the specimens known, and must have performed some important function in the animal economy of the living individual. This fossil differs both from the pentremite and encrinite, in being divided into four parts instead of five.”

There appear to be other undescribed species of Crinoidea in the Dudley collections. Crinoidal pelvis, A, 5.

MOUNTAIN LIMESTONE.

Platycrinites levis. The head of this in the Birmingham Museum, from Bakewell, (Derb.) A variety of columns of encrinites are engraved in Plot, as found in the limestone at Berresford, &c.

CORALS.

These remains are the petrified calcareous supports, or *nidi* of Zoophytes, varying much in form, but generally presenting vestiges of cells, in which the little animals

which formed them were lodged. The following species are generally from the limestone of Dudley.

Aulopora conglomerata and *consimilis*.

A. serpens. This is the *Tubipora axillaris* of authors. We have specimens parasitical on *Atrypa galeata*. A creeping anastomosing mesh of tubes with prominent axillary pores.

Escharina angularis. Cells radiating. On bivalves, &c.

Glaucaneme disticha.

Hornera crassa. In these two last the surface is partly striated, partly furnished with cells.

Fenestella antiqua. Composed of branches which unite and produce a cup, fixed by its base. Internally the branches form a network with oval intervals. The pores are external, on each side the *anastomosed* and connected branches.

F. Milleri, *prisca*, and *reticulata*.

Discopora antiqua. A parasitical crust, furnished with cells.

D. squamata and *favosa*.

Berenicea irregularis.

Retepora infundibulum. Of a similar shape to *Fenestella*. Cells internal.

Eschara scalpellum.

Blumenbachium globosum. Here the cells are star-like.

Gorgonia assimilis, *Cerriopora granulosa*, and *Millepora repens*.

Heteropora crassa. Dudley.

Stromatopora concentrica. Pores situated in the minute furrows of a semiglobular zoophyte, composed of superimposed *laminae*. Common.

Favosites alveolaris. Sedgley. In this and the following genera the cells and corals altogether are generally larger than the preceding. In *Favosites* the cells are

lengthened, partitioned, prismatic, vertical, connected by pores, being in close contact, and forming the massive coral by their agglutination. There are specimens two feet across in the Birmingham and Dudley collections.

F. fibrosa, *spongites*, and *Gothlandica*. Dudley.

Syringopora bifurcata. Mass formed of vertical anastomosing tubes, with round openings.

S. reticulata and *caspitosa*.

Catenipora escharoides. The chain-coral of Parkinson. Wren's Nest. Magnificent sections in the Birmingham collection. Here the oval orifices of the tubes appear on the surface of the specimens in continuous lines, having the look of chains, flexuous and united.

Porites petalliformis. Delves Green. The corals of this genus are frequently large and hemispherical, marked below by the lines of growth, and above by the orifices of the tubes which compose the mass by their close contact. These orifices have a beautiful stellate or flower-like appearance.

P. polymorpha, *pyriformis*, and *tubulata*. Dudley.

Astræa ananas. Here the cells are large and polygonal; and, when polished, the tubes present a pretty radiate appearance internally.

Acervularia Baltica. Dudley Museum.

Cyathophyllum turbinatum. Cylindrical, with one terminal cup, which is lamellar and rayed; single or aggregate: interior divided by more or less distant horizontal septa.

C. dianthus, *caspitosum*, *C*— (?).—B, 18, 19. Dudley.

Cystiphyllum Siluriense. In this genus the interior is of a vesicular structure.

C. cylindricum. Dudley. Birmingham collection.

Strombodes plicatum. Dudley. The interior of *lamellæ*, spirally contorted.

Limaria clathrata and *fruticosa*.

Verticillipora abnormis. Dudley.

Cnemidum tenue.

Cyclolites præacuta. Dudley.

MOUNTAIN LIMESTONE.

Favosites, or *Astræa*. Some species in the limestone; also found in gravel pits.

Tubipora ——. Tubes fine, vertical, approximate; not branched, but connected by short side branchlets. In large masses near Ilam.

T. ——. Tubes wider, as thick as a crow-quill; branched, flexuose, approximate. In large masses in the bed of the Manyfold; also in gravel-pits. Figured likewise by Plot.

Caryophyllea duplicata. Mart. in Fleming. In large masses. My specimens striated.

C. ——. As thick as a large quill, flexuose, and branched, striate; branches rather distant. In great masses in the bed of the Manyfold, and at Astbury. Figured also by Plot.

Turbinolia Fungites. Ram's-horn. Somewhat like the *Cyathophylla* described above. Astbury, &c.

VEGETABLE FOSSILS.

Fossil Algæ. Caldon Low; on slabs of limestone.—See Liths. C. and D. We do not find either figured by Brongniart. Some may doubt their vegetable nature.

COAL MEASURES.

CALAMITES.

These plants were similar to the common *Equisetæ*, or horse-tails of our marshes and damp woods, but were of a gigantic size.

C. nodosus. Darlaston; sometimes in new red sandstone.

C. Steinhaueri. Fine specimens, with the terminations, in the Birmingham Museum.

C. Suckowii. Bilston, Walsall, and Dudley. Birmingham and Dudley collections.

C. dubius, remotus, Cistii, cannæformis. Wolverhampton and Dudley; *approximatus*, Bilston; *Voltzii*.

FILICES, OR FERNS.

Not like the small plants of this tribe now existing in England, but of a great size, like those of Australia, New Zealand, and particularly of warm and moist countries.

Sphenopteris. Here we have a palmate form of leaflet, most analogous to that of some of the present spleenworts.

S. obtusiloba, Westbromwich; *Hibbertii*; *Hæninghausii*, Bilston; *furcata*, North Staffordshire, in our collection.—E, 5.

Cyclopteris. The large fronds or leaves of this genus are occasionally found in the middle of balls of stone or clay.

C. obliqua, Wednesbury; *orbicularis*, Bilston; *dilatata* (?).

Neuropteris. Here the leaflets are distinct, and frequently bear a resemblance to those of the fern-royal (*Osmunda regalis*).

N. gigantea. Common in North and South Staffordshire. *Grangeri*, Tipton; *heterophylla*, Westbromwich; *flexuosa*, Westbromwich and North Staffordshire; *Soretii*, *acuminata*, *Loshii*, *acutifolia*, *macrophylla*. E, 1, Fenton; 4, Madeley, (Staff.)

Pecopteris. Here we frequently have the leaves pinnatifid, or adherent amongst themselves, as is seen in some polypodies and other ferns.

P. nervosa; *dentata*, Dudley Museum; *cyathea*; *plumosa*, fine specimens in the Dudley Museum; *pennæformis*, Westbromwich; *lonchitica*, Westbromwich; *delicatula*,

Bilston (?); *adiantoides*, Wednesbury and Westbromwich (?).—E, 9, Mow Cop.

Lonchopteris Bricii.

Sigillaria. Brongniart considers these to be the stems of the preceding ferns.

S. pachyderma, *pyriformis*, *reniformis*, Westbromwich; *organum*, Westbromwich; *tessellata*, Oldbury, &c., Dudley Museum; *elegans*, Dudley; *elongata*, North Staffordshire; *Defranci*, Dudley Museum; *Dournaisii*, Dudley Museum.

Sphenophyllum. The leaves here are whorled, or in a star-like form, around the stems, as is seen in the common starwort of our streams.

S. polyphyllum; *roseum*.—E, 2, Shelton; 3, Shelton.

Lepidodendron. These plants were covered with awl-shaped, or linear leaves; and were perhaps analogous to our common club-mosses, but much larger. The markings are beautiful, being the cicatrices left by the falling of the leaves from the stems.

L. selaginoides, Bilston; *obovatum*, Bilston and North Staffordshire; *elegans*, Westbromwich; *distans*; *varians*; *Sternbergii*, Westbromwich and North Staffordshire.

Lepidostrobus. Considered to be the fruit of the preceding.

L. ornatus, Westbromwich; *variabilis*, Westbromwich. Fine specimens in the Birmingham collection.

Ulodendron. One species with the circular markings three inches across, another about an inch. North Staffordshire. E, 8, convex, circular, cellular within?

Stigmaria ficoides. This common fossil has round, but smaller cicatrices. Its leaves were simple, and the plant probably hollow and fleshy, with creeping or floating branches many feet in length.

Sternbergia approximata.

Bechera grandis. Westbromwich. A fine specimen in the Birmingham collection. Mr. Lindley, who had not seen the internal structure, supposed that this would be, as is seen in the specimen alluded to, tubular, and divided by numerous *septa*.

Asterophyllites. This and *Annularia* appear to have been allied to the *Hippuris*, or mare's-tail of our present waters.

A. equisetiformis, Wednesbury.

Næggerathia flabellata. Wednesbury. Allied to the palms.

Trigonocarpum ovatum. A fruit. Fossil fruits,—
E, 6, 7.

A CALENDAR OF NATURAL PHENOMENA.

The following Calendar of Natural Phenomena is an imperfect one, in several respects; the author choosing that it should rather have this fault, than be compiled from the notes of other naturalists, made in parts of England very different in climate and soil to North Staffordshire. It is composed from notes, taken for eight or nine years by himself, as he observed the opening of the flowers, &c. But in this space of time, there were both forward and backward years; and it must be remembered, that the remarks selected are chiefly from the early seasons, the author having generally taken the earliest dates, which occur, for the different phenomena recorded in his note-books. He much regrets that this is the most perfect plan of record that he can adopt; and he would add one observation to be borne in mind, that, for the first months of the year, the phenomena recorded often occur much later in backward seasons, even weeks, as was the case in the years 1838 and 1839. In

spring also, a frost of a few days continuance may have a great effect in retarding vegetation, &c. In the summer and autumnal months the phenomena of the seasons are generally more regular in recurrence. The English names of the plants are commonly given as they are found in Hooker's Compendium of British Botany.

JANUARY.

" Now shepherds, to your helpless charge be kind ;
Baffle the raging year, and fill their pens
With food at will : lodge them below the storm,
And watch them strict."

13th. Groundsel, the sterile strawberry, and chickweed frequently seen in flower. Kingfishers and wagtails in frosty weather frequent brooks, near their warm springs. Sea-birds appear inland, particularly in storms ; and some others, naturally shy, are driven by hunger to enter gardens or farm-yards.

19th. The wren singing.

20th. The robin singing.

22nd. The black hellebore coming out, (frequently in December,) and the honeysuckle beginning to expand its buds.

26th. Bats flying about on a fine evening. Gnats numerous, and the robin singing nearly at dark.

27th. The hazel shows its catkins in sheltered places ; the alder later.

29th. The lark and blackbird are singing. Moths are seen in fine evenings, and *Tipulæ* are also noticed about.

FEBRUARY.

" Already now the snow-drop dares appear,
The first pale blossom of the unripened year."

2nd. The missel-thrush is singing. The wall-flower out.

3rd. The red dead-nettle in flower.

5th. Mezerion in full flower. *Phascum subulatum* in fruit.

11th. *Tussilago alba*, *Omphalodes verna*, *Iberis saxatilis*, *Eranthis hyemalis*, and yellow crocuses out in the borders.

13th. Coltsfoot out, (24th March, 1839,) with a few daisies. *Helophorus grandis*, and other small beetles on the wing.

20th. Garden primrose out; *Cornus mascula* also. Snowdrops fully out; a few flowers of the creeping crow-foot.

24th. The hazel, (21st March, 1839,) and pilewort out.

27th. Perriwinkle and water-blinks in flower; the former also in fruit. *Cyclamen coum* out in the conservatory. Rooks building occasionally.

MARCH.

“Just to say the Spring is come,
The violet shines from her woodland home.”

2nd. The yellow bunting singing. The sweet violet, and ivy-leaved water-crowfoot in flower. In the gardens, *Draba aizoides*, the dog's-tooth violet, *Hepatica*, *Leucojum vernum*, and peach-tree are in flower.

7th. *Staphylinidæ*, and small lamellicorn beetles on the wing. Gnats are numerous. Frogs croaking all night.

9th. Sallows, the rose-willow, and osier in flower, and numerous species of bee, &c. upon them. Rooks building. *Scilla bifolia*, and *Saxifraga oppositifolia* very ornamental in the borders.

11th. A few leaves of the hawthorn sometimes expanding in early springs. The conservatories are gay with geraniums, *Cineraria*, *Epacris*, *Pultenea*, hyacinths, jonquils, &c.

16th. The daisy, wood-anemone, ivy-leaved Veronica,

hairy cardamine, and primrose in flower. *Byrrhus* and *Silpha* numerous.

17th. Wake-robin, and wild hyacinth springing.

18th. Dog's mercury and golden-saxifrage coming out. Elms and poplars in flower.

19th. Daffodils opening in the gardens. The wild snow-drop and gorse out. Amongst mosses, *Dicranum scoparium*, *subulatum*, *taxifolium*, *heteromallum*, *bryoides*, *Byrtrum hornum*, *cæspititium*, *punctatum*, and *Hypnum denticulatum* in fruit.

22nd. Dandelion, daisy, and wood anemone abundant. Rooks busy building.

23rd. The yellow anemone and chequered daffodil out in the gardens. *Erica mediterranea* out.

25th. Laurel and yew flowering; *Polytrichum nanum*, and *Jungermannia epiphylla* abundantly in fruit.

29th. Vernal Draba, (April 19th, 1839,) and thalecress out. Marsh-marygold opening. The gooseberry in leaf.

31st. The wild daffodils expanding (April 19th, 1839). Cut-leaved dead-nettle out. The large white butterfly occasionally seen.

APRIL.

"The swallow, for a moment seen,
Skims in haste the village green."

1st. The white and purple Azaleas in flower in the conservatories. *Fumaria solida*, *Cochlearia officinalis*, *Doronicum Pardalianches*, and *Sanguinaria Canadensis* adorn the flower garden.

5th. Dog's-violet, wych-elm, and cowslip in flower.

6th. Hedges becoming green. *Ribes alpina* in full leaf.

7th. The wood-sorrel, wood Luzula and moschatell are out.

9th. The willows abound with insects. The *Cicindela campestris* is abundant. The early purple orchis in flower.

10th. Cotton-grass and ground-ivy in flower, and wild daffodils fully out.

13th. Nettle butterfly abounding. *Primula minima*, *Soldanella*, *Berberis*, &c., out in the borders.

15th. Bugle and marsh-marygold in flower; and the sycamore, thorn, and mountain-ash in leaf.

16th. Acacias, Epacris, and heaths out in the greenhouse. *Ribes sanguinea* in flower. The house-swallow and willow-wren appear about this time; later in backward years.

17th. The great stichwort, lady's-smock, (coming out, 7th May, 1838,) and bullace in flower (9th May, 1838). The larch now green and flowering. Small lampreys abound in brooks, and the white butterflies are numerous. *Corchorus Japonicus* out.

19th. The cranberry, bush-vetch, and pear-tree in flower. *Bartramia pomiformis*, and *Tortula subulata* in green fruit. Lizards out, 1843. The birch flowering, 1839.

22nd. The Bedford willow budding. The butter-bur out. The primrose and pilewort in full flower, 1839.

23rd. Orobus in flower; wild hyacinth coming out. In the garden, the starch-hyacinth in flower. The almond fully out; the damson coming out. The orange-tip butterfly abounds.

24th. Bird-cherry, (May 10th, 1838,) wood scorpion-grass, and the oxlip in flower. The poplar and hawthorn green.

26th. Broom, *Myosotis collina*, speedwell-leaved Draba, field Veronica, hairy violet, vernal cinquefoil, mossy—meadow—and three-fingered saxifrages in flower. Hutchinsia in capsule. Hairy tower-mustard nearly out. *Marchantia hemispherica* in fruit. The cuckoo now heard.

27th. The wood lychnis, cherry, and sloe in flower. *Sialis niger* abounds.

29th. Milkwort and marsh violet in flower.

30th. Avens, ramsons, bilberry, crowfoots, alternate-leaved golden-saxifrage, and bitter cardamine in flower. Celandine coming out.

MAY.

“Ye fostering breezes, blow!
Ye softening dews, ye tender showers descend!
And temper all, thou world-reviving sun,
Into the perfect year.”

1st. The swift appears early in the month.

2nd. The ash, oak, and young beeches are nearly in leaf. Sweet Cicely, white dead-nettle, germander speedwell, and cross-leaved bedstraw, in flower. The lilac coming out. Tulips out. Moonwort, and wood mare's-tail expanding.

4th. Yellow pimpernel, and tormentil in flower. The alder drops its catkins.

5th. Teesdalia fully out; sweet-vernal-grass, and meadow-foxtail out.

7th. The rose and bramble in leaf. The cotton grasses look silky.

8th. The crab, yellow-rocket, and water ranunculus in flower. The corn-crake heard about this time. Wood anemone, ground-ivy, marsh marygold only now in full flower, 1838.

9th. Brimstone and peacock butterflies. Yellow mountain violet, and wall hawkweed in flower. Toothwort (*Lathræa*), in capsule. Fragrant willow in leaf. Lily of the valley coming out. Wild service-tree, and horse-chestnut in flower.

12th. The Bedford willow losing its catkins. Mountain-melic in flower. Bird's-foot trefoil out. *Thecla rubi*.

13th. The hawthorn coming out. *Narcissus poeticus*, early Carex, lesser winter-green, and cowberry flowering.

17th. Dove's-foot crane's-bill, pepperwort, white Corydalis, fumitory, and thyme-leaved Veronica in flower.

18th. Small and heart-leaved valerians out. Wood Argus butterfly. The Rhododendron, *Centaurea montana*, *Borago orientalis*, *Geranium phæum*, *Symphytum Bohemicum*, *Asperula odorata*, and *Statice Tartarica* in flower in the borders.

21st. Hawthorn, quicken, laburnum, columbine, monkshane, and London-pride out. Magpie moth abounds.

22nd. Wild beaked-parsley, lesser spearwort, mouse-ear-hawkweed, and brooklime flowering.

24th. Charlock, dewberry, *Orchis latifolia*, hemlock, crane's-bill, red clover, and bistort in flower. *Funaria Muhlenbergii* in green fruit.

25th. *Eleocharis*, *Cistus*, and salad-burnet out. Rose occasionally flowering. The may-fly abounds.

29th. The wood tiger-moth, brimstone butterfly, orange-tip, green hair-streak, pearl-bordered fritillary, small fritillary, brimstone moth, and many others abound.

31st. May-bugs and *Telephori* abound. Wood melicgrass, heath *Galium*, and peony flowering.

JUNE.

“ Heaven descends

In universal bounty, shedding herbs,

And fruits, and flowers, on Nature's ample lap.”

1st. White Chrysanthemum out on limestone rocks. Jacob's-ladder, wood hawkweed, purging flax, and cow-wheat, in flower. Wall whitlow-grass in capsule. Least mountain bedstraw opening.

3rd. Ragged-Robin, meadow Orchis, rough hawkbit, marsh cinquefoil, in flower. Also the dame's-violet, and

iris out ; and the panicles of many grasses appear. The fly-catcher now seen.

6th. Mat-grass flowers. The Admiral butterfly caught.

7th. Woodbine and scarlet pimpernel flowering. The ghost-moth, *Cidaria implicaria*, and others abound. *Libellula depressa* and other dragon-flies.

8th. Common beaked parsley, bittersweet, yellow and blue scorpion-grass, and water-elder in flower. The rose in ordinary seasons expanding. *Hemerobius perla* abounds.

11th. Cat's-ear, white clover, vetch, and cow-parsnip in flower. Thrift, *Phyteuma orbiculare*, *Sempervivum montanum*, *Inula Helenium*, *Thalictrum aquilegifolium*, adorn the borders.

12th. Meadow vetch, corn poppy, and elder in flower. In the garden *Astrantia major*, *Valeriana rubra*, *Tormentilla*, *Amaryllidæ*, *Iris*.

15th. White garden-rose flowers. Foxglove and rose-bay willow-herb coming out.

18th. The wild rose is now abundant, and the red garden rose coming out. Water plantain, valerian, common dropwort, and meadow crane's-bill flowering.

20th. Corn chamomile, sowthistle, and foxglove flowering. Honeysuckle abundant, and *Agrion puella* and *virgo* abound.

21st. Goutweed, wood woundwort, smooth hawk's-beard, tufted vetch, figwort, musk-thistle, and welted thistle out. *Pyrochroa* abounds.

23rd. Tradescantia flowers ; spotted Orchis and white oxeye, though often earlier. Bean-fields blooming.

25th. Red centaury, and eye-bright coming out.

27th. Butterfly-Orchis, frog-bit, and yellow flag in flower.

29th. The wild rose expanding in the moorlands.

JULY.

“ Welcome, ye shades ! ye bowery thickets, hail !
 Ye lofty pines ! ye venerable oaks !
 Ye ashes wild, resounding o'er the steep ! ”

2nd. The small yellow stone-crop in full flower ; loose-strife, and giant bell-flower out.

5th. Liverwort fructifying. Basil thyme, catmint, viper's bugloss, corn-cockle, buckthorn, meadow-sweet, and lime tree flowering.

7th. Haymaking is now general. The ears of wheat are shot. Winter-greens, wood and bloody crane's-bill, meadow rue, field Knautia, and great yellow loose-strife. Many birds become mute.

9th. Black bryony, melilot, corn poppy, hemlock, betony, and willow herb in flower. The large tiger-moth abounds.

11th. St. John's-wort, rough chervil, and knotted hedge-parsley : the latter in fruit.

12th. Sneezewort, bog pimperl, flowering rush, and bell-flowers out.

15th. Mallows, Alpine enchanter's-nightshade, and common helleborine flowering. Fungi abound in the woods after rain.

19th. Orpine, hedge convolvulus, and harebell flowering.

23rd. Upright hedge-parsley, wood hawkweed (early), flea Carex, great water willow-herb, and meadow plume-thistle out.

25th. Mushrooms often abound in wet weather.

28th. Mullein and ragwort out.

AUGUST.

“ Fair plenty now begins her golden reign ;
 The yellow fields thick wave with ripened grain. ”

1st. Wheat occasionally cut in early seasons, in the warmer parts of Staffordshire and Shropshire.

3rd. Mints flowering : also the scabious, and toad-flax. In the gardens Dahlias and carnations are becoming ornamental, with numerous annuals.

6th. Wild succory, soapwort, and golden-rod in flower. House flies troublesome. 1843, the swift last seen ; we saw it on the 12th in South Staffordshire.

10th. Tansy, feverfew, yellow hemp-nettle, clematis, viscous groundsel, Angelica, burdock, and thistles in flower. Corn in the more fertile districts of North Staffordshire frequently ripe.

12th. Great spearwort, shrubby hawkweed, umbellate ditto, hybrid bell-flower out. The Swift gone.

25th. Meadow saffron in flower. The lime losing its leaves ; begins to do so a fortnight earlier. The berries of the *Viburnum* red.

SEPTEMBER.

“ When Autumn scatters his departing gleams,
Warned of approaching Winter, gathered, play
The swallow people.”

5th. The pastures abound with field gentian, devil's-bit scabious, and green *Habenaria*. The grass of *Parnassus* abundant. Clustered bell-flower out.

13th. The hay harvest is not finished about Axedge (1842, an early year) ; generally the corn is cut throughout the north of Staffordshire ; but the oats are here quite green. It is also entirely cut in the later districts of South Staffordshire ; chiefly got in, in the midland part ; and entirely so about Lichfield.

28th. The redwing noticed.

30th. *Clavaria*, *Agaricus*, *muscarius*, *Cantharellus aurantiacus*, orange *Peziza*, and numerous other Fungi abound.

OCTOBER.

“ The fading, many-coloured woods,
Shade deepening over shade, the country round
Imbrown.”

1st. The bindweed and forget-me-not, with some few other plants still in flower. Many birds resume their notes in this and the preceding month.

4th. The gossamer very abundant.

6th. Flocks of fieldfares.

10th. Small birds congregate. Swallows and martins depart about this time.

15th. The hazel is turned yellowish; the elm, orange; the oak, yellowish green; the cherry, red, livid; the sycamore, brownish; the hornbeam, bright yellow; some beeches, and the quicken, rich reddish brown; the aspen, yellow; the Viburnum, crimson. The thorn, alder, and ash, are still green. The lime and wych-elm are bare.

31st. A nettle-butterfly out on a fine day.

NOVEMBER.

“ The crimson heath is wan and sere;
The sedge hangs withering by the mere,
And the broad fern is rent and brown.”

1st. The leaves are nearly all fallen from the trees. Flocks of various birds. Snipes frequent marshy moors. Several moths may be taken, particularly near the lights on the outskirts of towns. Moles are busy. Oats are frequently not got in, in the moorlands.

5th. The ivy in flower. *Polyporus Scoticus* growing.

DECEMBER.

“ No mark of vegetable life is seen,
No bird to bird repeats his tuneful call,
Save the dark leaves of some rude evergreen,
Save the lone red-breast on the moss-grown wall.”

20th. Perriwinkle, polyanthus, wall-flower, and ivy-leaved toadflax occasionally continue in flower.

25th. The robin singing sweetly on a fine Christmas-day.

29th. Moles at work, and the shrew occasionally seen. In mild seasons the crowfoot and daisy may be noticed in flower, and gnats are on the wing. In the remarkably warm December of 1842, the catkins of the alder, hazel, and even of the willows, were in flower at the end of the month; also the mezereon.



CHAPTER XII.

THE MANUFACTURE OF POTTERY—MEMOIR OF JOSIAH WEDGWOOD, F.R.S., &c.

It does not enter into the plan of the present work to give a minute description of the Figuline Art, nor to treat very fully of its history, neither to describe the variations in the mode of manufacture as practised in different places, but only to give a short account of it, as it originated, and has been improved in the county of which we are the historians.

The potter's art exists to some extent in all countries a little removed from barbarism: and the potter's wheel is, as is well known, mentioned both by the Jewish prophets, and the ancient Greek poets. The Egyptians were acquainted with the art of *glazing*, as is proved by the jars and little porcelain figures found with their mummies, many of which are preserved in the British Museum: and it is remarkable that some are coloured blue, with cobalt; others green, pink, &c. Glazing does not seem to have been much, if at all, practised by the Greeks and Romans, some of their vessels being covered with varnish. The Chinese, on the contrary, seem to have been long acquainted with this branch of the art, and from them the different Mahometan nations received their knowledge of ornamenting earthenware, by the way of India.* The ancient

* Some of the islanders of the South Pacific—the New Zealanders, for instance—understand the method of correcting the porosity of their coarse pottery by glazing.

Peruvians practised the art of pottery with great success, and their productions approach the Etruscan earthenware in character, as well as in beauty of execution. From the Mahometans of Spain the art of making ornamental pottery may have been carried into Italy, where, particularly under the patronage of Leo X., the potter's art was practised with success; and Raffaello himself is said to have furnished designs for the ornaments of the vessels produced, and the manufacture has been called by his name—also Fienza and Majolica porcelain, or, more correctly, earthenware. The specimens which remain of this variety of pottery are certainly remarkable in many cases for a superiority of design in the painting, though the colouring is not prepossessing. In France, the celebrated Palissy of Agen, equally distinguished for his knowledge of chemistry and natural philosophy, of natural history, and for his adherence to the cause of pure religion, improved the art in the sixteenth century. The pavement tiles, seen in old halls and churches, of black, red, and yellow pottery, adorned with religious, geometric, or heraldic devices, and frequently glazed, are sometimes of an early date,—in a few cases as old as the Conquest. These encaustic tiles have the richest effect, and their manufacture has been again introduced, with considerable improvements, of late years. The Dutch were formerly celebrated for their pottery,—called Delft, from the town so named. This was a thick, coarse earthenware, covered with a lighter coloured opaque glaze: in ornament it was far inferior to that of Italy.*

About the end of the seventeenth century Dutch potters settled at Lambeth, and also two brothers from the same

* A superior kind of Delft ware was some years back introduced, in which a porous body is covered by a glaze free from lead or other noxious mineral, and besides of an argillaceous character, and therefore well adapted to give an impenetrable coating to vessels of a coarse material.

country named Elers, established a pottery near Burslem, where the manufacture of earthenware had, however, long previously existed. A writer in Lardner's Cabinet Cyclopædia observes,—but we know not that he has sufficient grounds for the assertion,—“ Vestiges of considerable Roman potteries are discernible in many parts of this island, and particularly in Staffordshire, on the site of the great potteries which have been so long carried on in that county. In sinking pits for various purposes, remains of Roman potteries have been occasionally discovered, though at considerable depth below the surface.” Two centuries ago, the pottery of Staffordshire was little more than the same rude art which may be now seen in most districts, where clays and fuel abound. At this period many beds of coal *cropped out* in a line, on which most of the old potteries were built; and which potteries proved eventually the *nuclei* of the present series of considerable towns, called the Staffordshire Potteries. These coals were easily procured at, or near, the surface; and, with the attendant clays of different qualities, colour, &c., the facility of obtaining a *silex* from the grit of the neighbouring moorland hills, the proximity to the lead ore of Derbyshire, and to the salt of Lawton (both articles of importance in glazing), were probably the attractions which led to the settling of numerous potters in North Staffordshire, the carriage of heavy articles being at that time expensive.

In Plot's time, a century and a half back, Burslem was celebrated for the manufacture of *butter pots*, made of the darker indigenous clays of the district; and they, as well as the other articles produced at this time, were frequently ornamented with argillaceous pigments, or *slips*, formed by a mixture of other coloured clays with water, and also with manganese. The vessels, when made, were, in the un-

baked state, sprinkled with galena, or red lead, which, under the heat of the oven, spread into a soft glaze.

The Dutch potters alluded to, probably brought with them the art of glazing with salt. They likewise introduced a lighter and less clumsy red ware, formed of a fine clay from the neighbourhood of their pottery:—this was similar to the red ware of Bohemia, or the ancient Samian pottery. The stoneware of this period was formed by the native clays, combined with the grit, or sand, of Mow Cop and Baddeley Edge; and this would be a very superior ware to the former. The turning lathe, and the use of *saggers*, were also introduced about this period, as well as double firing.

The whiter clays of Devonshire and Dorsetshire were at first scarce, and used sparingly, and principally to give a superficial covering to pottery of a darker body. Upon this superficial white ground, figures were stamped or traced with a stilette, and, into the indentations, zaffre was dusted, producing a fine blue. In the course of time, these clays became more plentiful in the district, and were used in the body of the ware; and the discovery of the use to which calcined flint might be applied in the art, by one Astbury, about 1720, was also another important improvement. Astbury appears to have been led to its employment partly by accident, though it was not the only improvement he introduced. It is related of him, that, journeying to London on horseback, his horse fell blind, and, to cure the beast, an attendant at an hostelry calcined a flint, powdered it, and blew it into its eyes. Struck with the beautiful whiteness of the substance, he immediately perceived the use to which it might be applied as an ingredient in pottery: it soon also entered into the composition of glazes, as well as the substance of wares. The use of

liquid glazes, into which the articles were dipped, was another improvement. The salt, formerly used as a glaze, was thrown into the kiln, at its mouth, whilst it was in an incandescent state. This substance is now only occasionally used to produce the peculiar cloudiness seen in the patterns of Dresden ware.

This whiter ware now became an article of more general use. Another potter, named Daniel, is said to have introduced from other foreign potteries, where he had seen them used, plaster moulds, from which other forms could be obtained than the circular ones produced on the wheel. However, from specimens still in existence, it appears that the method of forming these moulds, from the boiled gypsum or plaster-powder, was not at first understood, as the moulds alluded to are carved from the gypsum, as it is found in nature. Previously to this, metallic, wooden, or pitcher moulds, were used for some articles, and also for forming the figures in relief, occasionally stuck upon the sides of vessels.

After the introduction of the plaster moulds much more elegant forms were produced; and, as the whiter materials of which the pottery was made were more expensive than at the present time, the articles were commonly made from the moulds by a species of casting; the slip or liquid clay being poured into them, in sufficient quantity to coat their interior to a certain thickness; the porous nature of the plaster quickly absorbing the moisture, so that, when the moulds were disjointed, the articles were taken out in excellent relief, and extremely thin and light—much more so than those produced by *pressing*, the plan now adopted. In this latter mode, *laminæ* of clay are pressed into the hollows of the moulds; and being afterwards joined together where they open, so form the vessels intended, but they are heavier,

and their ornamental relief not so well rendered. Pleasing varieties of this thin, light ware were called *tortoise-shell*, *agate*, &c., and were glazed with lead, and coloured by the pencil and sponge in various ways, the oxides of manganese, cobalt, copper, and iron being the pigments. The Whieldons of Fenton were noted for this variety of pottery; and at one time the celebrated Wedgwood was a partner in their establishment. Of this eminent man, and of his improvement of the art, we propose to give an account in a future page.

The art of making china, or porcelain, has not been practised in the district till comparatively late years. About 1745 the Littlers of Brownhills appear, from specimens in existence, to have made an imperfect porcelain, ornamented with enamel colours, but they met with no success. In 1780 Hollins and Co., having purchased the patent of Cookworthy of Plymouth, for the making of porcelain, were more successful. Though the manufacture of the finer pottery is but a late acquisition in Staffordshire, yet, in the production of one species of it, *china*, or soft porcelain, it is unrivalled. Into this species of pottery much phosphate of lime, obtained from calcined bone, enters; and it cannot be surpassed, if equalled, in whiteness and transparency, even by the beautiful porcelain of Sèvres. What we will here exclusively call porcelain is more entirely mineral in its composition;—it is harder, more vitreous, non-absorbent when the fracture is applied to the tongue, little apt to crack when exposed to violent variations of temperature, infusible, and not easily acted upon by chemical solvents, and therefore to be preferred for the manufacture of chemical apparatus: its glaze is also of a hard nature. Porcelain is not much manufactured in Staffordshire (the ware called ironstone being, however, we believe, an approach to it), whilst the pottery of China,

Dresden, Sèvres, Berlin, and Vienna is of this description. The manufacture of china and porcelain is, or has been, carried on with various degrees of success in other parts of England besides Staffordshire: at Bow, Chelsea, Derby, Worcester, Shropshire; Swinton, near Rotherham; Nun-garrow, in Wales, &c.

Since the days of Wedgwood many very extensive manufactories have obtained great celebrity for their rich ornamental china, &c., as well as for the production of the more useful kinds of pottery. Nothing can exceed the taste, beauty, and richness of some of the present china, nor the excellence of the earthenware; but in other respects (in the production of what may be termed classical pottery) the art is not in a more advanced state than it was half a century back, owing, no doubt, principally to the caprice of fashion, and to the taste of the public. The classical and elegant vases, medallions, &c., of Wedgwood remain unequalled in their style,—and, in fact, would scarcely obtain a sale in the present day. And, as regards the form and ornament of our *common* pottery, we may remark, that the rude earthen vessel discovered in the Peruvian tombs, or turned up by the plough, on the ground where the Roman dwelt so many centuries ago, might frequently serve as a valuable model. It will probably be agreed, also, that at present, no sufficient system of instruction in chemistry, drawing, modelling, perspective, &c., is patronized in a district, where their zealous cultivation by the class of superior artizans is of transcendant importance.

Clay, or alumina, forms a principal ingredient in all pottery; but is found in nature in very different states of purity. Clays contain silex, and frequently lime, magnesia, and iron: the latter exists in most clays, with the exception of those of Dorset, Devon, and Cornwall, and its pre-

sence is incompatible with the manufacture of a white ware from such clay. The Dorset and Devon clays burn white, even when of a black colour—that being solely attributable to vegetable matter. Cornwall clay which appears to be analogous to the *kaolin* of the Chinese, is composed of sixty parts alumina, and twenty silex. It is obtained, by washing, from the decomposed felspar of granite, which is performed on a large scale. The light particles of clay, suspended in the waters of the streams used for the purpose, are allowed to subside in dammed pools, the clear water being afterwards drawn off. The clay is dug out and dried in sheds, and afterwards generally packed in casks. Pure clays are infusible, but harden by the action of fire, and also contract in it. The last property is, in some respects, unfortunate: for instance, busts cannot be obtained of the size of life, in porcelain, from plaster casts taken from the living figure, owing to this considerable contraction in the kiln. In other respects, as in the reduction of the size of figures and vessels in graduated sets, it is occasionally equally useful, as it does away with the necessity for fresh modelling. Clay likewise possesses, in an eminent degree, the property called plasticity. Vessels made of pure clay would be apt to disintegrate, would contract much, and crack, so that a due proportion of silex is necessary to bind it, and correct these properties, to give a degree of vitrescence, and also to add to the whiteness of the pottery. A pure silex is obtained from chalk flints from the south-east of England. They are first calcined, which renders them brittle, and easily ground. Grinding is still performed in the mills invented by the celebrated Brindley, in the wet way; the water facilitating the operation, and preventing the injurious effect which the dust would have on the health of the workman.

Granitic sandstone, from the grit hills around the potteries, has been re-introduced of late; and is extensively quarried, as a substitute for flint. The harder varieties require to be calcined before grinding. Of this sandstone 100 grains were found, upon analysis, to consist of—silica, 93.7; alumina, 4.0; water, 0.7; loss, 1.6; with a trace of iron. The iron appears to be easily got rid of, by washing after grinding; but some specimens also contain sulphate of barytes, which is not a desirable constituent. Cornwall stone, which appears to be similar to the *petuntse* of the Chinese, is decomposed granite itself. It is used both in china and earthenware; also in modern *stone* and *jasper* bodies. Another constituent substance, occasionally used, is felspar, of which some is imported from America, and some obtained from Wales: the former variety contains much mica occasionally. This is frequently added also to glazes, as are several species of the purer sands. Both Cornwall stone and felspar, being very fusible, give vitrescence and transparency to the ware. Steatite has also been used.

Of course, more of the fusible ingredients are used in the manufacture of china and porcelain, as a more perfect vitrification is required. However, in Staffordshire, bone, calcined and ground, enters very largely into the composition of china, in as large a proportion as nearly one-half. In true porcelain, bone is not made use of, or only in a small proportion.

When a porcelain body is more or less coloured by metallic oxides, it is called *stoneware*; and any species of body may be so coloured. A drab is produced by nickel, black by iron and manganese, blue by cobalt, green by protoxide of chrome. Turquoise is a white body, coloured with cobalt and oxide of tin; for the production of which Sèvres has been celebrated. The *jasper* bodies of so much

celebrity in the time of Wedgwood were composed of clay, flint, and the sulphate or carbonate of barytes, or carbonate of strontia, and of gypsum, or selenite. This, and similar varieties, are so vitrified as to require no glazing, which, in fact, the barytes prevents, whilst, on the contrary, stone-ware does undergo this process. Mortars are composed of three parts of Cornwall stone, and one of china clay.

In all kinds of pottery, except the very coarsest, it is necessary that the clay should undergo a process to clear it of its impurities, and also to produce an intimate combination of it with the other ingredients. The clay is mixed with water, the purity of which is attended to, in different vats and troughs, till a slip is formed, which is several times passed through fine sieves, so as to separate the impurities: the flint and other ingredients, if any, are added in a similar liquid state. The quantities are mixed in the proper proportion by measure, the specific gravity of each liquid being carefully regulated. The liquids are then blended and resifted, and afterwards pumped upon the *drying kilns*, when the water is evaporated by artificial heat. From the kilns, the clay is taken off in a very loose and cellular state; but this is got rid of by powerful beating and slapping, till at last it becomes beautifully compact and dense.

In some large manufactories the steam-engine is put into requisition, not only to break and grind the materials, but also to make the clay as above described, as well as to rotate the *throwers'* and *turners'* wheels, &c. The facility with which the *thrower* moulds the clay to any desired form, as it rapidly revolves on the little horizontal table before him, must be seen to be understood, and never fails to strike the beholder with admiration. Aided by the centrifugal force of the revolving mass of clay, it is seen to take a variety of forms in a few moments under his hands,

till he finally gives it the figure which his volition dictates, calling to our minds the force of the Scriptural allusions to the potter's wheel. The thrower's attendants regulate the speed of his wheel, and place the lumps of clay in his hand, ready formed, of a certain size. He is furnished with certain measures, which he readily fixes in the trough at which he sits, and in which his wheel is placed; and so regulates the height, breadth, &c., of the vessels in a moment of time. The articles, when made, are cut off with a fine wire, and delicately placed on boards, to dry in a sufficient degree for the *turner*.

The *turner* next, in a beautiful manner, fixes the frail vessel on the *chock*, or block, of his lathe, shaves off the redundant clay, and polishes the article. He occasionally ornaments it by horizontal movements of his lathe, &c.; and likewise, in some cases, rapidly colours the vessels with lines, marbling, &c.; and on the bands of thick liquid pigment of various colours, with which he sometimes encircles them, he easily forms pretty ornaments, by dropping a thinner colour, which ramifies, in a curious manner, in the creamy fluid. This is called *dipped ware*.

Plain *handles* are made by squeezing the clay in a screw-press through different shaped holes, fixed into the bottom of its iron cylinder. The lengths of clay so produced are cut into proper pieces, and bent into handles. Generally, however, handles and spouts are made in plaster moulds. They are fastened on the vessels by slip.

Only plain round vessels can be thrown or turned. Oval and other ornamental shapes are made in the moulds, described above, by the *hollow-ware presser*, who beats his clay out on a plaster block, and lays it in the pieces of the moulds, forcing it into all the cavities by the finger and a wet sponge. The separate pieces of the mould are then

put together, and the clay carefully united at the junctures. The mould is next placed in a hot room, when the plaster soon absorbs the moisture of the clay ; and, on disjoining it, the included vessel is delivered out with all its embellishments in relief.

In *flat-ware-pressing* the moulds fit the inner or upper side of the vessels, and the clay is placed upon them, flattened, as in the preceding case, on a slab. It is pressed down on the mould, as it revolves by means of a *jigger*, and is trimmed by proper instruments. Plates, dishes, and saucers are made in this way.

When dry, the different articles are placed in the *biscuit oven* to undergo their first firing. The oven is of a half oval form, with fires all round it, and the whole inclosed within a large hovel. It is these hovels which form such conspicuous objects in pottery districts. The ware is not exposed to the naked fire, but is carefully placed in thick vessels, called *saggers*, made of the fire-clays of the neighbourhood. China is sometimes buried in these saggers in powdered flint to prevent it from warping or losing its shape, when in a state of semi-fusion. When the oven is filled, its door is built up, and plastered with mud ; the fire being at first very gradually applied, but at length increased to a white heat, and kept at that temperature for a certain number of hours. The *fireman* knows how to regulate the heat, from the inspection of little rings of Bradwell, or other clays, called *trials*. These are, in fact, pyrometers, showing the degree of heat by a corresponding change of colour. They are, at the first, placed in the oven, and are occasionally withdrawn for observation on an iron rod, through holes left in its side for this purpose.

The ware, after the first firing, is called *biscuit*, and has commonly to be ornamented before *glazing*, unless it is to

remain white, or in the form of *cream-coloured ware*, originally called Queen's-ware.

Printing the ware, a process introduced originally at a pottery in Liverpool, is accomplished by taking an impression on thin tissue paper, by means of a press, from the copper plates engraved with the patterns. This paper is wet with soap water when laid on the plate, and the plate itself is heated. The ink used is of an oily nature, different metallic oxides being blended with it according to the colour desired: for blue, cobalt, the pure oxide of which is now more easily obtained, a way having been discovered of separating the nickel and arsenic of the ore; for lilac, smalt, with manganese; for orange, litharge and antimony, with oxides of tin and iron; for green, oxide of chromium, with or without cobalt or tin; for pink, subchromate of tin and carbonate of lime; for red-brown, manganese, with litharge, and flint, and borax; for brown, zaffre, litharge, antimony, and manganese; for black, red lead, antimony, manganese, oxides of cobalt and of tin. The paper, with the impression on it, is next placed upon the biscuit ware; and, after hard friction with flannel rubbers, the porous ware absorbs and retains the ink, and the paper may be washed off. Before glazing, however, the printed articles are exposed in a *muffler* to a red heat, to burn away the oily matter of the ink or colour. Latterly a species of drawing and etching on stone has been applied in the printing of earthenware, instead of copperplate engraving. Occasionally the impressions are taken from the plates upon bats, or tablets, of semi-solid glue, instead of paper: in this case, the pigment is not mixed with the ink, but dusted upon the moist engraving, after it has been transferred from the glue to the ware. This is called *bat-printing*.

Earthenware, in the biscuit state, is also sometimes painted with the various metallic colours by a kind of water-colour painting.

The process of *glazing* follows. In Staffordshire, the ingredients of the glaze are combined in the form of liquid, being ground and mixed with water. Into this the different vessels are *dipped* with a great dexterity, which is necessary to equalize the flow of the liquid over the surface. The composition of glazes is various, and their formation requires an experience of the properties of each ingredient. They are commonly composed of lead in its different forms, borax and alkalis; whilst the silicious matters with which these substances form the glaze by vitrification, are flint, glass, sands, Cornwall stone, felspar, &c. *Raw glazes* are those in which the materials are mixed together, and simply ground with water; but they are frequently first vitrified together in the form of a glass or *frit*. In the latter case, a more perfect mixture must be produced; and the injurious effects of the metallic ingredients on the health of the dipper are counteracted. Less lead is now used than formerly, tincal or boracic acid taking its place; and other noxious ingredients, such as arsenic, being seldom, if ever used; so that, perhaps we may say, that the workman in this department, at the present period, seldom suffers from his trade.* When the glaze is dry, the vessels are ready to be again placed in the *gloss* or *glazing oven*, which is smaller than the first, or *biscuit oven*, and the fire is continued a shorter time, a quick-burning coal being generally used. In the *glazing oven*, the glaze runs equally over the ware, and covered

* Ventilation and cleanliness are now also more attended to than formerly; but cases of colic, paralysis, nervous fever, and of a species of epilepsy, from the action of lead on the system, even now occasionally occur. The use of phosphate of soda, and castor oil, as purgatives, appear the best antidotes: unfortunately ardent spirits are more commonly had recourse to.

with this bright, hard, smooth, and durable coating of glass, after which it is drawn from this oven, and carried into the warehouse, where it is carefully examined and sorted.

There is some difference in the plan of firing and glazing, according to the nature of the pottery. A true porcelain is formed of Cornish clay (kaolin), and Cornish stone (petuntse), or, instead of the latter, fine sand and felspar; or, chemically speaking, of alumina, siliceous earth, and an alkali, with a portion of lime, magnesia, bone, or some similar ingredient; which last components give it transparency, by producing vitrification. In this pottery, the first firing does not vitrify the ware. The glaze is felspar with an alkali; and vitrescence, and an intimate union between the glaze and the body, are produced by the second firing, which is intense, and hazardous to the ware. A substance called *hoaché*, enters into the body of some of the Chinese porcelain, this is probably steatite. The substances found in Britain (Cornwall stone and clay), however, do not seem well adapted for this manufacture—and, in fact, it appears to be no *desideratum* on account of the extreme beauty of china.

Soft porcelain, or china, is made of ingredients which are less intractable in the fire than those of true porcelain, at least when combined in the usual proportions. The glaze used is also more fusible. China is vitrified during the first firing, the second merely melts the glaze, which, however, is harder and more infusible than that of common earthenware.

After the second firing, china undergoes the various processes of *painting* and *gilding*. The colours with which it is painted are the usual enamel colours, metallic oxides, mixed with fluxes whose chemical nature is suited to the properties of the colours, commonly, however, formed of

flint, borax, and lead. The painter is furnished with the colours ready fluxed and ground ; and he mixes them with spirit of tar, and turpentine, or with oil of lavender, and so works them on the glazed china. Though these painters are often, from want of education, deficient in a knowledge of the principles of the art, perspective drawing, &c., many of them are able to produce a most beautiful effect from their fine pencilling and accurate copying, aided by the peculiar fitness of this kind of painting to produce brilliancy, transparency, softness, and blending of colour. Fruit and flower pieces, as well as portraits, may be painted on china, with every shade and tint which can be produced by oil ; and over these colours the artist has the most perfect control, though they have a very different appearance when just pencilled, to that which they assume when vitrified. Such portraits, well done, combine the richness of oil, with the pencilling of miniature, and are besides of a most durable nature. It is after being fired in the *enamelling kiln* that the various colours put on their true appearance ; and the unengaging and obscure unburnt paintings, are now seen in all their bright and beautiful tints. To produce these, of course very various substances are used. Blues are made from cobalt ; zinc gives it opacity (mat blue) ; phosphoric acid gives it a rich purple tint ; tin and alumina dilute or vary it. Manganese will produce a violet. Greens are obtained from copper, and also from protoxide of chromium, and are varied or diluted with cobalt, lead, tin, or alumina, and enamel. Reds are made from nitrate of iron, dichromate of lead, or muriate of manganese. Pink ; subchromate of tin. Rose ; gold and tin (precipitate of Cassius), with a little silver. Brown ; chromate of iron or antimony, lead, and manganese. Orange ; antimony, tin, and iron, also chromate of lead. Yellow ; antimony, tin, and lead, and

chromate of lead ; also oxide of silver, and green oxide of uranium. Drab ; yellow oxide of uranium. Brown ; titanium (at Sèvres). Black ; oxide of platinum, or iron, cobalt, nickel, and antimony. White ; arsenic and tin. Most of these are not acted upon by any ordinary substances when combined with the enamel ; but the rich opaque blue, produced by cobalt with zinc, appears to be so occasionally ; also the greens and a few others. Many of the substances named are added *only to vary* the tints.

The gold, for gilding china, is commonly obtained from its solution in *aqua regia* by evaporation, or by precipitation, by means of metallic copper or sulphate of iron, from which it is afterwards freed by washing in dilute acid. It is then formed with mercury and silver into the state of amalgam, and united to a portion of flux. It is worked up into a state fit for the pencil with turpentine. The precipitated gold is, however, occasionally mixed with borax and gum-water, and so pencilled on. Sometimes the gilding is done on a ground raised above the surface of the ware, which gives it a more costly appearance ; this ground consists of a metallic enamel, coloured yellow by antimony. In the enamelling kiln, the mercury sublimes, leaving the gold fluxed upon the ware, and it is then polished by means of whiting, and the use of agate pencils.

There are other inferior modes of gilding. It has been performed merely by means of gold leaf, and a strong size. Another species of gilding is produced by brushing a weak wash of gold, in precipitation with iron, upon a ground of purple enamel, itself produced by gold. This thin coating of gold soon wears off ; however, in this case, there is still the purple pattern left. Another cheaper kind of gilding is also used, called *lustre*, applied principally to common ware. In this, the oxide of gold is combined with oil, and

sulphur, and the composition brushed on. In the kiln, the vehicle used is burned away, leaving a thin film of gold on the ware, not, however, pleasing in appearance. A bright silvery covering is produced in the same way from platinum: this appears to be very durable, and is probably well adapted for several purposes, but seldom, however, seen.

The elegant and natural figures of flowers, in full relief, so common on Dresden and other vases, are ingeniously made, by working the petals, leaves, &c. simply on the palm of the hand, with the finger, &c., aided by iron *stilettes*, *spatulas*, and other little instruments; the adhesive property of the clay being counteracted by the use of oil. Moulds are only occasionally used. The flowers are fired and glazed, and then carefully coloured.

Of late, small articles have been made, in a novel and ingenious way; being stamped in dies, by a strong pressure, from clay in a state of powder. A firm and solid cohesion of the material is produced by this method of manufacture. Beautiful buttons are so obtained, as well as the tesserae for Mosaic pavements, &c.

The tessellated tiles, now so much used for the pavement of churches, halls, &c., are made of different coloured clays, commonly black, red, and yellow. The tiles are formed from moulds into which the clay is forced by a press; in the squares so formed, certain depressions are, in this stage, seen on the upper surface, varying according to the pattern; and into these depressions the different coloured clay is plastered in a softer state. After this, the tiles are allowed to remain for some weeks, and then the superfluous clay is scraped off from the surface, and the pattern brought out. They are glazed or not, according to circumstances. When laid down, the effect is beautiful, resembling the richest pattern of the loom.

MEMOIR OF JOSIAH WEDGWOOD, F.R.S.

JOSIAH WEDGWOOD, the son of Thomas Wedgwood, a potter, was born at Burslem, July 12, 1730. He was the youngest of thirteen children. His ancestors had lived for some generations in the place of his birth, and most likely derived their origin from the hamlet of Wedgwood, in Wolstanton parish; and his great-great-grandfather had married into another ancient family, bearing the name of Burslem, which, in all probability, they had obtained in a similar manner. His school attendance must have been very trifling, for it is related, that, at the early age of eleven, he began to work as a *thrower* in the service of his eldest brother Thomas—his father being already dead. The small-pox, then an unmitigated scourge, but now, happily—thanks to the immortal Jenner!—divested of its terrors, left a lameness in his right leg. This compelled him to relinquish the potter's wheel, and not improbably led him to turn inwards to his own resources; affording an example of an apparently fatal impediment proving the spring to future greatness. At a later period of life, he was under the necessity of submitting to the amputation of this limb, below the knee; after which his gait became peculiar, from wearing a cork leg.

In 1752 we find him at Stoke, the partner of Mr. Harrison, engaged in the manufacture of ornamental knife-hafts, and other small articles, in earthenware. In two years he transferred his partnership to Mr. Wheildon, of Fenton; an engagement more favourable to the development of his talents. Many specimens of their productions, which are similar to, but more varied than those made at

Stoke, remain. At the termination of this partnership, in 1759, he returned to Burslem, and commenced business alone. Here he continued a number of years prospering, and laid the foundations of his eminence as a potter. He made tortoise-shell and marbled plates and other wares in great variety; but here, by the study of chemistry, he began to improve the composition both of the bodies and glazes of earthenware. His productions in white-stone-pottery are distinguished by chasteness and ornament. At this period English pottery, if not unknown, was unpatronized in our own land. The higher classes had their tables covered with tea-services from China; and, if they dispensed with the ordinary pewter dishes and plates at dinner, it was to introduce oriental wares, beautiful articles from France, or pottery from Holland or Dresden; whilst the lower orders still retained their wooden platters and dishes. The trade, therefore, was one almost entirely of import. Wedgwood turned his attention to the improvement of table-ware, and in 1763 succeeded in obtaining the patronage of royalty. The youthful consort of George III. granted him her sanction, and allowed her name to be attached to one pattern of his cream-coloured-ware—*Queen's-ware*. The King himself selected another—*Royal-pattern*. Some of the crowned heads of continental Europe subsequently added their patronage to Wedgwood; the Emperor of Russia receiving a painted set of cream-coloured-ware. By this means he converted the trade to one of export, and based his rise on the support of the opulent, not merely of his own country, but also of the continent.

We cannot follow Wedgwood step by step through his successful career, in which he was gradually amassing wealth, and acquiring respect. These were not the results of accident, or the effects of extrinsic encouragement alone.

By an untiring energy, ceaseless industry, and great judgment, combined with liberal views, by which he was far from aiming at accomplishing his own aggrandisement alone, but regarded the prosperity and comfort of all those under his employment, he raised a useful art into an important branch of national manufacture, and extended the field of British commerce. But what especially distinguished him is, that, by his own individual, but energetic exertions, he was able to elevate this art, which he found in comparative obscurity, to a degree of splendour before unknown, and since unequalled in many respects.

The efforts of Wedgwood were directed to improve the roads of the district; and he took the most active part in promoting the Trent and Mersey Canal, against the opposition of the land-owners. He subscribed 1000*l.* to this latter undertaking, and took a good number of shares besides. From this spirited conduct, it was thought meet to assign to him the honour of breaking the first ground for the canal. Whilst it was in progress, he purchased the Ridge House estate, lying on the course of the canal, in the township of Shelton. Here he erected a new manufactory upon a large scale, covering upwards of seven acres of ground, houses for his work-people, and a residence for himself—the latter surrounded by ornamental plantations.

“A new ETRURIA decks Britannia's isle!”

Previously to this, Wedgwood had taken Mr. Bentley, a descendent of the famous critic, into partnership: a man of classical learning and elegant taste, whose connections with the aristocracy of talent as well as rank were of the utmost advantage to the progress of Wedgwood. And it is related that the partners themselves commenced potting operations at their new manufactory with their own

hands,—Mr. Bentley turning the wheel, whilst Wedgwood *threw* some vases and other vessels. One of these, an imitation of an ancient *terra cotta* vase, now deposited in the incipient North Staffordshire Museum, bears the following inscription:—“June XIII., MDCCLXIX. One of the first day’s productions at Etruria, in Staffordshire, by Wedgwood and Bentley. Artes Etruriæ renascuntur.” It was about this time that he commenced a new era in British pottery, which future ages will distinguish by his name, for it rose and declined with him. He engaged the ablest artists and men of science in his assistance, to improve the bodies and glazes, the shapes and various ornaments of his ware. Mr. Chisholme, an assistant of Dr. Lewis, the writer on chemistry and *materia-medica*, lent his aid in chemical improvements; Flaxman, Messrs. Webber and Hackwood, afforded designs in those departments in which taste presided. One result of these labours was the invention of a number of artificial porcelains, imitating the natural gems used by the ancients for the production of cameos and other works of art. These imitations were very numerous, resembling in this respect the diversity produced in the laboratory of nature. Besides black and a delicate dead white, they were tinged by the different metallic oxides, blue and green of all shades, and many other colours. They were possessed of a dense vitrescent texture, and were very hard, so as to be capable of taking on a gem-like surface, without glazing. The two most famous of these vitrescent porcelains were named *Egyptian black* and *jasper*. The former is a dead black body, obtaining its colour from the oxides of manganese and iron, and was chiefly applied to the imitation of antique vases. On these were depicted, in Wedgwood’s encaustic colours, which, when exposed to the furnace, were not liable to

run, the various devices of the originals. Jasper was chiefly formed of the native sulphate of barytes. Deep blue, produced by oxide of cobalt, and either imparted to its substance, or, by means of a dip, applied to the surface only, was the colour most usually given this porcelain. Upon the blue vase, or the disk, of a medal, dead white reliefs, displaying the most delicate designs of ancient or modern art, were cemented by the potter. The imitation cameos, medallion busts, and portraits, of Wedgwood—of which he formed a vast number, representing an endless variety of antique gems, and likenesses of crowned heads and of celebrated men, the benefactors of mankind, belonging to different ages and countries—were executed with the highest taste and finish, whether in Egyptian black or jasper, and were eagerly purchased for the cabinets of the curious, in which they now maintain the character of great rarity and unrivalled excellence.

“ Whether, O friend of art! your gems derive
Fine forms from Greece, and fabled gods revive ;
Or bid from modern life the portrait breathe,
And bind round honour’s brow the laurel wreath ;
Buoyant shall sail, with fame’s historic page,
Each fair medallion o’er the wrecks of age ;
Nor time shall mar ; nor steel, nor fire, nor rust
Touch the hard polish of the immortal bust.”

The composition of the barytic jasper porcelain is said to have been betrayed by a workman, when other potters produced cheaper but inferior articles. Amongst these rivals, however, the name of Turner deserves to be excepted, since his productions, in delicacy and elegance of design, went far to excel even those of Wedgwood. It was but a next step in Wedgwood’s successful career, when engaged in gratifying the most refined lovers of art and *vertu*, to open exhibition-rooms in London, which were

principally superintended by Mr. Bentley, and became a fashionable resort, where specimens of the medallions could be seen, and descriptive catalogues, both in French and English, could be obtained. But whilst we have chiefly dwelt on these latter productions, which are so intimately connected with the renown of this great man, it must not be supposed that his labours relaxed for the improvement of useful wares. On the contrary, his dinner and other services were carried to the highest perfection of the art. The body was compact and durable; the glaze white, and perfectly vitrescent; the colours chaste, and the shapes elegant. The quantity of clay expended in the formation of each piece was much smaller than in the pottery of the present day, and was regulated by weight; and great attention was paid to preserve truth of shape, so as to make such articles as plates “nest” well, or fit each other exactly, all imperfect or defective pieces being destroyed. It was found that this ware bore exposures to heat and changes of temperature without cracking, or injury to the glaze, so that it possessed the powerful recommendation of being very durable. No wonder that the partners should have been able to have ensured an extensive export trade to the continent of Europe, where their productions acquired an unrivalled reputation. At a subsequent period a gentleman of the name of Byerley succeeded Mr. Bentley as the partner of Wedgwood at Etruria. Wedgwood’s imitations of the ancient *terra cotta* vases, collected by Sir William Hamilton and others, exceeded the originals in execution, and obtained an extensive fame. But the most remarkable of his imitations remains to be mentioned—that of the celebrated Barberini vase, now called the Portland vase, and constituting one of the choicest treasures of the British Museum. This, which is perhaps the most finished

and costly gem of ancient art that has descended to our times,—itself the subject of an eventful history,—has been the source of many speculations in explanation of its mystical embellishments. Wedgwood and his coadjutor-artists were engaged two years in bringing the exquisite fac-simile to perfection, when it is related, that the fifty copies, then made, were disposed of at the price of fifty guineas each. When completed it obtained the concurrent testimony of the three presidents of the Royal Academy, and of the Royal and Antiquarian Societies, Sir Joshua Reynolds, Sir Joseph Banks, and the Earl of Leicester, as to the accuracy of its resemblance to the original. On ushering his imitation into the world, Wedgwood accompanied it with a publication, in which he had collected the various attempts of others to explain the designs represented on the Portland vase; and a separate dissertation of his own, containing his views on this subject, as well as the curious history of the vase itself. This dissertation is distinguished amongst the speculations on “Portland’s mystic urn,” by its plain sense and strong probability. The vase itself was discovered during the pontificate of Urban VIII., of the house of Barberini, which extended from 1622 to 1644, inclosed in a marble sarcophagus, covered with figures in high relief, in a vault on a small eminence, called *Monte del Grano*, near Rome, and it contained ashes. The sarcophagus was deposited in the gallery of the capitol, and the vase in the library of the Barberini family; whence it passed into the hands, first of Sir William Hamilton, and afterwards of the Duke of Portland, who purchased it for 1000 guineas. It is believed that the tomb was that of the Emperor Alexander Severus. As the vase itself has acquired a popular fame, and the designs upon it appear to throw light on the belief of the ancients in a future state, we shall

quote Wedgwood's illustration of them. He says—"It appears to me that these figures were emblematical images; nor am I, in the present day, singular in that opinion. Every one knows that an inverted torch is the emblem of extinguished life. It is, therefore, natural to suppose that the figure of the female, of sorrowfully-depressed expression, who holds the torch (especially considering that it is found upon a sepulchral urn), is the emblem of death, and, being between the two other figures, she may be regarded as the principal one of the group. The column, which is behind the figure of the man, and the overturned capital of which lies at the feet of the emblem of death, seems to intimate that the deceased was the head of a family, or of an empire; for a column is the emblem of both the one and the other: and it is evident that an urn so rich and costly could not be intended for any but persons of the highest rank, and that it would be impossible for others to be at such an expense. The sceptre, which the other female figure holds in her hand, is, according to all appearance, an emblem of the office of the deceased, and the right he had to administer justice; it may also signify the family of which he was the head, or the province of which he was governor, or perhaps the tutelar divinity of one or the other." "As the works of the ancients often present, in the same group, real personages, accompanied by emblematical figures, it is very possible that the male figure, who is turning round to cast an expressive look at the female, who regards him in the same manner, was intended to represent the deceased personage. If we view the subject in this light, the first group will represent to us the touching scene of a great personage snatched away by death from his family, or his kingdom; and if we reflect, that the artists of antiquity, in order to produce that sublimity and

grandeur of expression which we admire, even at the present day, in their works, observed the principle of giving in their designs, only just so much action and expression as they considered necessary to indicate the character which they wished to represent; we shall perhaps find, that the countenance and attitude of these two figures express sufficiently the feelings which would be naturally experienced on such an occasion." "The other side of the vase, although a continuation of the same subject, appears to be a distinct tableau, presenting to us an idea honourable to the memory of the dead. He is there represented as a young man, in the flower of his age, making his entry into the Elysian Fields. It is well known, that at all periods, whether in their writings or other works, the ancients expressed, by the symbol of a gate or portal, the passage from this life to another. Here the artist has shown great ingenuity; and, in the first step which the new comer takes in going from the portal, may be recognised all the apprehension and timidity of a man who enters upon an unknown region; and his garments, which he is represented as having retained until the last moment, may, perhaps, be a suitable image of the repugnance which man has to quit his material body. As the figure in the centre of the first group has been regarded as the principal one, and the emblem of death, so we may presume the figure in the centre of this (seeing the place she holds, the office she fills, and the serpent she has in her hand, which is well known to be the symbol of immortality) to be the principal figure in this group, and the emblem of eternity. She takes the disembodied spirit by the hand, with an air of affection, and encourages him, by her look and gesture, to advance; whilst Love, who goes before, torch in hand (but not inverted, as in the other group), to show him the way, turns

his head towards him, and casts on him a look full of tenderness. And Pluto, the sovereign of the realms below, and who is the last figure of the group, appears ready to receive him, in an attitude, and with a countenance which make one conceive that he views the arrival of the stranger with gravity and attention, mixed with what we may call, even in Pluto, an air of benevolence. As to the foot of the vase, the figure which is found there, the character of the drapery, and, indeed, the whole of the work, appear of a style altogether different from that of the figures on the vase, and, as may be seen, it has been necessary to cut it, in order to fit it to the vase, to which it is merely cemented; these reasons, together with others, make me presume that it is only a piece affixed, which belonged to some other work, and which has been made use of as a substitute for the real foot, which would probably be found to be destroyed when the vase was broken into two or more pieces.”*

In addition to the high merit of having established and perfected a valuable staple of manufacture—administering in such a multitude of ways to the comforts and conveniences of life,—of having restored and surpassed some of the ancient arts, distinguished by their finished elegance, Wedgwood, a man whose education was limited to the barest elements of knowledge, became eminent for his scientific acquirements, and, as we have seen, the master of a clear style of writing. He invented an instrument for measuring the high degrees of temperature of his furnaces, hence denominated a *pyrometer*, which consisted of pieces of baked argillaceous earth that were introduced between two bars, inclined towards each other at one end, and having a scale affixed to them. By the shrinking of the clay,

* See the quotation more at length in “The Borough of Stoke-upon-Trent: its History,” &c., p. 435.

which was supposed to be proportionate to the heat to which it was exposed, the temperature was measured. But it has since been ascertained, that a long-continued, though less heat, has more effect on the clay than a shorter and more intense one, and Wedgwood's pyrometer has fallen into comparative disuse. He described his invention in a paper which was read before the Royal Society, May 9, 1783, and was inserted in the seventy-second volume of the *Phil. Trans.* This paper he afterwards republished in French, under the title of "Description et usage d' un Thermometer," &c. Lond., 1785. In the year following the reading of his paper, he had the honour of being elected a Fellow of the Royal Society; and, in 1788, a Member of the Society of Antiquaries.

It was in 1783 that some serious disturbances took place at Etruria, caused by the dearness of bread, from the circumstance of this village being on the line of canal by which flour was transmitted from one place to another. On this occasion he was deeply affected, and wrote a plain but excellent pamphlet, powerfully remonstrating with the folly and wickedness of the parties engaged in the disturbances. And in the same year, it is related, he published "An Address to the Workmen in the Pottery, on the subject of Entering into the Service of Foreign Manufacturers." The same authority* informs us, that, in the year 1785, Wedgwood was examined before a Committee of the Privy Council, and at the bar of both Houses of Parliament, upon the occasion of an intended adjustment of the commercial intercourse between England and Ireland. He there gave an enlarged idea of the importance to the national interests of the Staffordshire manufactures; and further expressed his opinion, that,

* *Op. cit.*, p. 440.

great as the advances were which had already been made in these manufactures, they were but still in their infancy, when compared with the extent to which they were capable of being carried. About the same time he was an active supporter of an association in London called "The General Chamber of the Manufactures of Great Britain." Besides the pamphlets already mentioned, in reference to Wedgwood's literary productions, the result of self-culture, we ought not to omit the extensive correspondence he carried on with many of the most distinguished ornaments of literature and science of his age, both at home and abroad.

Wedgwood never extended his plans to the formation of china, or a semi-vitreous, semi-transparent ware; and it is remarkable that he did not adopt (but this, we believe, was from benevolent considerations) one of the greatest improvements in the potting art, that of printing the ware, under the glaze, with impressions in coloured inks, at first blue only, transferred from copper plates. His productions, like oriental ware, were always ornamented with the pencil, and no doubt exhibit a clearness of outline which printed pottery cannot equal. But, as in the case of manuscript and printed books, of illuminated books, and those illustrated by the engraver, cheap production is found to teem with advantages of another kind, which the utmost efforts of the human hand cannot compensate. Still the whole career of Wedgwood showed him alive to the inventions which promised improvement in the figuline art. During his residence at Burslem, when the ingenious Mr. John Baddeley invented "the engine-lathe," a machine for imparting to the surface of earthenware vessels a great variety of ornamental devices, he received the most substantial encouragement from Wedgwood. After much entreaty, the inventor was induced to show

the latter his unfinished lathe, of the success of which, probably, his own mind was not free from doubt; when Wedgwood, after a careful examination, pronounced, "It will do, —I see it will do!" and let the artist have little rest till his work was completed—for he called daily to inspect its progress. It is worth reciting that Wedgwood was a man of very industrious habits, and an early riser; being usually engaged in visiting the workshops of his men as soon as they reached the manufactory. And these visits were not visits of form, or even of mere selfish feeling; on the contrary, he took deep interest in every process of the art, many of which he himself was skilled in; for instance, his patterns and shapes, he was accustomed to design with his own hand, cutting them out with a pair of scissors in paper,—and in the personal concerns of his work-people, with which he made himself intimate, he displayed the sympathy of a friend.

His benevolence displayed itself in numerous acts of kindness and generosity. He contributed towards the pursuance of philosophical studies, by supplying every kind of useful apparatus, made of pottery. Wedgwood instituted the extensive application of a strong porcelain to mortars, and various chemical and other vessels, which have so materially facilitated the progress of science. Of his liberality in promoting the arts, we have the following high testimony, given by C. R. Cockerell, Esq., Member of the Royal Academy, in his evidence before a Committee of the House of Commons, on Arts and their connexion with Manufactures. "In illustration of the munificent and enthusiastic patronage of manufacturers, and the honour and advantage they confer upon their country, I beg leave to mention an anecdote of the late Mr. Wedgwood, related to me by Mr. Cumberland, of Bristol, who

wrote a pamphlet in 1792, recommending a national gallery of sculpture, casts, &c., in aid of which Mr. Wedgwood made a tender of 1000*l*. I beg further to say, that I have found Wedgwood's works esteemed in all parts of Europe, and placed in the most precious collections of this description of works."

Numerous instances of his generosity might be adduced. He always furnished funds for relieving the wants of the poor of his neighbourhood, particularly against the inclemencies of the winter; and, at his decease, remembered all his more needy relatives with a substantial legacy. In the district, which was the scene of his labours, he has acquired the honoured epithet of "the Father of the Potteries." Wedgwood terminated his earthly career at his house in Etruria, January 3rd, 1795, in the 65th year of his age. His remains were interred at the parish church, at Stoke-upon-Trent. In the chancel of this church, his memory is recorded by a chaste mural monument of marble.

The great peculiarity of the mind of Wedgwood, seems to us, to have been its practical character, its tendency to seek after extended usefulness, without being dazzled by any extrinsic splendour; in which aim he was materially assisted by his strong sense, and the activity and vigour of his faculties; and the principles of his character were of that enlarged and noble kind, as to give ample scope for the display of every effort of his genius. Although a comparatively uneducated man, his mind was capable of great expansion, which we have a right to infer, he spared no pains in imparting to it.

We cannot do better than terminate our observations with the following summary of his character, from the elegant pen of Dr. Aiken:—"The qualities of this estimable person were so happily combined and balanced, that few

more universally respected characters, in public and private life, were to be met with. To uncommon firmness of mind, and independence of spirit, he joined the elegance of manners, courtesy, and deference, which suited the elevated society with which he was conversant, and the consequence and celebrity which he attained. In his dealings, he was not only strictly correct, but refined and delicate. He so far overcame the disadvantages of education, as to speak and write his own native language with purity and precision, and to display a well-finished and cultivated mind."



CHAPTER XIII.

SMELTING OF IRON, ETC.—ECTON MINE—COAL MINES, ETC.

“Hail, adamantine Steel! magnetic lord,
King of the prow, the ploughshare, and the sword!”

LEAD AND COPPER MINES.

THE lead mines of the centre of England were undoubtedly known to, and worked by, the Romans, as pigs of lead with Roman inscriptions have been frequently found. In 1792 one was turned up at Hints, near Tamworth; it measured twenty-two inches and a half long, and weighed 150 pounds: it was inscribed:—Imp. Vesp. VII. T. Imp. cos. In fact, this great nation was far more enterprising in mining operations than the different people who succeeded in Britain. There is no evidence that the Saxons or Danes worked the mines in these parts: a very old mine, however, near Castleton, is still called Odin's mine.

It would be out of place here to enter into the subject of working mineral veins, or to describe the method of draining mines, ventilation, &c. Though the levels for the purpose of draining are very curious and remarkable for their extent in some cases in Derbyshire, they are inferior in this respect to those of Cornwall. When the ore of lead is obtained it is crushed or stamped, and dexterously washed in different ways, to separate the impurities, such as spar, &c.

Smelting lead ore is a simple operation, performed in *cupolas*, or reverberatory furnaces; when the sulphur, arsenic, &c. are first driven off by heat, and exposure at the same time to the action of the air, continued for some hours; and the ore is afterwards reduced and melted, and the slag separated by a still stronger temperature, and the addition of a little quick-lime. The melted metal is drawn into pans, and afterwards ladled into the iron moulds, in which the pigs are formed. From the slag, which is drawn out separately, is also obtained another portion of lead, possessing somewhat different properties from the former. More than half its weight of metal is yielded by the dressed ore. The lead of Staffordshire and Derbyshire contains a portion of silver, but in too small a quantity to be separated by *cupellation*. Formerly the ore was melted by wood or charcoal fires, on the summits of high hills, blown by the wind alone—these were called *hearths* or *boles*. Hence, in Derbyshire, the summits of high hills are occasionally named from these boles. The only smelting works for the ores of lead, zinc, or copper, which we know of in Staffordshire, are those of Whiston, Mixon, and one or two below Ecton. In 1840, those of Mixon were not in work.

To reduce zinc ore, which is, like that of lead, a sulphuret, it is calcined, to rid it of the sulphur, and then distilled, *per descensum*, from iron or clay crucibles, closely covered up, of course, as the metal would otherwise fly off in the form of oxide. The melted metal escapes by a hole at the bottom of the crucible into a receiver; when it is cast into quadrangular cakes. At Whiston, we noticed six of these crucibles of clay arranged in a circular oven, of a similar form to those used by the potter.

Calamine is here more particularly used for the manufacture of brass.*

Ecton copper mine is remarkable for its great depth—upwards of 1500 feet; as well as for the extent to which its excavations have been made. It is different from most of the mines in this district, being what is called a pipe mine. The vein of metal is, in reality, formed by the crossing of two other veins, running somewhat towards the cardinal points of the compass. Where veins cross in this manner the ore is frequently plentiful and rich; as was the case here. The pipe vein descends into the earth in a north-east direction, and at intervals, where it swelled into extensive deposits of ore, enormous chambers have been formed upon it, one above another, by the excavations of the miners. The drainage of this mine is effected by a water-wheel, upwards of thirty feet in diameter and six broad, worked by a stream, which is conveyed into the mine, from the opposite hill, by means of the aqueduct of wood, seen to pass over the road leading to Hartington. Immense heaps of limestone, rubbish, and veinstuff, lie around the mine, much of which is reworked for the copper it contains; and also picked for the sulphuret of zinc. An ancient steam-engine, having a copper boiler, is a conspicuous object on the high hill at the mouth of the shaft; and there are several *adits* or levels from the side and foot of the hill in the direction of the vein. At the upper level the ore is landed, being drawn up in two iron tubs, one ascending as the other descends. This shaft is not bricked, but has the rugged and bare rock at its sides; and, consequently, is not

* Till the middle of the eighteenth century the immense quantity of zinc used in England was imported by the East India Company, whilst the black-Jack or zinc ore, so abundant in our own country, was thrown aside, or used to mend the roads. This fact shows the advantage of paying attention to our native productions.

often used for the miners to go down by : at present ropes of iron wire are used in this shaft : though the buckets move at a rapid rate they are four or five minutes in reaching the bottom. At the end of the second adit, which opens into the valley, a little above the bed of the river, and about a hundred yards below the shaft mouth, is the water wheel working the pumps ; and here, too, may be seen the drawing shaft, through a lateral opening or chasm. There is also a great capstan here for lifting heavy weights ; and by another level, one of the chambers, formed by the extraction of the ore, may be entered from this spot. The water from the pumps makes its exit from the mine through the adit above described, under the boards of the flooring. The summit of the shaft by which the workmen descend may be also seen near the pump ; this is done by means of ladders. But few will make this descent, and we confess we did not wish the fatigue of going further ; we therefore copy the account given by a more ardent observer. " After descending what appeared to us an almost interminable number of ladders, and after groping our way through several cavernous passages, hewn out of the solid rock, and scarcely high enough in some places, to admit of our standing erect, we landed within forty yards of the bottom of the mine, in a gloomy excavation of great extent, and very considerable height. In the dense and overwhelming obscurity which reigned around us, scarcely broken by the feeble glimmer of our lights, we were unable to form any probable estimate of its proportions ; if we state its altitude to be in some parts not less than fifty or sixty feet, it is certainly not overrated. We were now buried, as it were, in the very bowels of a mountain at the depth of, at least, fifteen hundred feet beneath its summit. The situation itself is one of appalling

loneliness, and even in the company of the miners, who, from the force of habit, behold the scene with careless indifference, it is hardly possible to shake off the apprehensions which it is so well calculated to inspire." * Gunpowder was first used in England for blasting at Ecton in the year 1620, being introduced for this purpose by some Germans. The working of this mine was, however, discontinued in this century, but in the following it proved an exceedingly profitable concern to the Duke of Devonshire. About 1781 twelve tons of refined copper were produced weekly from it. Of late years little has been done; but recently a company has been formed, and the mine having been pumped of its water, good specimens of ore have again been raised from its bottom. Lead ore is also found, and much sulphuret of zinc, combined frequently with copper, a union, however, considered to be no desideratum, as the two cannot be easily separated by washing.

The most valuable ore of Ecton is the sulphuret of copper, which is picked, stamped, and *buddled*, or washed in the river below the mine. It is smelted at Whiston, and was formerly also manufactured into brass and copper articles at several works in the district. The process of reducing the ore, and obtaining pure copper, has for several centuries been pursued at Whiston. It is a complicated operation. The small ore is first calcined in a furnace, being frequently stirred to prevent fusion; this rids it of a portion of its sulphur, arsenic, &c., and it is then melted in a second furnace, when part of the slag, iron, &c., is got rid of: the melted ore is then run out into water, when it puts on the form of a coarse shot, of a dark colour: the ore may now contain one third metal. It is again several times

* Ashbourne, and the Valley of the Dove.

recalcined, and remelted, being each time granulated, or else formed into large pigs. It is next roasted, previous to the processes of refining and toughening. In the operation of toughening, the brittle, crystalline, purplish-red metal is covered, in the melted state, with charcoal; and then a pole of wood (birch or larch) is inserted into the melted metal, which is attended with an ebullition, owing to the escape of carbonic acid gas, and the copper, on cooling, obtains the desired properties of malleability, &c. This process of *poling* requires care, and if overdone, produces effects different from those desired; in which case an opposite course must be pursued, the air being freely admitted. After poling, the metal at Whiston is formed into large cakes, small ingots, or shot; the last being obtained by letting the melted copper fall into a well of water.

IRON.

The iron ore of Staffordshire is that form of it called the *earthy carbonate*. It was smelted at a very early period in this district, perhaps in the time of the Romans. In North Staffordshire, iron was certainly got soon after the Conquest. It was smelted at Uttoxeter in the thirteenth century, and coal and ironstone were both dug at Amblecote in the reign of Edward III.; coal mines were also mentioned amongst the articles of revenue of Hulton Abbey, at the Dissolution. In 1735 furnaces for the making of iron existed at Trescote Grange, Leek, Madeley, Mere-heath,* Rushall, Teauford, Pensnett, &c. Charcoal was originally used for the smelting of the ore, as it is now in Sweden and Norway; but in the year 1619 one Dudley commenced the use of coal in iron smelting at Pensnett,

* Here charcoal was used in smelting, as may be seen on inspecting the rubbish.

now exclusively employed in England, generally in the form of coke. Mr. Blewstone, a high-German, likewise attempted to make iron with raw coal. Previously, however, in 1589, Mr. T. Procter had obtained letters patent for making iron and lead with pit-coal instead of wood. In 1588 iron was manufactured with wood in Canke Forest.* The value of the iron smelted in Staffordshire may be inferred, when it is stated, that the quantity of this metal made at the present time (February, 1842) in Great Britain, is at the rate of more than a million of tons annually, and that one third of this quantity is smelted in this county. The number of furnaces at this time in North Staffordshire is 18, in South Staffordshire 135, though only 98 altogether are in blast, making 8295 tons weekly. Much ironstone is conveyed by canal into South Staffordshire to be smelted; a considerable quantity from the rich ironstone field of North Staffordshire, where the ore is of a good quality.

The iron ore is found in layers, several of which generally occur together, only separated by a little clay or shale, forming a band. It is, when raised, seen in flat tables; frequently in great massive pieces; or in the form of balls, occasionally columnar within. It is composed of iron, oxygen, and carbon; also alumina, and some carbonate of lime; and occasionally it contains other substances, as the carbonates of manganese and magnesia, silica, bitumen, iron and zinc pyrites, arsenic, phosphorus, titanium, &c. The ore may frequently contain about one-third per cent. of metal, combined principally with carbonic acid, which, therefore, constitutes a considerable part of the weight of the ore. The heaviest ores may not be better than

* Lansd. MSS. Brit. Mus.

lighter ones, as the latter may have that quality only from containing coal.*

The ore is first calcined in large heaps with cannel or small coal, when it loses one quarter or more in weight, and then appears in the form of a heavy blue or reddish cinder, and has become magnetic, as may be seen by powdering a portion, and applying the magnet. This process ought always, for the sake of the public health, to be performed, as it is in some districts, in kilns.

The coal consumed in the furnace, if the cold blast is used, is first coked; which is done by imperfectly burning it in heaps covered with dust or sand; or, better in kilns, by which process it loses its volatile parts only—bitumen, sulphur, &c. Of course, the less bitumen the coal contains, the more is the coke produced. The coal of South Wales is, therefore, particularly well adapted for coking.

The flux necessary, is limestone; and much of that used in South Staffordshire, is obtained from the quarries at Caldon Low, in the northern limestone district, where a pure stone exists in an inexhaustible quantity. Fluor spar is only occasionally used as a flux; this is obtained from Cromford.

The ore is first smelted into *pig-iron*, in strong blast furnaces, constructed of fire-brick, and other infusible materials, with a bottom of grit-stone; the air being forced in, in a condensed state, by the power of the steam-engine. To regulate the flow of air, it is first forced into a spherical, or cylindrical chamber, or regulator, from which it enters the furnace by one or more tubes, nearly at the bottom, whilst the ore, fuel, and flux, are thrown in towards the summit, being frequently raised up to the mouth, by

* The valuable "black band" ironstone, situated over the "bassy coal" in North Staffordshire, is an ore of this nature. It appears to be a similar band to the noted Scotch vein of the same name.

means of the steam-engine; but, where the nature of the ground admits, the furnaces are so built on the sides of hills, that there is no necessity for the inclined plane or engine to convey the ore, &c. up to the furnace mouth. A furnace will remain, for several years, in constant operation uninjured, producing from fifty to one hundred tons, or more, of iron, per week. To Mr. Gibbons of Corbyn's Hall, considerable praise appears due, for his improvements in the construction of furnaces.

Under the intense heat of the blast, the ore is reduced, and sinks from the boshes, or wider part of the furnace, to the bottom, into the hearth or crucible. As it descends, by its superior gravity, to the bottom, the lighter slag swims upon it, and issues by a hole in the side of the furnace, whence it is carried away, whilst the melted metal is let out by tapping, and run into sand, to give it the form of pigs; during which time the engine is stopped, or the blast is withdrawn from the furnace, and the air allowed to escape in another direction; occasionally, however, it is not formed into pigs, but simply run out, water being thrown upon it. The furnace is tapped every twelve hours. A ton of ironstone yields, perhaps, fifteen cwt. of roasted ore, which may produce from 31 to 46 per cent. of cast iron. The reduction of the ore is accompanied by the union of the lime with the earthy and silicious matter of the ore and coke, forming the slag. This slag is glassy, and commonly of a blue colour, owing no doubt, to the presence of iron; but sometimes darker, which is a sign that the iron is not well separated from the ore, and that what is obtained will not be sufficiently carbonized. No doubt, a variety of gases are formed in the process: the quantity of oxygen necessary to produce the intense heat is enormous, and it is thought that four times (by weight) as much air is taken

from the atmosphere, as the solid matters thrown into the furnace; whilst the product of metal, including the cinder and slag, is less in weight than the ore and limestone without the fuel. Much carbonic acid gas must be formed, by the union of the oxygen of the air and ore with the carbon of the coke, and more or less also of the latter combines with the iron. The nitrogen of the air consumed, must escape by the chimney, with the hydrogen of its aqueous vapour. The inflammable nature of some of the gases which are emitted, is seen in the great volume of flame at the furnace mouth.

The coke, in Staffordshire, is used in about the same proportion as the ore; the limestone in that of about ten per cent. An immense saving in fuel and flux, and also a greater yield, has been the result of Neilson's invention of the hot-air blast; in this mode of smelting, the air is first heated to 300 degrees Fahr. or more, before it passes into the furnaces, frequently very much higher, even to 607°, the melting point of lead; and, coal is used instead of coke. In cold air smelting, the air when forced in the chamber, or cylinder, loses, of course, part of its latent caloric in a sensible form, as all bodies do when compressed. When the pressure is removed, as it escapes into the furnace, and again expands, it must regain this lost caloric, in part from its own sensible heat. It therefore enters the furnace much colder than the external air—in summer even, probably not much above the freezing point, a disadvantageous loss of temperature. Besides, in the hot-air blast, the air is said to enter the furnace in a state freer from moisture.

Cast iron is called No. 1, 2, 3, &c. as it contains more or less of carbon. The Staffordshire pig-iron is not generally highly carbonized, as it is much used for the manufacture of *bar iron*, and not for casting. In appearance, iron of the

best casting quality, is dark and crystalline within, and covered with plumbago or *kish* externally, easily cut with the chisel, and very fluid when melted; whilst the less carbonized kinds are more compact, and mottled or grey in colour internally, and externally covered with oxide, also more cellular and concave above.

There seems to be a difference of opinion as to the effect of the hot-blast on the quality of the iron. It is said, at present, that the hot-blast iron is, in some respects, particularly for casting, inferior to that made by the cold-blast, being less carbonized. In other qualities it may be equal, or superior. It appears to be, chemically, a purer metal; and the inferior irons are said to have been improved by the hot-blast; and, in some cases, it also would seem, that hot-blast iron is the stronger.

Cast iron is fusible, hard; not malleable, but brittle; and cannot be hardened or softened like *steel*. It contains more carbon than the latter.

Bar iron, unlike cast iron, is extremely infusible, but possesses the property of welding. It is also devoid of the brittleness of cast iron; is flexible and ductile at all temperatures—the hotter the more so. It is not softened by heating and slow cooling, as steel is; and, on the contrary, is but little hardened by sudden cooling. It is easily filed, and, if pure, probably contains no carbon. It is these properties which make bar iron so valuable to supply the wants of man—far more valuable, in reality, than gold or silver—properties which savages the least removed from barbarism readily discover, and so much prize—a small piece of the metal, where it is scarce, being thought by them the most valuable of blessings.

To convert pig-iron into this useful substance it undergoes one or two processes. *Refining* is accomplished by

remelting the cast-iron on a smaller scale, burning off the slag, and suddenly cooling it; in which operation it loses about seventeen per cent. of its weight, becomes harder, close-grained, white, more infusible, and still less malleable. Another process, called *puddling*, succeeds, which was invented by Cort, 1780, who, however, like many other inventors, reaped little but misfortune from his discovery. In puddling, the metal is first melted in small quantities (a little slag being occasionally added) in a reverberatory furnace, where the carbon and oxygen are burnt off, so that the metal loses ten per cent. in weight. Whilst it is in this melted state, it is puddled, or stirred, with iron rods, through a hole in the side of the furnace, water being added or not. Now the iron becomes tenacious, clotty, and malleable; having, however, at an earlier stage of the process, put on a totally different appearance, being of an opposite consistence, and disintegrated like sand. The heat is regulated by a damper at the top of the furnace chimney. When the mass shows its tenacious clotty character, it is divided by the puddler into several portions, and these, called *blooms*, are submitted (though not always) to heavy hammering, or *shingling*, and are then passed through powerful rollers. The rough bars so made are welded together in the *balling furnace*, and again passed through rollers into bars of any particular thickness, when it is ready for sale, and to be manufactured into an innumerable variety of goods; or to be again carbonized and converted into steel for cutlery, &c., by heating with charcoal, attaining then the properties before alluded to, and becoming hardened to a great degree, and rendered very compact, strong, and susceptible of a high polish.

Occasionally pig is converted into bar iron by a single process called *boiling*. In this the metal is melted with

hammer-slag, and boiled for about half an hour; the cinder then separates, leaving the pure metal to be worked into the malleable state by the puddler.

COAL-MINES.

The disposition of the strata in a coal-field is generally so well understood, that the operation of *boring*, in order to explore them, is but occasionally resorted to. Boring is performed by a chisel at the end of a rod, varied in form according to the nature of the strata; and the matter obtained is brought up in a tube also screwed on the lower part of the rod: as the chisel pierces deeper, the iron rods are lengthened by screwing other pieces to the upper end. Occasionally, the chisel must be changed, or the tube let down and brought up; and to accomplish this, the whole length of rods has to be withdrawn: this renders the process tedious. When some depth is attained, of course, the weight of rods becomes great; and they are raised by means of a windlass, and pulley-block and rope, suspended from three poles fastened at the top. The rod is also alternately raised and depressed in cutting and boring, by means of a cross elastic beam or *spring-pole*, the weight of the rods driving in the chisel; whilst a lateral rotating motion is given by one or two men, at a cross handle at the summit of the rods. Several men are also required at the lever to lift up the rods. When the rods are to be extracted, they are secured from falling back, whilst the lengths are successively disjoined, by inserting a *fork* under the collar at the top of each rod, and unscrewing them by means of a *spanner*. After a certain depth, boring becomes expensive, from the time required to raise and let down the rods; as well as from the liability of the rod to break; in which case, days may be occupied in regaining the lower portion.

A good bed of coal having been found by boring, or by other modes of observation, or being previously known to exist, from a knowledge of the strata, a *shaft* or pit is sunk down to it. These are frequently expensive undertakings from their depth, the inlet of water, the hardness of the rocks to be pierced, &c. The shafts of coal mines are generally round, and they are bricked or occasionally *tubbed*, unless when sunk through firm rock, a process necessary both to support the sides, and to prevent the inlet of water. A *horse-gin*, *whimsey*, or a better steam-engine is used to draw up the rock, marl, shale, &c. produced by sinking, or simply a windlass, or *turnbeam* at first. When the coal has been *won*, it is worked in different ways, according to circumstances.

A bed of coal is more or less horizontal, sometimes, quite so, occasionally much inclined, or in fact, nearly perpendicular or *rearing*, in some parts of the North Staffordshire coalfield. The thickness of the beds also varies much, though they are usually from four to ten feet; the thick coal of South Staffordshire is thirty feet thick; and, of course, these variations give rise to different modes of ventilation and working, and greater or less difficulty and danger in so doing. Generally, a *horse-gate* or gallery, laid with rails, is driven, right and left, from the bottom of the shaft along the level of the coal, by means of which the coal is drawn to the bottom of the shaft by ponies. The coal may, perhaps, be first got on the rise of the stratum, and if the bed of coal (or ironstone, got commonly by this method) is to be taken away entirely, it is by the plan called *long-work*; in this case the strata are allowed to sink and close upon the empty space left by the removal of the coals: galleries are driven into the bed, from the horse-gate, in such directions as is most convenient for the transit of the

coals obtained. The coals are also hewn or wrought in a direction oblique to the level, owing to the natural fissures or *slines* alluded to below. In the North of England galleries or *boards* are driven into the coal at right angles to the horse-gate, at certain distances from each other, say 70 or 80 yards. The quadrangular areas or masses of coal are then worked away, ribs of coal being, however, left, or walls raised, strengthened with pillars of timber, at the sides of the galleries and boards. The coal is drawn down into the horse-gate through the boards. The great portions of coal, contained between the boards, are either got entirely, the roof being prevented from coming down by props of timber, which are withdrawn as the miners proceed, and the strata allowed to close in; or occasionally pillars of coal are left, which are finally, in part, or wholly removed.* Generally, the *slack* or small coal is sufficiently valuable to be drawn to the surface; but, sometimes, it is left in the space from which the coal has been removed, called the *waste* or *gobbing*. The miners find that an attention to the direction of the natural partings or slines of the coal, is requisite for its easy excavation, and consequently the direction, in which they carry on their operations to take away the masses above described, varies.† If the coal has been worked away above the level of the shaft, it may next be got downwards or below the horse-gate, in which case the coals will have to be drawn upwards. Frequently, by

* The mode of getting in practice in North Staffordshire, called *post and thirle*, is a modification of this plan, successive rows of posts or pillars being left, and the *wall* of coal hewn or *thirled* away from them.

† These slines generally much facilitate the getting of the coals, but in particular situations in a mine, it may happen, that the coal must be got, as it were, "against the grain." We have satisfied ourselves that the law mentioned by Murchison and Phillips, respecting the direction of these fissures, holds good in the Pottery coalfield, they being diagonal to the lines of dip and level. At Fenton Park, at one colliery, they run 3° E. of S., and 3° W. of N.; and the dip is 3° S. of S. W.

means of a long inclined railway, the coals are worked much lower on the dip still; and there is generally a steam-engine near the bottom of the shaft to draw them up this inclined plane. Several beds of coal, or ironstone are worked from the same pit, and, in many cases, level galleries are driven below the beds, proceeding horizontally, till the natural dip of the stratum brings it down to the level of the cross cut; of course, fewer shafts have to be made, to work an extended bed of coal, in this plan of getting.

But to enumerate all the modes of working coal would exceed our limits:—in perpendicular or rearing beds, for instance, the method of course varies, and is attended with more danger of accident; and again, in the thick beds of coal of South Staffordshire, where great pillars of coal, or *men of war*, are left to support the roof of the lofty excavations, and where the usual plan of ventilation must likewise vary.

Timber is used to support the roof in getting veins of ironstone, as well as the sides and roofs of the galleries of coalmines. Being extremely subject to decay in some situations, particularly where the ventilation is imperfect, it becomes expensive. The terebinthinate woods, as larch and fir, are most durable.

There are few mines which do not require to be drained of their water, which would otherwise accumulate in them, and fill the workings. This is sometimes accomplished by driving into them *culverts*, or galleries from neighbouring low valleys; or more generally by pumping up the water, from the lowest part of the mine, in shafts sunk for the purpose, by powerful steam engines; or by conveying it by means of drains, to other shafts and engines at a distance. The pumps do not differ much, excepting in length, from

the common pump, having, besides the valves of the bucket, others called *clacks*, below, which likewise open upward. The inferior extremity is perforated with holes, to prevent the entry of pieces of timber, lumps of coal, &c., and is sunk into a well, or *sump*, at the bottom of the shaft. When the mine is very deep the pumping apparatus may be divided into several *lifts*, the lowest pump delivering its water into a cistern at the bottom of the next, and so on. These cisterns are frequently placed where water breaks into the shaft, that it may not sink to the bottom, and thereby require more steam power to raise it. The water, also, is frequently not brought to the top of the pumping shaft, but delivered through a side culvert into some neighbouring valley. Sometimes, if little in quantity, it is brought up in a large iron tub.

If a mine be at all extensive, and particularly if on a bed of coal which abounds in inflammable air, great attention to ventilation soon becomes necessary. Two shafts are now requisite, one being made the downcast and the other the upcast pit. Down the former the atmospheric air is made to rush, and up the latter, after it has circulated through the mine, to ascend. The air would, under almost any circumstances, have a tendency to circulate thus, descending by one shaft and ascending through the other, and this tendency is increased by various methods. In many cases a fire is burned in a sort of furnace, erected over the mouth of the upcast shaft, which of course creates a great draught; it has, however, been advantageously placed at the bottom. Occasionally a fire, contained in a large portable grate, is hung by a chain at some distance down the shaft. Sometimes a steam engine is placed at the bottom of the shaft, to draw the coal up the inclined plane, to drain the mine, &c.; and the smoke and steam

from this engine being discharged into the upcast shaft, has, also, the effect of producing a powerful current. These methods seldom fail to produce a good draught, if there be two shafts; in case there be but one, which is rarely the case in Staffordshire, a wooden pipe is sometimes fixed to its side down to the bottom, and the air is made to descend through it by means of a box fixed at the top, and open at the side, which is always turned to the wind. A strong draught having been procured, it then remains to make it circulate in a good current through all the galleries and chambers of the mine; and, if this be accomplished, no accumulation of inflammable gas, or *fire-damp*, or of carbonic acid gas, or *choke-damp*, can occur. To effect this extensive circulation some channels have to be stopped up, others opened, and in many places valvular or trap doors are essential, only opening in one direction. The upcast and downcast shafts being situated together in many cases, and for convenience communicating below, the air is prevented passing from the bottom of one to the other by double trap-doors, only opened when necessary; and then not both at the same moment, for, if that were done, the ventilation of the mine would immediately be stopped. It is generally less perfect in the chambers whence the coal is being hewed, and the inflammable gas is also apt to accumulate in the *waste*, from which it has been taken.

The ingenious system of ventilation, just described, was invented by Mr. Spedding of Whitehaven, about the year 1760, and it has been improved by Mr. Buddle and others. Other plans or modifications have been proposed; such as that of Lieut. Menzies. Ryan's methods appear somewhat empirical, but some collieries are said to have been benefitted by them.

The gas, so fearfully destructive from its explosions, and to prevent the accumulation of which this ventilation is principally necessary, is a combination of hydrogen with carbon—four parts, by weight, of the former, with eleven and a half of the latter. It is not inflammable unless mixed with as much as six, and not more than fourteen volumes of common air. It is given off by the coal either slowly and silently, or in a more rapid violent manner by what are called *blowers*. Wherever it abounds it is extremely dangerous to use a naked light, or to blast the coal with gunpowder; and the safety lamp, invented by the great Davy, must be used. No doubt most explosions happen from the neglect of the use of this lamp, in some seams of coal always necessary; in others only occasionally so, to explore after any temporary suspension of work (when accumulations are particularly apt to be found, especially if the ventilation has been defective), or in certain conditions of the atmosphere, indicated by a low state of the barometer. Frequently, however, the naked candle may be used in the Staffordshire mines without any risk. Beautiful as is Davy's invention, it does not appear to be always a safeguard. Though the wire gauze, which surrounds the lamp, does not commonly allow flame to pass, and though it will not, when red hot from the combustion of the gas within, set fire to the gas without, yet it appears that when a current of explosive mixture is moving through a gallery at the rate of three hundred feet a minute, the gauze is no sure protection. And it also appears, that any foreign body, such as a particle of soot or coal, coming in contact with the outside of the red-hot gauze, in a current of inflammable air, may become ignited, and explode the mixture. The lamp of Messrs. Upton and Roberts, an improvement on Davy's, appears, in some respects, safer.*

* Parliamentary Report on Accidents in Coal Mines.

The miners of this district are fully aware of the value of the safety-lamp; and, in dangerous mines, they are much used. Occasionally, however, at least in North Staffordshire, very defective ones are sold, of local manufacture—made more capacious than Davy directs, with the bottom of tin, and screwed on in a very imperfect manner. A valuable use of the safety-lamp is, that it enables a miner to try, without risk, the purity of the air of any part of a mine, as the flame lengthens where gas is present; and a proportion of only a thirtieth part may be thus known.

In North Staffordshire some of the seams of coal are gaseous—such are those called the Ash and Great Row. Some of the shafts to the former bed are upwards of 1000 feet deep.

Carbonic acid gas, or *choke-damp*, is also another evil which the miner has to fear—particularly immediately after an explosion, by which it and nitrogen are produced. If breathed, it instantly suffocates; and it is, from its great specific gravity, apt to accumulate at the lowest parts of shafts, mines, &c. It is remarkable that the lead mines of Derbyshire and Staffordshire are not subject to this, though one would expect that the limestone (carbonic acid gas and lime), in which they occur, would be apt to give it out. Other gases (hydrogen, and olefiant gas) have been supposed to be occasionally present in coal mines.*

Carburetted hydrogen does not appear to exert any violent effect on the health of miners, apart from its explosive properties. Colliers are, however, rather subject to catarrh, produced by the dust which they inhale, and which is sometimes seen to give a black appearance to their lungs after death. This, however, is a very different affection

* We believe it to be well ascertained, that a gas occasionally exists in coal mines, which, unlike nitrogen and carbonic acid gas, has but little effect on a light, and yet destroys life when breathed.

from that serious one called *melanosis*. Mines are occasionally unhealthy from their high temperature, frequently owing to a bad ventilation, or to the decomposition of the martial pyrites contained in the coal and refuse. This temperature is occasionally as high as ninety degrees Fahrenheit. The curious disease, described as affecting colliers, attended with an alteration of the appearance and properties of the blood, is probably rare. In fact, the employment of the miner and collier appears to be tolerably salubrious; as much so (barring the accidents to which they are exposed) as most others, though far from suitable to the tender in sex or age.

Colliers work in flannel dresses, as being most calculated to protect the body from fire, in case of explosion; but the *getters* have frequently the upper part of the body naked, as the heat is often so great.

The coals are commonly drawn up in *corves*, or *skips*, which are wooden boxes, of which the sides are readily taken away from the bottom in several horizontal sections. Iron rods are sometimes fastened to the side of the shaft from the top to the bottom, for the purpose of steadying the corves in ascending and descending.

The colliers themselves are commonly let down and drawn up sitting in the loops of a chain, and their heads are defended from any accidental fall of coal, &c., from the top, by an umbrella of sheet iron.

Coals are sometimes got from the surface, which is also the case more commonly with ironstone. In other cases, the mines may be entered from the surface by slanting galleries, or *foot-rills*, driven down into the beds of coal.

CHAPTER XIV.

STATISTICAL TABLES, ETC.

No. 1.—Summary of the Population of Staffordshire, from the Census of 1841.

	Males.	Females.	Total Persons.
Hundred of Cuttlestone,.....	13,579	13,264	26,843
----- Offlow,.....	77,550	72,689	150,239
----- Pirehill,	63,791	64,378	128,169
----- Seisdon,	67,320	63,906	131,226
----- Totmonslow,.....	23,943	24,240	48,183
City of Lichfield,	3,099	3,662	6,761
Borough of Newcastle-under-Lyme, .	4,786	5,052	9,838
----- Stafford,.....	4,796	4,449	9,245
Total,.....	258,864	251,640	510,504

No. 2.—Showing the Increase in the Population at each Decennial Census.

Year.	Population.	Increase per cent.
1801	239,153	
1811	295,153	21
1821	345,895	17
1831	410,512	19
1841	510,504	24·3

In reference to the two tables above, it may be remarked, that Staffordshire is one of the few counties (principally mining and manufacturing) where the males exceed in number the females. In the kingdom at large the number of females predominates; yet it is well known the births of male children exceed those of female children. Such a change in the disparity of the numbers of the two sexes is accounted for by the more exposed life of males, and illus-

trates one of the remarkable laws brought to light by statistics, that which maintains the general equilibrium of the numbers of the two sexes. A larger number of males are both born and die. We may account for the fact, that there are in Staffordshire an unusual proportion of males (1000 males to 972 females), by supposing that the onerous nature of the prevalent occupations and manufactures draws an excess of the stronger sex.

During the last decennial period, there are only four counties in which the rate of increase in the population reaches 20 per cent.: Durham, 27·7; Lancaster, 24·7; Monmouth, 36·9; and Staffordshire, 24·3. The last table also shows that the population of the county has doubled in about 37 years; whilst, from calculations made upon the census of 1841, of the general rate of increase of females, who, from their domestic habits, are more certainly available for statistical purposes, it would require $52\frac{1}{4}$ years to double the population of the kingdom at large.

Some of the following Tables (from the Registrar General's Annual Reports) present a somewhat unfavourable view of the degree of salubrity of certain of our districts. Generally speaking, the mortality in town districts, in all parts of England, much exceeds that in rural ones; the excess in the former case being on almost all diseases, with the exception, perhaps, of scrofula, apoplexy, and influenza. The mortality of towns is increased to a lamentable extent in such as are large, manufacturing, crowded, smoky, ill-built, badly drained, &c.

No. 3.—The Mean Annual Number of Births and Deaths in certain Districts, for the Three Years, ending June 30, 1841, to 50 Males and 50 Females. The last column shows in how many of the Population one Death annually occurs.—From the *Fourth Annual Report*.

	Births to 100 living —50 Males and 50 Females.	Deaths to 100 living —50 Males and 50 Females.	One Death in so many of the Popu- lation.
England,.....	3·175	2·214	44
Metropolis,.....	2·966	2·557	39
Staffordshire, ...	3·575	2·287	43
Derbyshire,....	3·194	2·221	45
Devonshire,....	2·786	1·760	56
Lancashire,	3·722	2·859	34

No. 4.—Showing (according to the Registration and Census of 1841) the rate of mortality in certain Districts of Staffordshire, being the mean of Three Years preceding June 30th, 1841.

One Annual Death in so many of the Population.

Stoke-upon-Trent, Burslem, and Wolstanton (including the Potteries),.....	40
Walsall,	43
Stone,	55
Stafford,	45
Newcastle-under-Lyme,	40
Birmingham,	40

No. 5.—(From the Second Annual Report.) On the 28th May, 1821, there were living in the following Counties in every 10,000 Males, and in every 10,000 Females, aged

	70 to 80		80 to 90		90 to 100	
	Males.	Females.	Males.	Females.	Males.	Females.
Stafford,.....	207	212	52	59	4 $\frac{1}{4}$	6
Derby,.....	227	217	59	59	4 $\frac{1}{2}$	4 $\frac{3}{4}$
Salop,.....	262	264	71	94	4 $\frac{3}{4}$	7 $\frac{3}{4}$
Middlesex,.....	137	160	25	37	2	3 $\frac{3}{4}$
Northumberland,....	276	284	82	93	10 $\frac{1}{2}$	13 $\frac{3}{4}$
England collectively,	221	228	56	64	4	5 $\frac{3}{4}$

No. 6.—In Deaths Registered from July 1, 1837, to June 30, 1840, both inclusive, there were (the annual mean) in every 1000 deaths—

Places.	Under 5 yrs.	70 to 80.		80 to 90.		90 upwds.	
		Males.	Femls.	Males.	Femls.	Males.	Femls.
The Metropolis	404	60	78	21	34	2 $\frac{1}{2}$	5 $\frac{1}{2}$
Mining parts of Durham and North- umberland	407	74	82	40	74	7	15 $\frac{1}{2}$
Mining parts of Staffordshire and Shropshire	521	51	58	23	33	2 $\frac{1}{2}$	7
Rest of Staffordshire, of Shropshire, and Cheshire	375	81	82	48	53	5 $\frac{1}{2}$	8 $\frac{1}{2}$
Birmingham	474	50	55	17	26	2 $\frac{1}{2}$	3 $\frac{1}{2}$
Norfolk and Suffolk	352	100	103	70	77	12 $\frac{1}{2}$	14 $\frac{1}{2}$
Whole of England and Wales	395	80	85	44	53	6	9 $\frac{1}{2}$

No. 7.—On the same plan as the preceding ; but only for One Year, ending
June 30, 1841.

Places.	Under 5 yrs.	70 to 80.		80 to 90.		90 upwds.	
		Males.	Femls.	Males.	Femls.	Males.	Femls.
Stoke-upon-Trent, Wolstanton, and Burslem (Potteries)	487	56	61	20	23	1 $\frac{3}{4}$	3 $\frac{3}{4}$
Uttoxeter, Cheadle, Leek, and Longnor	281	91	91	85	95	14 $\frac{1}{2}$	10 $\frac{1}{2}$
Wolverhampton and Seisdon	593	28	44	20	24	3	6
Tamworth, Lichfield, and Burton- on-Trent	321	111	90	74	79	7 $\frac{1}{4}$	20 $\frac{3}{4}$
Whole of Staffordshire	467	60	63	46	45	4 $\frac{1}{2}$	7 $\frac{1}{2}$

No. 8.—(From the Register of the Parish Church, Stoke-upon-Trent.)

Year.	No. of Deaths, the age being above 70.	No. of Deaths, the age being under 5.	Total No. of Deaths.
1834	31	156	338
1835	22	159	328
1836	27	144	301
1837	35	203	393
1838	19	153	325
1839	31	129	325
	165 or 80 in 1000	944 or 467 in 1000.	2010

Of the deaths at above 70 years of age, 18 occurred in the "Spital;" being paupers from different parts of the wide parish, which has other places of burial.

The tables, from No. 3 to 8 included, show that, in certain of our districts in Staffordshire, an impure atmosphere, unhealthy employments, and mining accidents, are circumstances very unfavourable to longevity; whilst, in some of the rural districts, the value of human life is greater than the average. They also show, in some districts, a great mortality in children below the age of 5 years; as in the Potteries, and more particularly in the mining district of South Staffordshire and Shropshire, a circumstance due, perhaps, to a variety of causes; amongst which may be mentioned the employment of the mothers in manufactures, and consequent neglect, and improper feeding in early infancy, their ignorance of domestic duties, and their neglect of, or inability to procure sufficient medical advice in cases of infantile and puerile sickness. With respect to violent deaths, whilst explosions of inflammable gas seem more destructive in the mining districts of Northumberland and Durham, deaths from the fall of earth (probably in the iron-stone mines) are very numerous in Staffordshire, Shropshire, and Wales. The high rate of the mortality alluded to is equalised, as regards population, in a remarkable manner, by a proportion of births greater than the average.

The following Table will give a comparative view of the deaths from phthisis, or pulmonary consumption. The prevalence of this affection is much influenced by climate. Thus, the mortality from the disease is great in the north-east part of Staffordshire—high, cold, and humid; whilst the general healthiness of that district is, as just seen, above the average. Another great cause of the disease is confinement to sedentary handicrafts—the purity and im-

purity of the air appears to have less effect: thus the miner escapes, whilst the artizan frequently meets an early death.

No. 9.—Showing in 100 Deaths the number of Deaths from Phtisis in the following Districts. The mean of Three Years ending June 30th, 1840.

Whole of England and Wales	18½
Metropolis	15¼
Devonshire	17½
Mining parts of Durham and Northumberland	15
Birmingham	20½
Mining parts of Staffordshire and Shropshire	15¼
Rest of Staffordshire, of Shropshire, and Cheshire	21¾
West Bromwich	15
Walsall	15½
Wolverhampton	13½
Tamworth, Lichfield, and Burton-on-Trent	15¾
Uttoxeter, Cheadle, Leek, and Longnor	21¾
Newcastle-under-Lyme	19
Stoke-upon-Trent, &c. (Potteries)	22½
Stone	21
Stafford	15
Penkridge and Seisdon	17½
Staffordshire collectively	17½

No. 10.—Cholera in 1832.

Places.	Pop. in 1831.	Cases.	Deaths.
Bilston	14492	3568	742
Darlaston	6647	220	68
Dudley	23043	1224	277
Kingswinford	15156	263	87
Sedgley	20577	1349	290
Tipton	14951	1452	424
Walsall	15066	346	85
Wednesbury	8437	285	95
Westbromwich	15327	297	62
Wolverhampton	24732	565	193
Wednesfield	1879	1	0
Willenhall	5834	42	8
Total	166271	9622	2313

The above Table, it may be noticed, refers only to the southern manufacturing and mining district of the county. Birmingham, though so near this district, it is

well known, suffered comparatively little. Many rural places entirely escaped. The Pottery towns were also some of them quite exempt from the disease, and in none was it very fatal. Newcastle-under-Lyme was more severely visited. In South Staffordshire the first death occurred, June 15, at Tipton; the last, Nov. 29, at Dudley. At Bilston there was a plurality of deaths in 49 families; and, in 4 of these, the number of deaths amounted to 5. At Bilston, with respect to sex, the deaths were proportionate, with respect to age, as follows:—

Under 10 years,	20	30	40	50	60	70	80	above	unknown.
116	96	198	103	110	90	43	25	10	15

We omit other tables, respecting the eruptive diseases, &c., which we had compiled from the Reports of the Registrar-General and Census Returns (to which we are so largely indebted), thinking that they would have less general interest than the above.



ADDENDA.



TO CHAPTER I.

THE following fact has been observed by a correspondent—we have noticed the same in North Staffordshire. “A large proportion of the waste land of South Staffordshire has evidently” (in remote times) “been in a high state of plough cultivation.” He mentions numerous examples. “When was it thrown out, and what was the cause?”

Accidents from deleterious gas seldom occur in lead mines. At Butterton, near Leek, however, a melancholy one occurred last year, in the mine mentioned at page 25, from the presence of noxious vapour, but of what nature it was may be somewhat doubtful. A little boy, in play, ventured down the ladder; “on arriving near the bottom, he instantly exclaimed, *I am dying*; his playfellow immediately gave the alarm, when three men, one after the other, each attempting to rescue the preceding, met the same unfortunate fate.” We are also informed by the principal miner, that the pit had been some time closed, till the boy opened it, and that its working was stopped, “because nothing but large bodies of pyrites were found, and because the gas from the waters had a violent effect on the miners’ eyes.”

The water of the Motts Well, near Uttoxeter, contains sulphuretted hydrogen, as well as being of an encrusting quality.

ANTIQUITIES.

In the Cottonian Library are many MSS. relating to the Antiquarian History of the county. Several may be found under the heads Lichfield and Burton, others are:—

The Lives and Martyrdoms of St. Wolfade and St. Ruffin, &c., in old English verse.

Registrum chartarum prioratus B. Mariæ et S. Wolphadi de Stanes, &c.

Vita S. Modvennæ, virginis Hibernicæ, per Galfredum Edys, Burtonensem monachum.

An Exemption to William Heyworth, Bp. of Lichfield and Coventry, from attending parliament on account of his age and infirmities. (Orig. Lat. on vellum.) 17 Hen. VI.

Annales de rebus Anglicis, 1066 ad 1374, per Will. de Schepseved monachum abbatia de Crokysden.

Amphibali (S.) Vita, Passio, Miracula, &c.

Annales monasterii Burtonensis, temp. Ethelredi fundati, per Wilfricum cognomento Spot, &c.

In the Harleian collection:—

Armes found in Aldrydge Church, 1583, &c.

Notes and extracts from deeds relating to the Abbey of Pulton or Dieulacres, (to which place the monks of Pulton were removed,) found in the Chartulary of that house, &c.

Carta foundationis Abbatia de Hulton, per Henricum de Audidelege. A. D. 1223.

Carta foundationis Prioratus de Trentham per Ranulfum Comitem Cestriae, &c.

An old Clog-Almanack used in Derbyshire or Staffordshire.

Other MSS., copies of charters, &c., under the heads, Burton, Trentham, Dieulencrase, Rocester, &c.

Dr. Pegge published a history of Eccleshall Manor and Castle, and of Lichfield House, in London, 4to.

Mr. Fletcher of Dudley, has shown us a Roman bottle of porous red pitcher, found near Kingswinford.

A boss or umbo of a Roman shield was lately found on Hardwick farm, at the north end of Great Barr common, half a mile from the line of the Ick-neild street. Plates of iron were found with it, but they were quite oxydized, so that it was impossible to preserve them. It is deposited in the Birmingham Museum, and we have been favoured with an electrotype copy of it, through the kindness of Mr. Ick. "It is of metal as hard as gun-metal" (bronze?), circular, and two inches across, with the design in well executed relief. This design is "a captive stripped and bound to an oak, while two female figures with long flowing hair, perhaps Druid priestesses, are in the act of immolating him; one is armed with a club, the other with a short sword. In the back ground are other female figures bearing his helmet, cuirass, &c.; in the foreground lies a sword, shield, and a musical instrument *like a viol*," also a garment and pieces of armour. This very remarkable relic has been supposed to represent the death of a Roman soldier at the hands of the British females; it however probably figures the death of Orpheus, beaten to death by the women of Thrace. *See* Virgil.

TOTMANSLOW HUNDRED.

TUTBURY CHURCH. The Norman entrance arch has seven mouldings. The first outer one has no pillar, like the following, but is continuous with a projecting horizontal band or string, two lions forming its corbels; it is ornamented externally with circles enclosing animals, and internally with hatched work. The second moulding is externally of

flowers with foliage, and internally of zigzag work. The third, roses outwards, ribbed or fluted inwards. The fourth has zigzag work within, and winged foliage without. The fifth is of beak-heads of lions or tigers with moustaches, and other elaborate ornaments. The sixth is formed of alabaster, and all the carving is very fresh; the device is of complicated beak-heads, three together, being birds or griffins, with other decorations. The inner moulding is of three rows, of the common zigzag work. The columns have their capitals adorned with figures of men and animals, in part restored. The horizontal band is of cross-work and flowers; there are also bisected arches, hatched work, &c. on the front. The window is rich, but with only three mouldings—the outer rim ornamented with beak-heads and flowers; the middle one of moustached beak-heads and other rich device; the inner one of zigzag.

ALTON. Here some recent excavations have disclosed more remains of the once impregnable baronial fortress; they consist of arches, apartments, a deep well, and other objects. The foundations of the walls are built in grooves cut in the solid sandstone rock. On the opposite side of the deep fosse, on a commanding rock, is now built a Roman Catholic chapel in Pugin's best style, with a beautiful cross standing opposite the entrance; the interior has the usual excess of ornament of that creed. Alton church does not appear in any part older than the Reformation, and contains nothing to interest the antiquary. The same may be said of Bradley Church, the situation of it, however, being remarkably secluded.

CHEADLE CHURCH has, like that of Bradley, been rebuilt, with the loss of all its antiquities, if it ever had any. Here too, a pretty Romish chapel is in the course of building by Pugin.

ROCESTER. Here there is a fine shaft of a cross in the churchyard, besides the upright stone which we have figured.

CROXDEN ABBEY. The round arches seem to be placed only where strength is particularly required. The west entrance is of many mouldings, with three lancet-shaped windows above of great height. The cross appears rather from the gable than from a rood-loft. There is a stone coffin on the floor of the chapter-house, which was rounded at the extremities and groined. We noticed a human skull still remaining in a vault below the south transept. The kitchen fire-place may also be seen. Croxden church is as ancient as the abbey, having lancet-shaped windows. It was the parish church. The great gate of the abbey was close to it, as may be noticed from its remains; and the hamlet a little further on is called Great Gate.

PIREHILL HUNDRED.

BIDDULPH CHURCH has been rebuilt in good style, with very ornamental chancel and altar-table. One window is occupied by beautiful painted glass, originally from the Continent, and presented by Mr. Bateman. Over the tomb of Sir William Bowyer (1640) are suspended his casque, crest, and gauntlets. There are six very ancient tombs or coffins in the churchyard, carved with crosses within circles, one having, besides, the figure of a sword, another that of an axe; there is also a cross.

TRENTHAM CHURCH. A mutilated cross exists here also, in the churchyard. The piers, as well as the Norman arch, mentioned in the body of the work, appear of early date. The Priory probably stood here. The church has been beautifully restored.

WESTON-UPON-TRENT. On the bells—1st. Katerina. 2nd.

Ave Maria, mater Dei, miserere mei. (!) The ancient font is broken, but preserved in the garden of a neighbouring gentleman. T.

At SALT there was a church in ancient times, and a Norman font still remains on its site. T.

The door of the chapel of Burston, built on the spot where the son of Wulfere was martyred, and in ruins at the end of the 16th century, still exists, forming the door of a barn. The capital of a column also was lately dug up. T.

ABBOT'S BROMLEY. The church has suffered much by alterations; the clerestory windows are placed in pairs, and are handsome; the architecture Early Decorated. The font is elegant. There is an ancient stone in the north aisle with male and female effigies, but illegible; also a brass, on the floor of the south cross aisle, for Johannes Draycote, 1463, with a half length figure (small), the dress that of a monk. T.

BLITHFIELD. The mansion has been restored; for an account of the historical portraits see Pennant, or the "Beauties of England and Wales." In the church is an altar-tomb on the north side of the chancel, to Lodolkin Bagott, knight, and Anne his wife, date 1541; and a brass to Thomas Colwiche de Colwiche and Jocose his wife, date 1508. There are also sedilia, a double piscina, ancient font, screen, stalls, and coloured glass.

BROUGHTON CHURCH, probably built a little before the Reformation, still remains in its pristine state, embosomed in ancient trees, in a solitary spot, with no house near, except the remarkable gabled and balustraded Hall, itself perhaps almost as ancient as the church. The church has aisles and porch, and the three windows of the chancel are filled with beautiful coloured glass, apparently almost entirely ancient: the east window contains four fine figures

with escutcheons, &c. ; the south window, kneeling male and female figures ; the north one, ancient heraldry, the names Smith and Savage occurring. None of the monuments of the Broughtons, Bagots, &c. are, we think, older than the 17th century.

HIGH OFFLEY CHURCH and the neighbouring one of Norbury, have suffered from renovations. Between the former place and Eccleshall there is, or was lately, built into a bridge over a stream, a tomb-stone with the figure of an ecclesiastic and escutcheons. T.

Some solitary ruins belonging to the ancient mansion of Batchacre still remain.

Of MUCCLESTONE CHURCH, the tower is a fine specimen of the Decorated Gothic ; the body of the church in the worst modern style ; the ancient font converted into a pig-trough in the clerk's yard.

WILLOWBRIDGE LODGE is of about the same date, and in the same style as Biddulph Castle, having also a turret. It stands on a bold grassy knoll, and formerly was the hunting lodge of the Gerards.

WHITMORE CHURCH has been in part rebuilt, but an ancient semicircular arch remains in the nave. There is a dilapidated tomb, with black-line figures, to Ed. Manwaring and Alys his wyffe, right heir of Whitmore and Bedulphe

CUDDLESTONE HUNDRED.

CANNOCK CHURCH. The chancel is Early Gothic, the remainder late Perpendicular, Grecian, &c. ; the ancient high-pitched roof lowered. There are two illegible alabaster slabs, with black-line effigies in the north aisle, some encaustic tiles, a mural tomb to Mrs. Warynge, 1613, carved wood, and very ancient cross.

HAUGHTON. The church contains an interesting stone, with the black-line figure of an ecclesiastic; the dress differs but little from that of the Romish priesthood at the present day—there being the stole, alb, pall, &c. The hands are together as in the ceremony of the Mass, the chalice and missal over the shoulders, and the crown has the tonsure. The following is the inscription:—

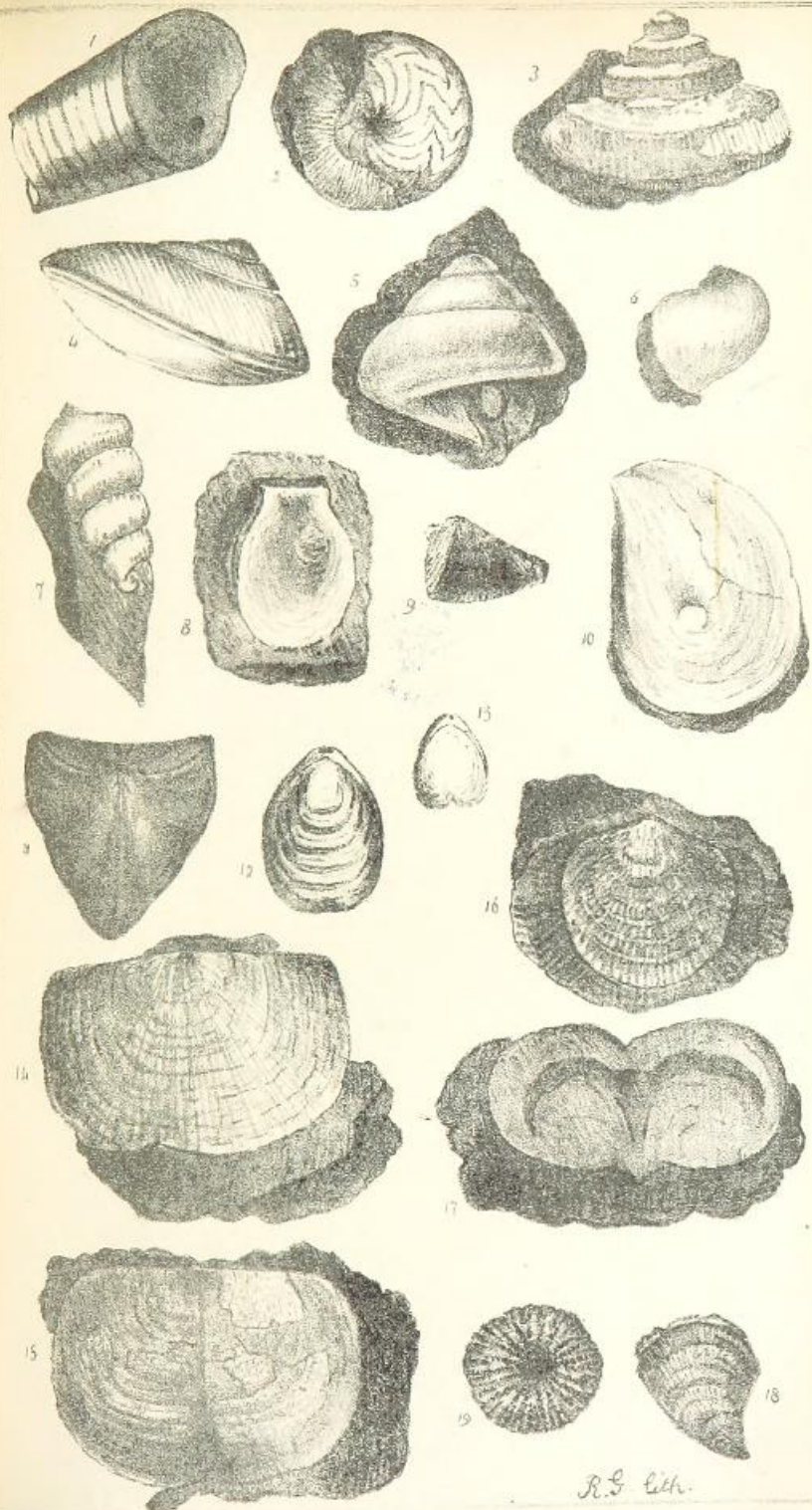
“Hic jacet Dñs Nicolaus Cranmer quondam Rector istius ecclesie, idem est qui fabricata fuerunt Campanile, et Campanæ, et Capella de Sancta Katerina, qui obiit anno Dñi millesimo quingentesimo vicesimo, cujus animi propitietur Deus.” The Rev. C. S. R.

FORTON CHURCH contains little remarkable, but a tomb with the recumbent male and female effigies of Sir T. Skrymsher and wife, the date 1633.

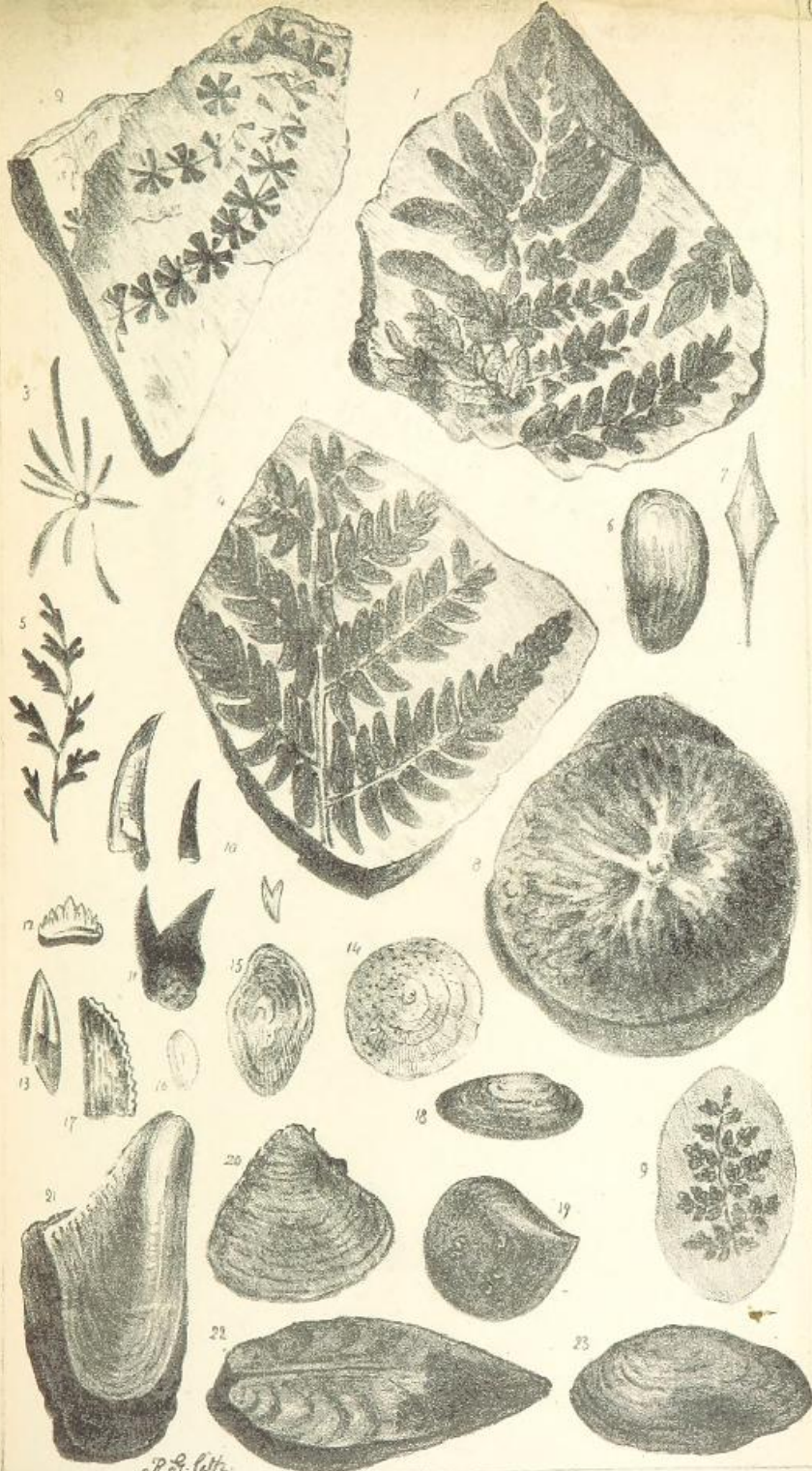
At BEDNALL there is an ancient rounded arch on the north side the chapel. Acton Trussell—on a bell—Sancta Maria, ora pro nobis. T.

BLYMILL CHURCH has been partly rebuilt in bad taste. The tomb, noticed in the text, is in the wall of the ancient chancel, on the exterior, under an ornamental arch: on the slab may be traced the remains of a handsome cross, but no inscription. The church contains tablets for the family of Dickenson, who have been its ministers for some generations; that of the Rev. Samuel Dickenson, the botanist, records his death on May 15th, 1823, at the advanced age of 93.

The church of WESTON-UNDER-LIZARD has also, unfortunately for the antiquary, been rebuilt, in a similar style. The east end of the chancel, however, retains its handsome painted window, and there is still remaining a portion of the ancient glass. The un-Gothic architecture is concealed by a mantle of ivy. The chancel contains costly monuments of the families of Mytton, Cocks, Bridgman, &c., and







R. S. Whit.



two very ancient and interesting tombs, under arches in the north and south walls, presenting effigies of wood. The inscriptions (of less ancient date) inform us that the effigy to the south represents Sir Hugh de Weston, knight of the order of Templars, who died about the year 1304; this effigy is cross-legged, the right hand grasping the handle of a sword, the feet resting on the back of a lion *couchant*, the head on double cushions, with the remains of angel-supporters. The opposite effigy is that of Sir Hamo de Weston, knight of the order of Templars, father of Robert and Osbert, who died about the year 1188: this effigy also has the feet on a lion, and a small scrip or purse hangs by its girdle; it also is cross-legged: the arms within the arch over each of these effigies are an eagle (wings spread) *sable*.

SHERIFF HALES CHURCH has also been rebuilt, and its architecture is concealed by a covering of ivy; the ceiling of the nave is of handsome carved oak, and there are some stained arms in the chancel windows.

BRADLEY CHURCH is of the Decorated character, with a double chancel; there are some remains of stained glass, and the font is ancient and curious.

CASTLE CHURCH has been rebuilt of brick, and contains little to interest the antiquary.

SEISDON HUNDRED.

TETTENHALL CHURCH. The only ancient monuments we could find were a mural tomb of the Creswells, an altar tomb of the Wrottesleys, of the date 1578, and one older in black-line of the same family. There are the usual sedilia, some fragments of painted glass in the lancet-shaped windows to the east, and a great box in the vestry, carved from the trunk of a single tree, as curious an antiquity as the others.

Many of the elms, which we knew in our boyhood upon the green, have fallen beneath the axe.

CODSALL. Also another rounded arch in the south wall of the chancel. Sir Walter Wrottesley's altar-tomb has suffered less than usual; it has five kneeling children in front.

SEDGLEY CHURCH. Rebuilt in good style by the late Earl Dudley. The east window is filled with painted glass. We could find no ancient memorials of the dead. There is a modern tablet to Mr. Wainwright, which, as he was a contributor to our local Flora, we mention here.

KINGSWINFORD CHURCH has also been rebuilt. The architecture of Trysull Church is ancient and more interesting.

OFFLOW HUNDRED.

ALREWAS. There was certainly a church here about the Conquest. There is a semi-circular arch or two in the present one, and the font is Norman.

BESCOTT. The moated site of the ancient hall is close to the Railway Station.

NATURAL HISTORY.

Several instances are on record where the domestic hen has, in old age, put on the plumage of the cock, had spurs, crowed, &c. We are informed by a gentleman, whose observations we can rely upon, of a pea-hen, which has, at the present time, put on the plumage of the peacock.

The following rare birds have been shot by W. T. Smith, Esq. of Brereton Lodge, in that neighbourhood:—Nightingale, Pied-Flycatcher, Ring and Water Ouzels, Bittern,

Golden-Eye, Green-legged Sandpiper, and Barred Woodpecker. He has also noticed white varieties of the Starling, Swallow, Ouzel and Pheasant; also the Raven and Quail.

Dreissena polymorpha. On stones and timber in the Trunk Canal, Stoke-upon-Trent, June, 1843.

Ripiphorus paradoxus. In the cell of a wasp's nest, 1843.

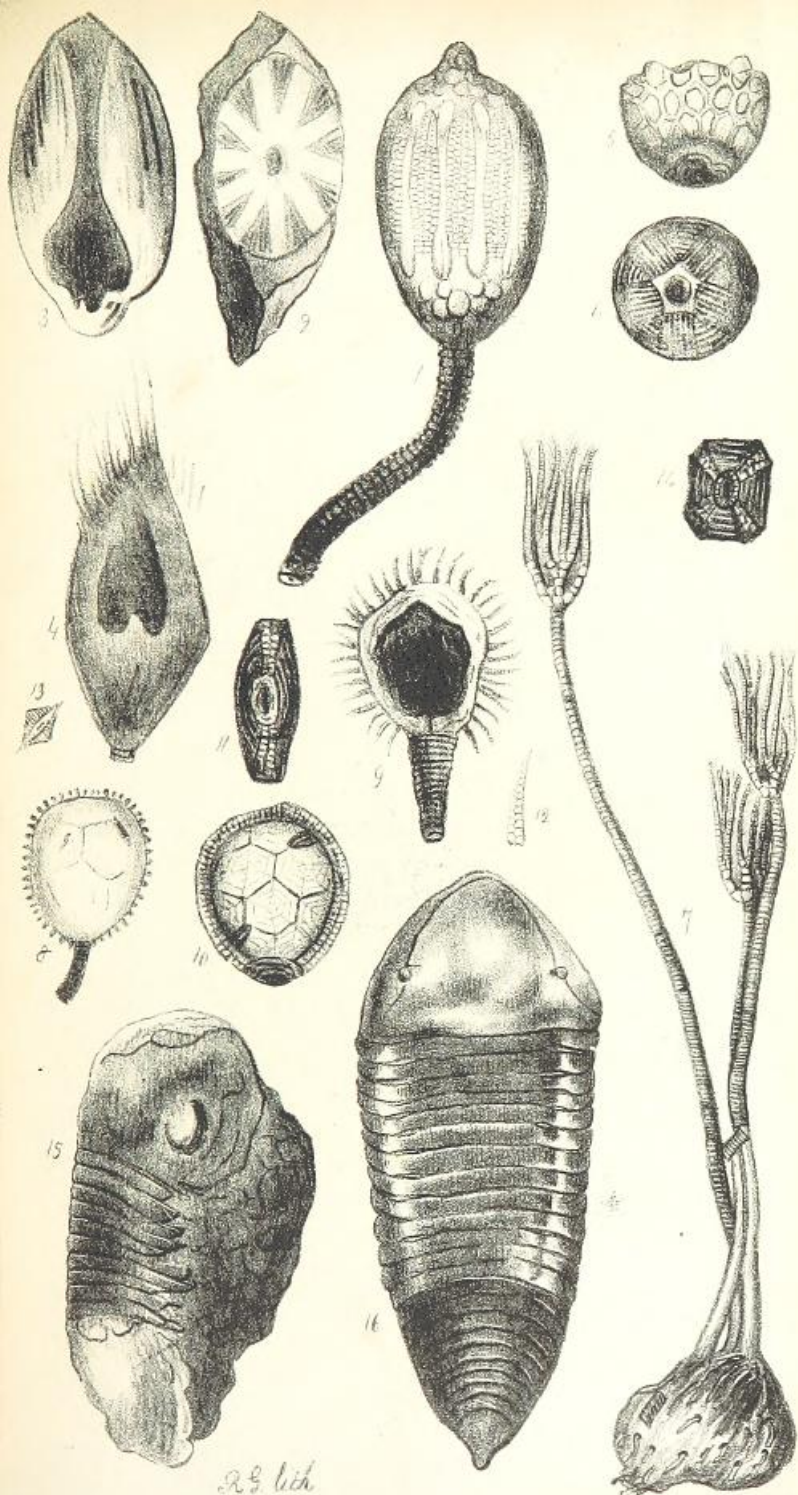
Colymbetes striatus, *Latridius porcatus*, *Hypera punctata*, *Apion assimile*, *Gracilia minuta*.

THE END.

LONDON :

Printed by S. and J. BENNETT, WILSON, and FLETCHER,
Singer House, Shoe Lane.





R. S. Lich

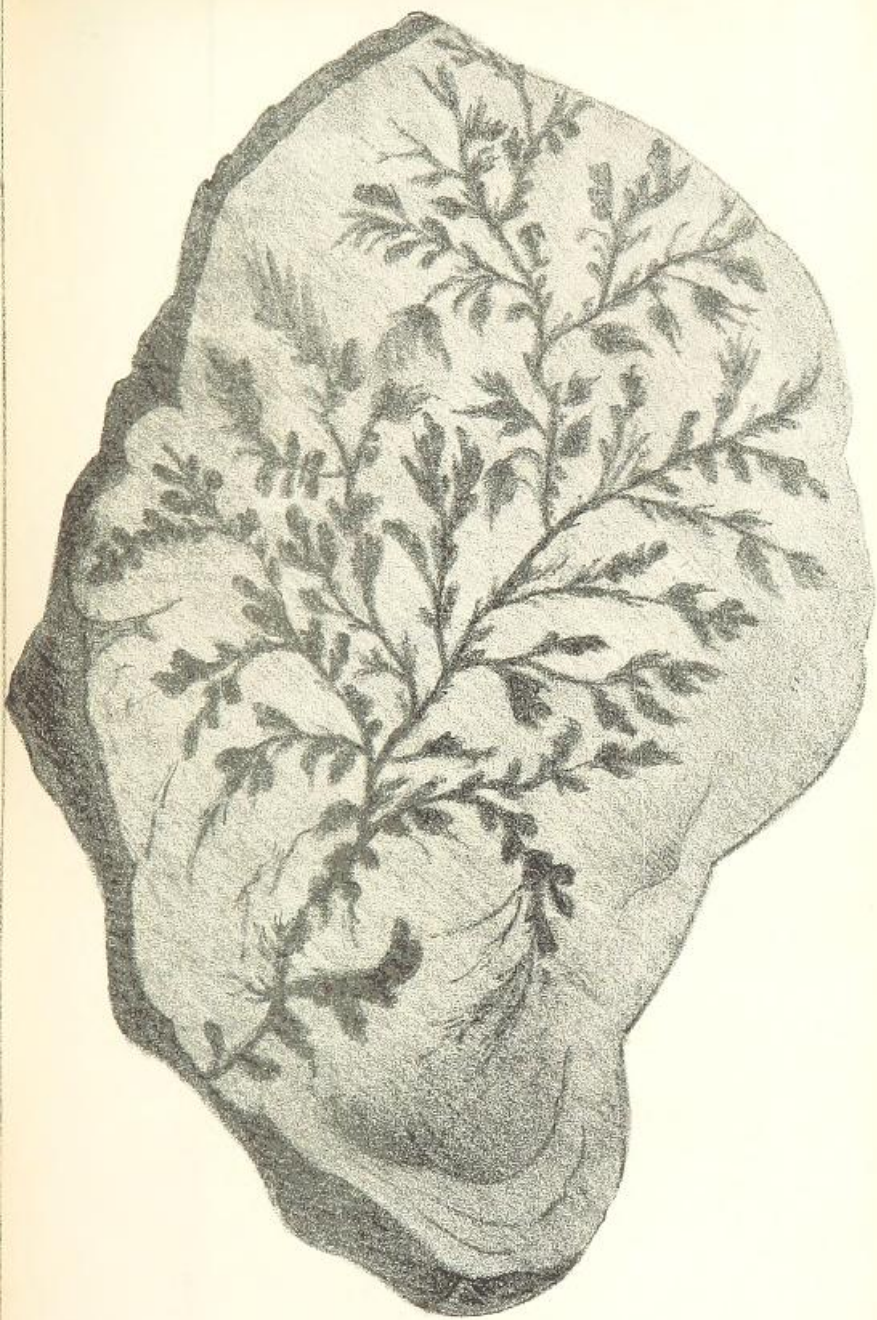


555



R. G. Lick.







Explanation.

Strata

Magnesian Limestone

New Red Sandstone

Red Marl

Coal Strata

Millstone Grit

Mountain Limestone

Trap Basalt &

Old Red Sandstone

Ludlow Rocks

Aymestry Limestone

Wenlock Limestone

Caradoc Sandstone

N.B. The figures denote so many feet above the Sea.

Quarries & Claypits

Dip of Strata

Lead Mines

Copper Mines

Salt

Gypsum

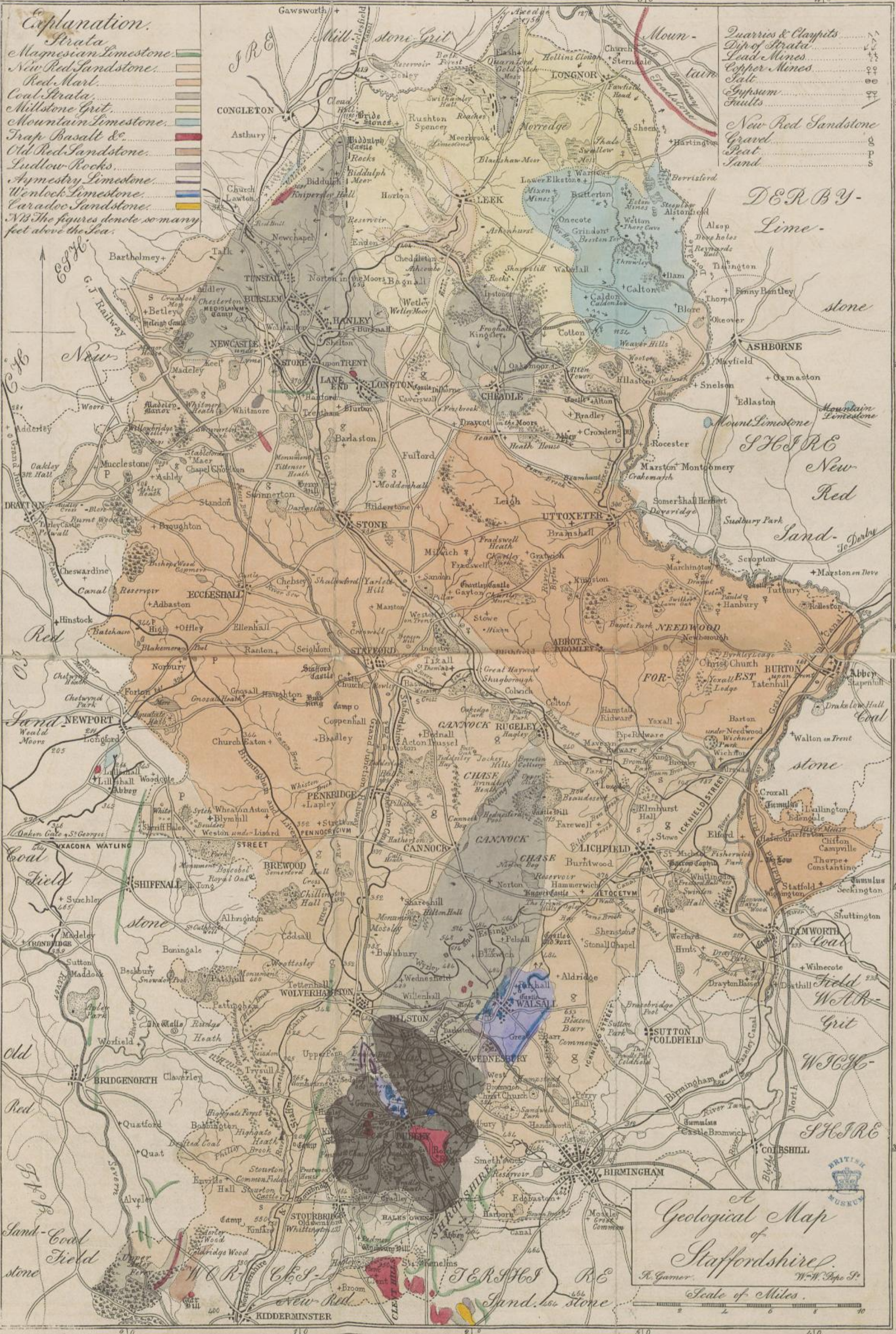
Faults

New Red Sandstone

Gravel

Peat

Sand



Geological Map of Staffordshire.

A. Garner. W.W. Pope P.

Scale of Miles.

5 end

559

561

2162 a

SUPPLEMENT

TO THE

NATURAL HISTORY

OF THE

COUNTY OF STAFFORD;

COMPRISING ITS

GEOLOGY, ZOOLOGY, BOTANY AND

METEOROLOGY:

ALSO ITS

ANTIQUITIES, TOPOGRAPHY, MANUFACTURES,

ETC.

BY ROBERT GARNER, F.L.S.,

CORRESP. MEMB. OF THE D. U. Z. AND B. A., OF THE EPID. SOC. &c.

LONDON:

JOHN VAN VOORST, PATERNOSTER ROW.

F. CREWE, NEWCASTLE-UNDER-LYME.

MDCCLX.



NEWCASTLE:

PRINTED BY F. CREWE.

SUPPLEMENT.

METEOROLOGY.

The following additions respecting the climate of our county, with some observations of a somewhat similar nature, we are enabled to give, partly from our own researches, but principally from the kindness and industry of several friends.

TABLE.—QUANTITY OF RAIN IN NORTH STAFFORDSHIRE.

	1853.	1854.	1855.	1856.	1857.	1858.	Mean.
Rudyard, 31,85 inches	26,91	22,74	34,15	26,00	26,42	28,01	
Etruria, 31,05	26,08	22,61	31,34	28,17	20,52	26,62	

July and August were the wettest months, then June and October, followed by January, September, and November. The spring months were therefore the driest.

TEMPERATURE.

The mean temperature taken at Trentham, at 8 a.m. and 8 p.m., for three years, 1850—1—2, was $47\frac{1}{2}$; taken at Etruria (probably 100 feet higher,) and judging from the daily highest and lowest temperature, and for the three years 1855—6—7, it was $46\frac{1}{2}$. The mean temperature for December for the three years at Etruria, was 40; January was one degree colder. The mean for February was 43, whilst that of March was 38. July and August were the hottest months, and equal, 51. The highest temperature in the shade on any day from 1853 to 1859 inclusive, was 79, the lowest 3, but the instrument went down several times to 8—15. It, several times during the months of deep winter, rose, in the

shade, to 60—4. On one night in May it was as low as 12; on one night in June 21; and once in July, in the night, below freezing.

We may observe with respect to the seasons, how regularly a flower opens, an insect appears, or a migratory bird visits us (see p. 467.) Yet there is a variation in this respect according as the season is late or early; but if they do not come in with the calendar exactly, they do so with the true season, and relatively to each other. Hence such phenomena may well become the farmer's and gardener's perennial almanack. During twenty-one years in which the appearance of the cuckoo was recorded, it occurred three times in the third week of April, twelve times in the fourth, and six times during the first week of May. Of twenty times that the arrival of the swallow was noted, it occurred once in the second week of April, nine times in the third, and ten times in the fourth. The swift came most commonly as late as the 18th or 20th of May, not often so early as is said at p. 472; the willow-wren generally makes its appearance about the middle of April. These observations apply to the lower part of North Staffordshire.

It may also be recorded that the Spanish chesnut (see p. 44,) was productive in North Staffordshire in 1846, 1857, and 1858; and in such favourable years only, in our colder districts, is the fruit of the out-door vine, or the mulberry edible, or wheat of first-rate quality. Neither the Laurestinus, the Irish Arbutus, nor the Common Laurel will thrive at Trentham, whilst the Rhododendron is there seen in all its glory.

A warm fountain or spring (see p. 25) is said by Plot to exist at Berresford, the place being situated, perhaps, on the same line of fault as the Buxton springs. There is, we find, on the spot, what is called the *warm well*, the water of which feels cold to the hand in summer, and warm in winter, and what is more, it smokes in cold weather; the temperature in August was 60, or much warmer than common springs. The late Dr. Murray found both iodine and bromine in the Ingestrie well.

HISTORICAL ANTIQUITIES.

Some remarkable antiquities of a very ancient date have come to light during the last ten years. In the first place, two British *torques*, or torchs of the purest gold, have been found. One, formed of eight twisted wires or rods, each itself formed of three other wires, and having two solid chased perforated ends, weighing $15\frac{1}{2}$ ounces, was turned up by the foxes, in the Greaves, near Draycott, in the parish of Hanbury, on Needwood Forest, discovered by the Queen's ranger, Mr. Thomas Hollis, and afterwards forwarded to her Majesty. A second, about half the weight, was discovered in 1854, by two labourers, in a field at Stanton-in-the-Moors, and is, or was in the possession of the farmer of the place. Querns or ancient grindstones have been found, of which there is a pair in the Stoke-upon-Trent Museum from Congleton Moss, and portions of others have come under our notice, as well as a paddle from a moss near Eccleshall, similar to those still used in Wales to propel the coracles.

The mound called Moat-in-Ribden, at the foot of Wever, is a remarkable entrenched quadrangular hillock, apparently a British barrow, not marked in the ordnance map. There are several ordinary barrows still visible near the same spot, two towards the Blazing Star. There is a regularly shaped barrow at Meaford; and Saxon Low on Tittensor Common is a remarkable mound. The author was one of a party, this year, to open the large mound in the centre of the camp at Bury Bank; an attempt made to find the interments was unsuccessful, for at the base, in the centre, nothing was seen but a heap of stones, some bits of charcoal, and small fragments of bone. Another barrow near Trentham, opened this year, by the same party, proved more productive; at seven feet below the surface was found a large deposit of calcined bones, apparently both human and canine, enclosed in a rude cyst; also bits of charcoal, two arrow-heads of flint, and many other pieces of the same material; a broken hammer-head of stone, an urn containing bones, with a drinking cup, and incense vessel; also

fragments of other vessels, many of them being marked by a pattern. We will not record one or two other unsuccessful attempts of the same kind; one at Throwley. A barrow exists in the field before the Izaak Walton Hotel, but it has been opened, we believe, by T. Bateman, Esq., of Youlgreave, who has caused the Staffordshire and Derbyshire barrows to yield up their long-hidden contents, as we are about to record. The mound at Seckington, close to the east margin of the county, is not a British barrow, but a Saxon tumulus, the memorial of a great battle recorded in history. There is a large mound near the Clifden Station, also just without the limits of the county, and others on the near side the Dove. At Mayfield, close to the church, is an ancient quadrangular mound. The camp at Beaudesert, though British, is not quite as described in the text. It is a high, bare, sandy, and stony spot, or plain, surrounded by a trench, and with other advanced entrenchments and earth-works. Hartshill appears to be a British entrenched camp with a large tumulus at the foot; not so, numerous other moated spots, often situated on lower grounds, and which mark the sites of almost forgotten manor houses or ancient mansions.

It is not easy to give any analysis of the researches of Mr. Bateman, the renowned barrow digger, in respect to the ancient entombments of our Staffordshire moorland and limestone district. The oldest mounds contain fewest instruments of metal, but rather bones, flints, and urns, with some pins, studs, javelin-heads and cylinders made of bone. In other barrows, however, daggers, pins, awls, wire, an armilla, a bracelet, &c., of bronze, brass, or lead, were found; also ornaments of jet or Kimmeridge coal, remains of the stag, horse, pole-cat, boar, ox, water-rat, and hawk; likewise axe-heads and celts of basalt, &c. Barrows yielding the above were opened at or near almost all the villages lying in the above district. The human deposits consisted of skeletons, and confused bones, often in cysts or urns. These urns are generally rude, sometimes ornamented, in late instances of baked black or red Samian pottery, not often, however, turned on the wheel. Mr. B. found also drinking-cups, and what are called incense-holders. The deposits of human and animal bones are frequently calcined, as are often the arrow and spear-heads of flint which are found in the barrows, and, indeed, often on the surface in the

limestone district. Hone-slate celts were obtained at Castern and Grattan, and others of bronze, as well as palstaves or half-socketed celts. Barbed arrows and serrated flints are rare; stone hammers, being simple boulders, worn at each extremity by pounding, have been found here, as in the mines near Llandudno, and a place called the Boroughs, near Wetton, has presented a trace of the round pits peculiar to British habitations, and similar to some seen by us on the brow of a rock at the same place in Wales, and also, indeed, on Abbot's-Castle Hills, at the west edge of Staffordshire. At the Boroughs too, Mr. B. found late Romano-British remains, consisting of glass fragments, earthenware, a long bronze pin, iron spear-heads and knives, one having a stag-horn handle. A necklace of porcelain-glass and silver wire has been found near Dovedale; also iron spear-heads, a knife, and a javelin, at Steep-low, near Alstonefield; again, fibulæ, rings, base coins of Tetricus and others, as well as a bronze pan or kettle from near Thor's-cave. Finally, Mr. B. considers the skulls found to belong to two different races, some being long and boat-shaped, others rounder or oval.

Mr. Carrington, the intelligent assistant of the last-named gentleman, has opened twenty-three barrows in Wetton parish alone, of which thirteen contained human bones, most commonly burnt: there were vessels or urns in most of these latter, less commonly cysts. The beaks of hawks, stag's horns, fibulæ, bracelets, and incense cups, and urns containing bones, were found in some of these; also pieces of raddle, perhaps for painting the skin. Of many barrows which he opened, about two-thirds were of the early stone period, only one Saxon. Mr. C. thinks immolation to have been practised, especially of a child with a dead mother.

This year the author instituted an examination of the site of Etecetum at Wall. A slight inspection of the spot shews that the Romans have been here, for, lying on the roads, may be picked up portions of brick, tile, and pottery, originating with them; there is also a stone half-buried in the road, very like a portion of a pillar, perhaps the column figured by Plot more than a century and a half back. Two trenches dug in the Castle Croft brought up pottery of four different kinds, and a broken ring of bronze, also portions of the upper and lower stones of a quern. Another trench dug northwards through the foundations of the

wall from which the place is named, and which formerly, in the memory of the inhabitants, existed breast-high, brought to light the base of a square apartment, with its walls of strong masonry, and its floor of plaster laid on extremely hard concrete. This apartment had been plastered and coloured in red, green, yellow, and white, with well-made stripes. There were also numerous pieces of large tiles, turned up at the side, and notched and bevelled at the corners. One brick had P. S. upon it, others double circular rings, cross-scorings, or the marks of the fingers.

A brass stud or button, a coarse earthen patera, slates perforated with holes, and nails probably to fasten them, oyster shells, charcoal, and bones of the ox and horse were also turned up. Three coins were found, one, first brass, with the head of an emperor, apparently Nero, and the words *Cæsar Aug.* incised, the other letters illegible; a second with an emperor's head, like that of Constantius, but the legend on that side illegible, except the letters *Imp.* the reverse, however, having a figure, and the words *Genio populi Romani.* A third was smaller and illegible. Wall is situated on the Watling St., near its junction with the Icknield St., having terraces on both sides the former road. A lane leads through the site north-westerly towards Pipe Hill, called the Fosse or Port-way. (See p. 68 and 69.)

A Roman coin of base silver is in our possession, found at Newborough-on-Needwood; it is a consular coin, the size of a sixpence, having on one side two heads with wreaths, and on the reverse a figure with four horses in a chariot, and the word "*Roma*" underneath. There appears to be a Roman road at Over Areley, called Port-way, and Roman coins have been found at Hawkbatch.

To descend to more recent times, we lately visited a spot, where one of our early monastic institutions was placed, Redmore, from which the nuns were soon removed to Polesworth, because the gay cavaliers, riding that way to hunt on Cannock Chase, spoiled their devotions. With some trouble we found the solitary quadrangular site, not far from Gentleshaw, in some low ground, embosomed in a wood, through which a brook flows, now ochrey from the scorixæ of an ancient smelting place above; and here also is a well, considered medicinal, and still called the nun's well. We must also claim for our county the honour of giving birth to Robin Hood, who was a Loxley man; but Robin Hood's

butts at Wiggington, now levelled, appear to have been rather of British origin. Near Barlaston was lately found the interment of a warrior, but of what date does not appear quite clear; some remains of armour were dug up, amongst others an engraved boss or round piece, also a sword. We have been shewn, by Mr. Molineux, a key found at Cubblestone, near the same village, the form mediæval, though of bronze. Another, of very nearly the same pattern was brought us from Hilderstone, and a third has been picked up at Tittensor.

TOPOGRAPHICAL ANTIQUITIES,

COMPLETING THE CHURCH NOTES OF STAFFORDSHIRE.

See Page 89, &c.

HUNDRED OF TOTMANSLOW.

LEIGH. This cruciform church was restored in 1845, and is now a beautiful edifice. In the church-yard we noticed some mouldings of the Anglo-Norman style, dug up during the renovation, and shewing the existence of an older building; also a gravestone having a carved double cross within a circle, and another less common one with a cross, upon the upper portions of which are sculptured what appear to be figures of crayfish, emblematic, perhaps, of some mediæval Izaak Walton, who plied his craft on neighbouring Blythe. We also picked up several old tiles with flowered crosses, griffins (Lathorpe), and geometric devices upon them, some encaustic, others in relief—and similar ones at Draycott.

CHECKLEY. Within the church here, some ancient paintings have come to light upon the west wall. They consist of emblems of mortality, time, and eternity, such as a globe, wings, hour-glass, skull, cross-bones, scythe, arrow, and spade, with an in-

scription in black letter,—“Oh death, I will be thy death—will be thy victor.”—Hos. 13, 14. Another inscription probably has reference to an escutcheon with a wolf sable—(Wood of Tean?) “Beniedmin shall raven as a wolfe, in y^e morning he shall devoure, and at night he shall divide the spoil.”—Gen. 49, 27. The font must be Norman, being very elaborately carved. The east window of the chancel contains arms, (for instance, a shield with fret and a cross on a canton,) five figures, and as many pictures, one being a crucifixion. The side windows also present figures of evangelists, priests, and monks, standing or kneeling; also the names Johannes, Marcus, Clericus, &c. All this glass appears to be of the decorated period. A window to the south has likewise little pictures of a later date, emblematical of the months, February netting, March pruning, April planting, May flowers, July mowing, October swine-feeding, and others, difficult, unless nearer, to make out; but the Stafford knot amongst the devices, the badge of the house of Stafford, now rather surreptitiously taken for the county and other purposes.

MAYFIELD. The church here has a chancel with a decorated east window, ornamental parapet and buttresses, and the priest's door with a semicircular head. The door within the south porch is of ornamented and uncommon Norman device, as regards the capitals of the pillars and the arch, the latter especially, its margin being deeply cut into fluted lozenge-like cavities, with beak-heads, or rather trefoils between. The north aisle has been restored, the south is of pure Gothic, the tower later. The Norman piers and arches, the former round on the south side, four-clustered on the north, the open roof of old timber, the trefoiled lavacrum, and the church-yard-cross, are the most notable objects. Calwich now contains no trace of its abbey, not one carved stone, but human bones are turned up on the site of the pretty flower garden.

ELLASTONE. Here the chancel and tower are of ancient perpendicular work, the nave modern. In the chancel is an altar-tomb—the effigies have been richly carved, but are terribly mutilated; there is no inscription, but the arms on the sides, and above, probably shew it to belong to the family of Fleetwood.

UTTOXETER. At Uttoxeter church is a black-letter memorial to a Milward, of Eton, and his shield ermine with fess, gules

and bezants impaling the Fleetwood coat, parted per pale, nebuly, argent and azure, with martlets; also another to the father of Lightfoot, the Hebraist, long minister of the place, and who died 1653, aged 81. A third epitaph however, records the age of an individual (Archibalde) who died at the age of 103, this, besides the black-letter, has some rude drawings and his escutcheon, a wolf rampant, armed and langued, sable.

ROCESTER. The foundations of the abbey are to be seen in a field to the south of the church. In the latter, the only notabilia are some fragments of stained glass in a south window, one a symbolical emblem of the Trinity.

BRAMSHALL old church was of the decorated style of Gothic architecture, there is nothing interesting at the present one. KINGSTON church has the nave of stone, the tower of brick, it is the wreck of a good ecclesiastical structure; part of the rood-screen remains. GRATWICH church has still less of interest, and the same may be said of DILHORNE, it having, however, a rather unusual octagonal tower. Of KINGSLEY also, the tower alone is ancient. Neither does IPSTONES, or BAGNALL, claim the attention of the Ecclesiologist. At GREENWAY HALL, now in ruins, the republican Bradshaw died in indigence, and left a wife who became a pauper.

ALTON had a castle, even before the Conquest, held by Lunam. The curious chronicle or diary of Thomas Shepsheved, Abbot of Croxden, is extant in the Brit. Mus.

ILAM. In our previous account of Ilam church the curious font is omitted, which is evidently Norman, or possibly Saxon: the devices in its arched compartments are difficult to describe; one is a lamb with a staff and a dove at the top; then a male and female, hand in hand; a half-length portrait; and also two dragons, or similar creatures, gorging what appear to represent human heads. The tomb called St. Bertram's, is of mediæval architecture, and therefore, does not belong to the Saxon saint. Besides the curious but rather effaced crosses in the church-yard, there is another, of the same so called Danish or Runic character, behind the hall.

WATERFALL. Here the church, consisting of chancel, nave, and tower, is dedicated to St. James; the chancel only is ancient, being a mixture of the Norman and decorated style, the arch

being a good specimen of the former, though injured; the east window decorated. The rood-screen and other wood-work is really of old dark oak, but painted in imitation, and a match with the royal arms over the chancel arch. The register goes back to 1600. The villages of Flash, Warslow, Elkstone, One-cote, Butterton, Wetton, Alstonefield, Calton, and Caldon, all situated in a wild part of the north-east county, mostly on a limestone bottom, are more interesting to the artist or searcher for the picturesque than to the ecclesiologist.

GRINDON church has been rebuilt, and a spire added, which scarcely suits an edifice built on high grounds; nor the wild district. The old church was of the 12th century. The ancient font is basin-like, and has a serpent with its tail in its mouth, for its top moulding.

ENDON. The church here is pleasantly situated, but the spot has no antiquities. In a field close by, is a modern tombstone, to the memory of John Daniel and his sister Alice. He must have been unorthodox, from his singular place of burial; his epitaph records his motto in life, "Integrity and Honour." The lady's is more in conformity with common usage, and what is better than an epitaph, she left a donation of £500 to the North Staffordshire Infirmary.

HORTON church consists of tower, nave, north aisle, and chancel of a base gothic style; the font is massive, large, and rude; there are a few pieces of stained glass in the windows, and a curious brass of a Wedgwood, of Heracles; a few of the upper steps leading to a former rood-loft, with the stone doorway, still remain. In the church-yard is a small stone to the memory of a woman who lived to the age of 114 years, one of many proofs that human life is long spun out in these moorland districts: there are also two large yew trees in the church-yard, one nearly five feet in diameter.

MEERBROOK. This chapel is now separated from Leek under the Marlborough Act. It consists of tower, nave, aisle, and chancel, all built about the seventh year of Elizabeth's reign, by Sir Ralph Bagnall, in a plain style, his arms being painted in the church. The registry goes back more than one hundred and twenty years, and the present incumbent, his father, and grandfather, have been the pastors of this primitive district the whole of this period.

SHEEN. This remote place, though its chapel has been rebuilt, affords some antiquities, for instance, two remarkable tombstones, one being ornamented with a flowered cross, the other having the rudely carved figure of a female, with supplicatory hands, and a triangular style of head-dress.

LEEK. In Leek church-yard is a stone with the figure of a man thrashing corn, and the words, "now thus," the date 1697. The name on the stone is Wm. Trafford, of Swithamley, his age 93, and the two adverbs are said to have a particular reference to a feint by which the gentleman escaped the dangerous questions of some marauders in the civil wars, they setting him down as out of his wits. There is also a tombstone, carved with a cross within a circle, an arrow, and a sword. The remarkable Danish pillar is about 10 feet high, the shaft round, with a head towards the top, and a carved capital, from which springs a pyramid, surmounted with a small cross, and carved with a complicated pattern at the sides.

RUSHTON SPENCER. This chapel was anciently called the "chappell in the wilderness." It is pleasantly situated together with some ancient firs and yews on a green knoll. It would appear that an early English edifice, principally built of wood, gave place to the present post-Reformation structure of stone. The oak pillars, and some other woodwork, the pulpit, benches, and some "dog-teeth," also cut in oak, are (at least the last) traces of the old building. It is dedicated to St. Lawrence. There is a south porch, and a sepulchral chapel of the Traffords, also the stump of a cross in the church-yard. The oldest monumental stone is of the date 1610, but there is a more remarkable one, connected as it is with a romantic but tragic love-story, and covering an unfortunate youth, who having made love to his master's daughter, came to a premature end, and was interred in a position the reverse of the usual way. The stone has the following strange inscription—"Memento mori. Thomas, son of Thomas and Mary Meaykin, interred July 16th, 1781, aged 21 years. As a man falleth before wicked men, so fell I. Bia thanatos." The surrounding district is still wild, and the names, Wolf's-dale, Wolf's-low, Boar's-ley, Wild-boar Cliff, and Elk-stone, seem to shew that it must have been formerly a hunting-ground. At a little distance is an ancient burial-ground, and

this, with other names in the district, as Gospel-stone, would appear to indicate that here was the haunt of the persecuted heretic or saint. The name Spencer appears to have been derived from the favourite of Ed. 2nd, to whom the ville was given. A rocky point on the Congleton and Leek road is called the Drummer's knob. Tradition says—"when the Scotch insurgents passed this way, in 1745, a drummer sate down and amused himself by singing or playing,

‘ Hie thee Jamie, hame again,’

when an English soldier asked his officer's permission to have a shot at him : although the distance was great, leave was given, and down fell the poor drummer.”*

HUNDRED OF PIREHILL.

STAFFORD. The font at St. Mary's Church deserves description. It is, perhaps, of the time of the early Edwards, and reminds one of Byzantine work. It is thirty-seven inches high, and a little less in the transverse diameter at the brim, but bulging below. The bowl is divided externally into four convex surfaces by four pillars, formed by human or semi-human creatures. The inside is lined with lead, and has a hole at the bottom, and this surface is not basin-formed, but rather corresponds with the somewhat quadrangular outer surface and projecting pillars. The pedestal consists of an upper and lower portion, the upper having a lion under each pillar-figure, whilst the lower octagonal portion has double-bodied lambs and half-human creatures, with their single heads intermediate to the lions above, and below the projecting sides. The flat rim has a moulding below of prominences or teeth, in pairs, but above this a band or flat surface, on which is the upper inscription; there is another lower band with an inscription above the lions. The character (capitals) used in the inscriptions is what is called Lombardic, or similar to other examples of the period alluded to.

* An Account of the Ancient Chapel of Rushton, by Rev. T. W. Norwood, M.A., Leek, 1856.

The upper inscription—

“TV DE HJERVSALEM
RO[RFM PRÆBIS FLUVIA] LEM
ME FACIENS TALEM
TAM PVLCORVM TAM SPECIALEM.”

The lower one—

“DISCRETUS NON HS [QUIA] NON FVGIS ECCE LEONES.”

The letters within the brackets are restored by guess. It has been observed, that so restored, a meaning (wise, or discreet) would be required for “discretus” which is not sanctioned even in monkish Latin; neither would *qui* or *quia* seem to fit. At the restoration of this church, a plain oblong reliquary of silver was dug up, and shewn to us, having a transparent lid of tale, and of some foreign mint-mark. There is a mural monument to Sir Edward Aston and his Lady, with their figures in alabaster, under a canopy; also an altar-tomb to Lord and Lady Aston.

St. Chad's Church, which, a few years back, was a wretched structure enough, though, probably, soon after the Conquest, raised in a style worthy of its use, has now also been restored by the praiseworthy exertions of some good churchmen; and in removing the accumulation of brick-work and plaster, a fine chancel arch, once elaborately carved, and now carefully restored was revealed; also a fine oak ceiling, clerestory windows, arcades, and zigzag mouldings. Indeed this church, as is the case in other instances, is but the chancel, tower, and nave, of a once noble building, having the aisles and transept removed, and the pillars and arcades walled up.

The lands of the priory of St. Thomas, at the dissolution of religious houses, first came into the possession of Bishop Rowland Lee, who married Henry 8th to Anne Boleyn, and whose sister was married to a Fowler; the Grey Friars was granted to James Levison; and the Augustines to Thomas Neve and Giles Isam. Dr. Fowler (see p. 105) left Stafford to practise at York; when here, he is said to have resided in one of the timbered houses near the market-place.

Coins are still in existence which were struck at Stafford before and after the Conquest, by Godwinne and Wolfnoth.

SEIGHFORD. The north aisle of the church is ancient, and there

are some semicircular arches in the building, also fragments of stained glass in the windows, and an altar-tomb with the effigies of Wm. Bowyer and his wife.

SANDON. This village has now found its local historian.* We may add, to our previous accounts, that the ancient glass in the church windows has the bearings of Robert, third Baron Stafford, and Will. Ferraris, Dom. Tutburisæ; also of the Malbancs, who gave the church to Combermere. There are piscinæ and a staircase for a rood-loft. The font is square, with rude figures at the corners. The alabaster tomb in Stowe Church is of a Ferrars, and the canopied one to Walter, first Viscount Hereford, ob. 1558. Marston church is early-English.

WESTON-UPON-TRENT. This church has the following constituents—nave and aisles, chancel and aisles, tower and spire, and south porch. The last is rather curious. The windows generally are lancet-shaped. The font, at the date of our visit, was being restored, with a portion of the old one for a pattern, being of the palmy period of church architecture, with a flowered garland or band. Stone church-yard contains the altar-tomb, with effigies, of Sir Thomas Crompton and his lady, formerly in the old church.

BLITHFIELD, the seat of the Bagot, is well worth the antiquary's visit. The church consists of nave, aisles, chancel, and tower. The font is octagonal and plain, with three round transverse bands, the pillars and arches not remarkable. There are several monumental stones with engraved black line, but as the inscriptions are nearly gone, brass plates of the legends accompany them. There are ancient oak benches of perpendicular work, and the fine three-light and cinquefoiled east window is emblazoned with old heraldic devices. Besides the tombs already mentioned (p. 546), another alabaster tomb in the chancel supports the effigies of Rich. Bagot and Maria his wife, 1596. Another has an incised slab, and is the memorial of Ludolkin Bagott, his two wives, and nineteen children. There are other stones to Joh^s. Bagot, and to Ludowycus B. and his wife Helena Boteller de Beausy (1511), and a slab, with a skeleton effigy, to Salebury, eldest son of Sir W. B., 1673. There is a perfect cross

* Guide to Sandon Park: Hill and Halden, Stafford, 1854.

in the churchyard. This church, like others in the county attached to ancient mansions, has suffered comparatively little from the spoiler's hands.

ABBOTS' BROMLEY. There is an arched canopy without an effigy at the south-east end of the nave. There remain some fragments of painted glass in the north windows, one representing a man in armour, seated on a white charger. The bells are ancient; on one we read, "Jhesus be mi sped R.S.," on another, "Pater—miserere nobis O.E." In the tower, too, are kept the stags' heads used in a hobby-horse dance, annually practised, having some connexion, we suppose, with this woodland district. The curfew tolls here, as the sacristan informed us, from the Monday after old Michaelmas to Shrove Tuesday.

COLWICH church has been restored. The tomb and effigy (see p. 115) do not belong to the Sir William Wolseley who was drowned, as the accident took place in the year 1728, but to a preceding Sir William. Neither was there ever a monastic building at Haywood, the spot called the Abbey may have been the site of the Bishop's house. Colton church has mostly lancet-shaped windows, with three pillars and arches between the two chancels. There are sedilia and a piscina walled up, with a leaden font more curious and ancient than prepossessing.

ELLENHALL. The architecture of this village church is generally later than is represented in the early part of the volume, though there is a round arch and flat buttress on the north side of the chancel. The pulpit cloth may have formerly been part of a priest's cope, or something of the sort, being of rich material and mediæval embroidery. There are numerous ancient tiles remaining in the floor, and a yew at least as ancient in the enclosure.

RANTON ABBEY. Some richly carved bosses of flowers and fruit, and capitals of pillars lie in the garden opposite the hall. In the wall, to the south-east of the fine tower, is an elegant door-way and some panelling. The tower itself has a five-light west window of perpendicular architecture, with corbels, and two shields over it, one apparently with the chevron of the Barons Stafford, also two headless figures below; it has also upper decorated windows, a band of crosswork above, and battlements, but the eight pinnacles are gone; the tower has a door with carved dripstone, and numerous heads and gurgoyles.

HIGH OFFLEY. The church has massive pillars of an early date, one with quasi-volutes, and heads between them. There is a mural tomb to "Gerard Skrymsher, Dr. of Physick, son of James S., of Norbury Manor, ob. 1700, æt. 83." The east window is in the decorated, the others in the perpendicular style. The church at Chapel Chorlton has been rebuilt in approved churchwarden style; the broken font forms an ornament in a neighbouring rockery.

SWINNERTON church consists of a tower, nave with clerestory, north and south aisles, a chancel separated from the nave by a carved oak screen, and a chapel of the same size and form as the chancel on its south side. Recent renovations have brought to light some Anglo-Norman work, particularly a door leading from the tower into the nave. This has two circular plain pillars, their capitals squared; that on the left hand with a scroll ornament, that on the right with a carved head, and a scroll issuing from each angle of the mouth; the capitals bear abaci, likewise covered with scrolls: above, the rich semicircular arch has three principal mouldings differently carved; the inner one has beaked heads, the next square compartments filled with scrolls and quatrefoils resembling the tooth ornament, the outer of round bosses each in a plain border. The tower below is coeval almost with the Conquest, but has several strata of rebuilding; thus, there is a row of trefoiled feathered arches below the moulding of the second part, higher up corrupt Gothic, and at the top classical urns of comparatively modern times. A pointed door for the rood-loft is now closed up. There are two heads, one of a king, the other of a bishop, on one of the piers. The windows, in different parts of the structure, are the lancet-shaped of the early period, the geometric or decorated of the middle, but, generally, the perpendicular or transomed. The screen is of this latter date.

ALDBASTON. Here the church consists of chancel, nave, tower, porch, and north aisle of perpendicular architecture. On an alabaster slab, having male and female figures in black-line, and escutcheons, may be made out the name of Reginald Bredock, of Aldbaston, 140—. There are escutcheons in the east and south windows of Skrymsher, Boteler, Bredock, Griffin, &c. There is the base of a cross in the churchyard, and a hollow yew, about twenty feet in circumference.

AUDLEY church has been now restored. The brass mentioned in the first part of the volume is to Thomas, the son (not the brother) of Lord James Audley, neither is there any female figure on the tomb. The Delves effigy, according to Pennant, is that of Sir Jno. Delves who died 1369. There was a Lord Peter Audley also at the battle of Poitiers.

MADELEY. Here we noticed the outline of sedilia in the chancel wall of the fine church already described. Of Keele church, only the lower part of the tower is ancient. At Betley Court is the stained glass representing Morris Dancers figured in "Knight's Old England."

ABBEY HULTON. A farm-house has been lately built on the site of this monastic house, and the bones and skulls of the old Cistercians, and probably of the once redoubtable founder, Lord Audley, have been thrown out without ceremony, together with fragments of pottery, tiles, &c. The capital of the pillar of the chapter-house lies at an ancient farm-house, Carmount Side, and the top of a doorway at a fountain near Bucknall. The chapel at the last village was, no doubt, built out of the ruins, and had a good decorated window, but it is now rebuilt.

NEWCHAPEL. Here, according to tradition, lived the harmonious blacksmith, whose lively song, keeping time with the quickening strokes of his hammer on the anvil, caught the ear of the great Handel, then on a visit at Turnhurst, and caused us to be indebted to him for the simple but wonderful combination of harmony, time, and melody, which bears his name. Barlaston, Fulford, Talk-o'-th'-Hill, and Blurton, have ecclesiastical edifices of little interest. The tower of the first place is alone ancient; the King's arms in the latter have the date 1629. At Burslem, the church tower may be as old as Henry 8th, or perhaps a little older. There is a stone coffin in the churchyard.

STOKE-UPON-TRENT old church had a semicircular arch between the nave and chancel, and some of the buttresses were shallow, in the Norman style. The chancel generally was of the date of Edward 1st, the nave having been much mutilated. There was a piscina with sedilia; the font was plain but gracefully formed, it is now placed in a field to hold drink for the cattle; one bell was moved to a manufactory, the other re-cast. At the rectory, which was moated anciently, is the head of a friar, pro-

bably a dripstone termination removed thither, and in a cottage, at the Trent side, is a stone from which a brass escutcheon has been taken. The top of the altar also remains in the enclosure.

At NEWCASTLE-UNDER-LYME the tower of the old church is of remarkable height and proportions, but we were in error in setting down any of the architecture to the Norman period. At Trentham was lately found, in the courtyard, an ancient gravestone, with sword and cross, the latter worked with four circles and flowers in the compartments: also, in the churchyard, a beautifully carved effigy in chain mail, and the helmet on the bosom; the head, however, and much of the legs gone. Trentham has also now found its own historian.*

NORTON-IN-THE-MOORS. That an ancient church stood where the comparatively modern one does is evident. There are two yew trees in the churchyard several centuries old; the font of the first church exists in the neighbouring farm-yard, and there are the old gravestones mentioned by Erdeswicke, though any inscription or sculpture which they may have had is worn away. There is a curious stone under one of the yews. The register is in good preservation, the date 1575 may be made out, and several excommunications are recorded, proving that the moorlanders have been somewhat uncanonical; it also notices a very early donation, when money was of more value than at present, of £100 to the S. P. G., from the head of a family of very ancient date, and now scarcely extinct.

HUNDRED OF CUDDLESTONE.

NORBURY church is interesting; the tower is of brick, but the nave, chancel, and modern vestry are of the decorated architecture, with a fine arch of separation, ornamental buttresses, corbels, &c. In the north wall of the chancel is the effigy of a crusader, or, at least a cross-legged figure, under a rich arch or canopy with finial and pinnacles, being also feathered, and the cusps ornamented with heads, flowers, angels, eagles, and nondescript creatures. A helmet and gauntlet of later date hang up above. The head, neck, arms, and legs, are enveloped in chain mail, the latter resting on a lion, the sword unsheathing, and the kite-

* Trentham and Its Gardens, 1857.

shaped shield with the arms of Boteler, gules, a fess, chequy sable and or, between six crosses sable. On the opposite side of the chancel is a fine mural monument to Carolus Skrymsher, miles, 1708, also four sedilia ornamented with heads and shields and the Boteler cross. Within the communion rails lie three beautiful but injured effigies of a warrior and two ladies; the former has his armour, part plate, part chain, of the 14th century, with crosses on the tunic; the left female has the hair in a net, the boddice close, and the cloak held by a cord over the breast, and a rose on each side; the other has the mantle over the head, the hair also in a net, a row of roses down the front, and two square brooches to the cord. There is an ancient brass with a female figure and part of an inscription, the head is veiled and hooded, under a canopy: this is the memorial of Halhys Botiler. There are also more modern brasses of the Skrymshers. There are traces of painting on the church walls, and some ancient wood-work. There was formerly, it is said, much stained glass in the church, removed to that of Broughton.

COPPENHALL has a small stone chapel of the 16th or 17th century. At DUNSTAN the tower only is of stone. WHEATON ASTON has nothing of interest. The font lying at Stafford Castle may very probably have been taken from Castle Church, hard by. BLYMHILL CHURCH is being restored, and several coffin lids, marked with crosses, have come to light.

RUGELEY. In the school-house, which is the chancel of the old church, is the engraved memorial of an ecclesiastic, John Weston, of the 16th century. In CANNOCK church there is an alabaster stone in the chancel inscribed,—“Filius Willielmi Finey de Finey Prope Leeke, qui obiit——.” Finney House still exists in the place.

PILATON HALL. Of this ancient seat of the Lyttletons there is an interesting account in the *Gent. Mag.* 1789, with a description of its carved wood, and ancient glass, the latter representing the seasons, the signs of the Zodiac, a man with his legs in the stocks, St. Modwen, &c. It is now in ruins, but partly occupied as cottage residences.

HUNDRED OF OFFLOW.

BURTON-UPON-TRENT. There is a coffin-lid with a cross-fleury and circle against the south wall of the church-yard. Further remains of the abbey have been discovered, of rich decorated architecture; also some zigzag mouldings and a broken coffin. At the neighbouring mansion are still to be seen the outlines of a fine arch built into the gable, and some other pieces of sculpture, also a portion of the old gateway.

ROLLESTON church has a zigzag doorway on the north side of the nave, which is generally in the decorated style; the chancel, however, later. There is a beautifully carved figure of an ecclesiastic in a cope, built into the north wall of the chancel, also a tomb with recumbent effigy, 1638, and older ones in black-line, 1485 and 1550, all being to the Rollestons and Mosleys. Sir E. Mosley obtained the estate by purchase, 1611.

TUTBURY. There seems little difference of date and style between the great gateway of the castle and some of the buildings on the opposite side of the court, both being originally of rich perpendicular architecture. At the latter side remain the walls of two fine halls with windows at each end, their fireplaces having jambs adorned with animals; the two rooms below these halls were groined. The church in its present state has a north aisle with bad windows; the clerestory lights have also been altered; the east window is modern; there is a Norman window on the south side of the tower, and a fine doorway of the same style on the corresponding side of the nave, the south windows generally are of fine perpendicular masonry. The above particulars may supply some deficiencies, and rectify some inaccuracies in our previous account of the castle and church.

HANBURY. The low tower of this ancient Saxon village, being situated on a hill, looks well. The chancel has several lancet windows, but the east one is perpendicular in style. There is a fluted piscina. The puritanical figures (see p. 145,) belong to the Agardhs, he in a cloak and stiff frill, and his wife and daughter with ruffs and broad-brimmed hats. The carvings alluded to previously, are principally tombstones with numerous modifications of the cross and circle; the present font is plain. The recumbent figure of Carolus Egerton is in the style of the Stuarts, with flowing hair and large boots; he was

the king's head-ranger in Needwood. There is also the figure of an ecclesiastic in engraved brass, and the fine head of a cross in the same; also some painted glass in the north windows—a king kneeling, and a figure with a chalice, seated; also some arms of Hanbury, Egerton, and Adderley, occur.

YOXALL. We found no genuine remains of Norman architecture at this church; it has the most usual constituents of a country church, but no transept, porch, or spire. An altar-tomb is now placed under the stairs, at the north-west corner of the building, with two effigies cut in the alabaster or gypsum, so commonly used in Staffordshire for the purpose: one of these represents Humphrey Wiles, of Horecross, the other his wife, Mary Chetwind, of Ingestrie: he in long robes, she not unlike an effigy of her own family, at St. Mary's, Stafford. The date of the Yoxall tomb is 1565.

TATENHILL. Here the east window of the church is perpendicular and fine; generally, however, we cannot speak so well of the more corrupt windows and architecture of the edifice. The north and south door-ways are indeed better in style, and the chancel is large. There are two alabaster slabs in the chancel; one, being rude in design, to Wm. Agardh and wife, 1505, the other, having also two figures, but the black letter illegible, as is the case with a fine slab in the porch. The font is plain, but ancient, with a clustered pedestal.

BARTON-UNDER-NEEDWOOD. The church consists of tower, nave, aisles, and chancel. It has niches or sedilia in the latter, partially plastered up; also stained glass in the windows, lately restored. There is one incised slab, but illegible. The school was erected only a few years later than the church.

ALREWAS. The church here is remarkable; once, no doubt, of great pretensions, but now strangely defaced, speaking architecturally; even the rich perpendicular font, one of the finest in the county originally, seems to have been cut down midway in the bowl. There are fragments of ancient tiles, carved wood, and painted glass dispersed about the structure. There is a second Norman door on the north side of the building, also a double tier of upper windows throughout, mostly perpendicular, the chancel alone retains its high-pitched roof. There is a door appertaining to a former rood-loft, part of the screen remaining;

also sedilia and piscina. The piers are lofty, with arches of great span.

WHICHNOR. The church has a tower and nave, also a very large north aisle or chapel. It is evidently of the palmy period of the gothic. There is an elegant door-way on the north side, walled up, having flowered mouldings; the windows and edifice generally are of the same decorated style or later perpendicular. The font is octagonal, with quatrefoils on each face. There is a seat in the south wall, with the canopy and finial cut away. There are several shields in the east and north windows, Somerville quartered with Griffith; other quarterings of gules with bezants fretty, lozenges, &c., and in one window is the name, as we read it, "Dame Isabel Estaclon," and rampant lions.

BROMLEY-REGIS church consists of tower, nave, north aisle and a modern south porch. The west doorway is square headed, but that to the north has an ogee canopy and finial. The aisle and chancel are vaulted, with four rich pendants to the latter. There is a door for a rood-loft with two shields above it, the screen of carved oak. The windows have stained glass, ancient and modern; those of the chancel have St. Elizabeth, a saint with an arrow in his side, and a fawn rearing up to him, the head of a man, and a saint with a saw, perhaps St. Jude. The font appears more modern than the building; the ancient monumental slabs are now illegible.

HAMSTALL RIDWARE. There is the shaft of a cross in the church enclosure, and an old manor house in the Elizabethan style close by. The church has a low tower and spire, the nave, a clerestory and aisles. There is much old carved oak, as screen and stall-work, in the church, as well as ancient painted glass in some of the windows, particularly those of the north aisle—St. James and other figures with inscriptions; and in the late decorated or early transomed east window heraldic pieces, a cross, and outspread eagle. There is some extra architectural carving, externally, at the west end of the north aisle. At the time of our visit there was a mediæval painting of the crucifixion, in a pew, and we have heard of another of the Flight into Egypt, purchased at a sale in the village, and taken from the church. A monk, or priest, is interred in the south aisle with effigy, date

1418. There is also another altar-tomb, and several monumental slabs now illegible.

FAIRWELL has few or no remains of its ancient religious house, but the chancel of the little church is ancient, the window at the east end pure Gothic, of an earlier style than those at the sides; there are some old oak stalls. HAMMERWICH is also more pleasing to the lover of the pretty and picturesque than to the antiquary. The church is a structure of stone, plaster, and wood, with a good window to the east. There is an old yew and some firs in the church-yard.

WEEFORD has nothing interesting but some beautiful glass, brought from Orleans, it having been rebuilt, as well as Hints. The old chapel at the latter place had semicircular arches; a tomb to Thomas Bassett and his two wives; as well as ancient painted glass. There is a mound here, in part artificial, close to the Watling street. The name is derived from *hynt Brit. a way*. At Canwell, a well called St. Modwen's is almost the only trace of the conventual establishment. The country here is very picturesque.

LICHFIELD. *St. Michael's Church.* On the north side of the chancel, in a niche, lies the effigy of a person in a long garment and hood, supposed to be William de Waltone, which has been restored by Richardson; the face is pleasing in expression, the hair rolled at the temples, the hands in supplication, and the feet resting on a dog. The chancel and aisles of this church seem to have been rebuilt; the pillars and arches, the groining of the chancel, the woodwork of the ceiling in the nave and aisles, and the windows generally, filled as they are with beautiful painted glass, are notable objects. The date of the font is 1669, it is adorned with episcopal shields, roses, and fleurs-de-lis. The oldest date to be found on any tomb is 1525, being on a stone, in the burial enclosure, to the memory of William Clark, clerk of the church; his son William appears to have been a venerable sacristan, as he held the same office 71 years. Another stone, now almost buried, has an escutcheon with a chevron and two birds (the arms of the Dean?)

St. John's Hospital. The chapel of this ancient building has an open timbered roof; the windows—some in the decorated, others in the perpendicular style.

Eriary. A few venerable portions of the walls remain ; as well as the tomb-stone of young Richard, the merchant, built into a wall which appertains to the modern mansion, erected on the site, and incorporated with some remains of the monastery. This stone is probably of the date of the earlier Edward, and has several monkish Latin verses in Lombardic character around it, hardly worth giving, but telling his bequests to the church, with a prayer that he may become St. Michael's merchant above.

Cathedral. In our previous account (see p. 158) the height of the central tower and spire is erroneously given, through an error in printing, the true height is 252 feet. At the present time the chancel aisles, which had their piers and arches walled up, are being again laid into the chancel, and chancel, aisles, and Lady-chapel, restored and freshened, will no doubt come out in great beauty, independently, one should have thought of paint or gilding. Amongst other parts will be seen to advantage the window, door, and passage leading towards the chapter-house; with its arcades; the arched, feathered and decorated panelling and niches of the aisles; the beautiful mouldings of the windows, the embattled parapet, the groining, and the stall-work, niches, pedestals, brackets, and canopies of the chancel and Lady-chapel. Pennant says the statues in the choir were, on the left, St. Peter, the Virgin Mary, and Mary Magdalene with one leg bare; on the right, St. Philip, St. James, and St. Christopher, with Christ on his shoulders. It is proposed to erect the altar-table and reredos near the junction of the chancel and Lady-chapel, leaving the latter for the early services appointed by the statutes. The Bishop's throne will be near here, to the south, in the chancel, followed westward on each side by the stalls and substalls. The chancel will be separated from the nave by gates and elegant open work. The comparatively modern ceiling of the central tower, it is hoped, will be removed, to shew the lantern and double tier of arches. At the east end of the south aisle of the choir was formerly the altar of St. Chad, that of St. Peter stood on the opposite side, St. Thomas's in the aisle of the south transept, and St. Stephen's in the corresponding site in the opposite transept. There is a holy-water stoup in a room over the sacristy, or Bishop's court. With respect to the exterior of the building, we may add to the original account, that, on the

north face of the north transept, only the rich door, the window above, and the figures are ancient. The clerestory windows of the chancel are perpendicular, the windows of the Lady-chapel, mostly, decorated. There is a niche or tomb externally, on the north side of the nave, the south side has been plainly restored. The south transept has windows of early Gothic below, with an ancient arcade, but perpendicular ones above. About the centre of the building may be traced remains of the previous edifice of Bishop Clinton; thus within the building, the piers nearest the tower in the chancel are of earlier date than those succeeding, and canopied figures have been added to take off their plainness, when compared with the following arches, mouldings, and capitals. During the present restoration the eastern extremities of two other antecedent buildings have been discovered, one no doubt the early Saxon edifice, the other Clinton's. There are some cells or chapels below, on the south side of the Lady-chapel, but no crypt appears ever to have existed, though cloisters formerly did. The room over the chapter-house is used as a library, and there is an apartment opening into it. In the south aisle of the chancel, beside the tomb of Bishop Hacket, lies a representation of a wasted corpse, the effigy of a dean, the richly carved figure of a bishop with his crozier under a canopy, and one or two other effigies or portions of effigies. Some others lie in the wall of the south aisle, of an ancient kind, the feet and heads only seen.

TAMWORTH has found a describer in Mr. Palmer, in a separate "History." Besides Canute, he tells us, that Edward the Martyr, and Edward the Confessor, struck coins at Tamworth, as did William, through the same mint-master as Edward. Many charters of the Saxon kings are dated hence. The church has a crypt, of which Mr. P. gives an interesting account, and of an inscription found therein, also of the seal of the college. The bare wall of the castle is Saxon or Norman, and the apartments are interesting from their carved woodwork, and indeed were thought so by that connoisseur, Sir Walter Scott. The old walls near the church belong to the deanery. ELFORD has also found a restorer and historian in Mr. Richardson.

WHITTINGTON. The upper part of the church tower and spire were rebuilt about a century back, and are pleasing in their appearance. The body of the church is the reverse, being raised of

brick; a rather fine Gothic arch, between the tower and the nave, is built up: a few fragments of stained glass remain in the east window. The register is curious, and begins 1575. "There is a very remarkable old house in the village, whose style of architecture is very beautiful—it is now partly covered with ivy and very picturesque in its appearance; it must have been built some three or four hundred years ago."

STATFOLD. One would suppose that strictly agricultural districts, such as this around Tamworth, are becoming more scantily peopled than of yore, the churches having either been curtailed in size or become disused. This interesting little chapel is in this latter case, as well as several others north of Tamworth. The altar remains, also sedilia and piscina. Likewise a large tomb having an escutcheon, Wolferstan impaling Middlemore: the font likewise is uninjured, it has, around its rim, the words—"Nascentes morimur finisque ab origine pendet."

THORPE CONSTANTINE. Here the church has nothing ancient except its tower and spire. That of CLIFTON CAMVILLE is built of a light coloured stone, and is decorated in style. The east window is of fine architecture of the above period, the roof has been lowered, and the building generally injured by injudicious repairs, but less so on the south. To the north there is a kind of transept and a porch. There are mural niches within, on each side—in the one to the north is buried the founder's wife with a cross-fleury on her coffin. The lower part of the tower has been opened to the nave, and displays a finely groined ceiling, arches, and windows. There are old oak and stone sedilia, and a brass on the floor of the chancel, of which the female half-effigy is in good condition, but the canopy, escutcheons, &c., are gone. There are fragments of painted arms in the east and north windows—crosses, mullets, lion regardant-passant, and fretty.

HARLESTON church has a tottering wooden belfry, its more picturesque looking portion. HASELOUR church is unused; it has a pretty little spire and a decorated window and canopy below; for the rest it is quite overgrown with ivy and filled with lumber. Most of the tenements in this district are very ancient timbered structures. EDINGALE presents nothing interesting.

WEDNESBURY. One slab in the church is to John Comberfoot and his wyffe, 1559—two have the names illegible, the dates 1591 and 1517. On another stone may be read—"Hic jacet Gualterus Hercourte, stemmate pernobilis—nobilior qui dominum suum Assascinatorum gladiis obsessum stupenda magnanimitate (etiam in pueritiâ) munivit et liberavit." DARLASTON church was partly rebuilt of brick in 1721; its ancient painted glass is gone.

WESTBROMWICH old church, dedicated to All Saints, was mostly rebuilt in 1788. Its tower has a good decorated window westwards, there is also a second, in good style, in the same face of the building. There is a porch and side-chapel to the south, the latter of late Gothic style. Generally speaking, the church has been much altered and debased at different times. It had formerly alabaster tombs of the Whorwoods, also arms; two effigies remain at the east end. The font is octagonal, with escutcheons; there is a cross in the church-yard.

TIPTON, WEDNESFIELD, WILLENHALL, and SMETHWICK have comparatively modern churches, of little interest in any way, and it does not enter into the plan of the present volume, as observed originally, to descend to our present times. HARBORNE church has an ancient tower. BARR is a beautiful domain, with an elegant church for the style prevalent at its period of erection; the former is associated with Shenstone and his cousin, Miss Dolman; the latter noted for a beautiful east window, painted by Eginton. NORTON church has, on the big bell, "Sancte Anna, ora pro nobis;" also a mural tablet to Phineas Hussey, M.D., of Wyrley Grove. PELSALL has nothing of interest, neither has BLOXWICH.

HANDSWORTH church is a pleasing object, in an arboreous neighbourhood, but has been greatly altered outside. The monument, by Chantrey, to Watt, is in a chapel to the south side of the chancel; he is represented in a chair, in an attitude of calm contemplation, with a tablet on his knee, and a pair of compasses in his right hand,—the motto, "*ingenio et labore.*" There is a tablet and bust to Boulton, by Flaxman. The Wyrley chauntry is to the north of the chancel. There are two aisles to the nave having massive piers, and low pointed arches. The tower is between the south aisle and Watt's chapel, at its east side is a projection to contain a staircase, and it has a pointed

window on its south side with ruder ones above. At the west end of the church is a circular window, and at the east a large decorated one. A tablet is in the chancel to Archdeacon Fulnetby, 1636, also a table-tomb in the north chauntry with effigies of William Wyrley and his lady, he in plate armour with gauntlets, sword and dagger, his head on a helmet, and his feet on a lion; she has a ruff, and her feet on a dog. At the east end of the south aisle is a second table-tomb, with a single effigy of about the same period as the last, in plate armour, and with sword and dagger, said to belong to William Stanford, of Perry Hall; a skeleton effigy is bricked into the front of this tomb, the arms above, barry of six, or and gules, on a canton gules, a gauntlet or, holding a sword, the date 1570. There are also three slabs in the Wyrley chapel with effigies and letters in black-line, but the latter illegible. There is a trefoiled piscina in the same chapel, also ancient coats of arms, in the east wall, appertaining to Wyrley and their alliances Harmon, &c., as do some arms remaining in a window over this aisle at the west end.

HUNDRED OF SEISDON.

PATTINGHAM. This church has (like so many more of our ecclesiastical buildings) been erected at different times, there being Norman arches in the nave, an early-English chancel, some decorated windows in the south aisle, and other parts of later date. It appears to have had a spire formerly. Shaw gives an interesting view of it, as it was in his time, with its cross and lich-gate. It had one ancient stone with a figure of Johanna Molineux, 1507, also, formerly, painted glass in the windows. The church has been lately well restored. "It is the noble chancel which is especially interesting, its ample proportions and grand simplicity at once attract the eye on approaching it; whilst its narrow lancet windows and still narrower dividing buttresses—these again diminished in effect by the large chamfers taken off their angles—constitute so peculiar but genuine a specimen of the style." The roof has been raised to its original pitch, opened and timbered, with a new cross to the gable, oaken seats and screen.

PATTESHULL church contains two fine altar-tombs of Sir John and Richard Astley with effigies, Sir John's of the date of Hen. 7th or 8th, the figure with a collar of SS. and his head lying

upon a helmet with plume, also the figure of his wife by his side, and those of seven sons and eight daughters in the panels, with the arms of Shareshull, Astley, and Harcourt. Sir Richard's is of the date 1687, and his figure reposes between those of his two wives. In the hall are pictures of two celebrated combats of the knight at Paris and Smithfield.

PENN. The tower and chancel of the church here have been rebuilt, principally of brick; however, the aisle and nave, with the pillars, arches, and windows, especially the decorated east window, are more interesting. Several of these windows are filled with painted glass. The font is lined with lead, in the perpendicular style, with shields. There is some ancient woodwork, as the ceiling and pulpit. The base of a cross is in the churchyard. The Levesons and Bufferys were the ancient possessors of lands here, and Raphael Sedgwick, M.D., 1767, is interred in the chancel, with an apparently well merited inscription.

WOMBOURNE. The spire of the church is its principal ornament, of peculiar construction, with canopied lights, and dragon on the top. St. Benedict is the patron saint. An ancient elm stands opposite the lich-gate, or rather the stock of it, for the upper part has been blown down. But little of the original structure of the body of the building remains: it has a sort of transept; the north aisle has a late Gothic door and window at the west end. There is a curious carving in gypsum, of the good Samaritan near the south door, and on the floor is a stone from which the brass figure of an ecclesiastic has been removed.

TRYSULL. The church here is superior to the general run of our ecclesiastical edifices, and has been carefully restored, and partially rebuilt. It is generally of the decorated style of architecture; the head of the east window has tracery uncommon in Staffordshire. Four round piers and their arches, separate on each side the nave from the aisles. The west end has a rich entrance with a square head. The old glass, mentioned by Huntbach, has disappeared, for now the windows are filled with beautiful modern devices; the beams of the roof, the screen, pulpit, niches, &c., are of carved wood. The most ancient tomb has a black-lettered inscription to Nicholas Barnsley, together with his arms. Large stones of various mineralogical character, granite, trap, micaceous, &c., being the remains of the "great

Northern drift," abound here on the surface of the country, and many form the village boundaries.

ENVILLE. The church consists of tower, nave, aisles, and chancel, all ancient, indeed mostly Norman, but the chancel windows were modernized and spoiled half a century ago. The piers are very massive, and there are some fine carved old oak stalls. The altar-tomb of Thomas Grey, with its effigies, is a magnificent specimen of alabaster carving: the stone of Rogerus de Morf is known as figured in other works.

KINVER. The church, as at present existing, presents no trace of Norman architecture, but the north side, mentioned, as doing so, by Bishop Lyttleton, appears to have been rebuilt. This church is however generally ancient, with geometric or decorated windows, in one or two instances, however, later. The chancel has aisles, the north one being the burial-place of the Foleys. The south aisle contains the tomb of Ed. Grey, 1528, one of the most interesting specimens in the county, being formed of a curious granitic conglomerate or porphyry, highly polished, and with the figures of himself, his two wives, seven sons and ten daughters, in brass. There is also a more modern monument, 1685, to the memory of Wm. Talbot, of Lichfield, Whittington, and then of Stourton Castle, placed here by his son, the Bishop, the latter the father of the Lord Chancellor, and the first the son of Sherington, and grand-son of John Salwarp, who was half-brother to Sir John Talbot, of Grafton. There are sedilia, a screen, and pulpit (1625) in carved oak, and what sets off the edifice, beautiful stained glass, of which, however, only a few fragments are ancient; the ancient escutcheons gone. There are is a sort of crypt at the east end of the chancel.

OVER ARELEY. Here the church consists of tower, nave, chancel, north aisle, and south porch. The nave and aisle are most ancient, the chancel and porch comparatively modern. The style of the aisle is principally decorated, but one or two of the windows have now depressed heads. The nave has perpendicular clerestory lights; the roofs have been depressed, and are battlemented with an ornament of trefoil arches. The old parts are of grey sandstone, the later of red. The priest's door and another to the north are made up. There is some scanty carving in the ceiling of the nave, but shallow; with Tudor rose, the symboliti-

cal triangle, and traces of colouring. Many of the windows have coats of arms belonging to the Lyttletons. The "crusader" now lies under the west window, and is in good preservation; the shield has four bars dauncette, the time probably Ed. 1st. The register goes back to 1564.

KINGSWINFORD church is ancient, with the common components of a village church, of Norman origin, but altered and debased beyond measure, indeed, the working of the adjacent mines threatens its entire destruction at no distant period. Bilston requires no notice, its old chauntry, of which the steeple is yet standing at Summer Hill, had some arms in the windows. BOBBINGTON is on the Salopian border of the county, and its chapel is dedicated to Holy Cross; it also had formerly heraldic glass in its windows, described by Shaw from Lyttleton. HIMLEY church has been rebuilt, and contains now no antiquarian notabilia. ROWLEY REGIS contained an effaced alabaster stone, also an ancient niche, but it is also rebuilt. CLENT and BROME no longer appertain to the county.

1859.

NATURAL HISTORY.

ZOOLOGY.

It cannot be expected that many additions of the higher quadrupeds can be made to the Fauna of the county. *Vespertilio mystacinus* however makes six species of bat found in it. To the black-cock, grouse, red-deer, and wild cattle, of which Staffordshire may be proud, should perhaps be added the bloodhound, for which Blithfield has been celebrated of yore, and which, when sold, have frequently produced very high prices. The common name, mouldewarpe, (Maul-warf,) for the curious little mole, reminds us of our Saxon derivation. A captured mole was tied by one of its hind legs, and allowed to make its way into the soil, and it accomplished it with almost as little effort as a fish swims in water; when it found a worm it commenced most heartily to feed upon it. When a live one was placed before it, above ground, the mole did not notice it at first, but soon examined it, and then bit it about half-an-inch from its head; it then, beginning at that extremity, took it in gradually,

carefully cleaning each portion with its curious paws. We have also, a few words to say on rats, as well as moles and bats. A friend affirms that a water-rat once took his fly whilst fishing; this appears a mistake as to the species, for, in fact, the common rat is nearly as much a water-rat as the very different creature, the true one, or water vole; and is often mistaken for it. It appears to be the common rat to which are due the heaps of shells of *Anodon* and *Paludina*, which we sometimes see on the water-side, evidently broken by their teeth, whilst *vice versa*, the true water-rat wanders miles from the water, probably in the winter. Hence it is that great quantities of their bones are commonly found upon opening British barrows. The common Staffordshire name for the shrew is nurserow, (Sax. nase screawa,) nose shrew, from its long snout.

With respect to birds, we noticed a swallow, lately, to shew a curious feeling for a bird, it was amusing itself, and in a novel way; this was with a feather, which it had caught as it was floating in the air, and its delight evidently was to let it go, and after the wind had carried it to some distance, to catch it again, the trick being many times repeated. This May, 1859, a cuckoo was heard at one o'clock one fine night; so with several of the warblers, which are thus often mistaken for the nightingale, for instance, the black-cap—and particularly the sedge-warbler. The beautiful garden-warbler pours out its rich, rapid notes before light, at two o'clock in a fine June morning. *Anthus Ricardi* must be added to our pipits; the spotted rail is in Sir O. Mosley's collection, and has also been taken at Stone; also the green sand-piper, grey plover, and grass-hopper warbler. Herons have formed their nests at Swithamley, Trentham, and Betley; it was to the fostering care of the late Mr. Tollet, who prevented the gun being used against them at the last place, that the herons were indebted for the opportunity of building, which they soon availed themselves of. That gentleman, a second Gilbert White, found time to pay much attention to the habits of birds, together with his other urbane deeds. He considers the heron to be beneficial to a fresh-water fishery by keeping down the too numerous small fry. He succeeded also, after years of patience, in half domesticating the coot and moor-hen, so that they would come near to be fed; and with respect to the tippet-grebe, or

cargoose, (*Colymbes cristatus*,) he noticed that the old bird gave refuge to its goslings upon its back, thus protecting them from the pike, which would soon else have got them. Mr. T. noticed also the teal to breed at Betley.

Paludina vivipara and *Listeri*, and *Dreissena polymorpha* have now become tenants of all our canals; the former appears to have been introduced with the *Anochæris*. Sir O. Mosley has obtained a variety of *Unio pictorum* from his pool, with a fine orange-coloured nacre.

With respect to insects, (beginning with the Coleoptera) the smaller stag-beetle, *Dorcas parallelipedus*, must be added to our previous list, as found at Brereton; *Prionus coriarius*, and *Cetonia nobilis*, or the Rose-beetle, have been taken in North Staffordshire. *Sirex gigas* and *juvencus*, and *Bombus rupestris*, and *Latreillii*, at Rolleston, &c.* The locust, *Locusta migratoria*, occurred here in 1842 and 1846, and we have a specimen caught near Stoke-upon-Trent, 1857. Two beautiful butterflies must be added to the list, *Colias Edusa*, the clouded yellow, and *Vanessa Antiopa*, the Camberwell beauty. The painted lady was taken in 1846, and was plentiful in 1851. The white Admiral has occurred near Stone, and *Pamphila Actæa* has been caught near Shenstone; also *Vanessa C. album*, by Mr. Boyle, on Cannock Chase. Of the Crepuscularia, *Anthrocera Lonicæræ*, has occurred, and in 1846 and 1847, several specimens of Death's-head were noticed in North Staffordshire, one even in winter. We had two caterpillars in 1858. *Sphecia bembeciformis* must be added, taken by Mr. B. Of Nocturna, *Zeuzera Aesculi*, the wood leopard, *Cerura bifida*, *Pterostoma palpina*, *Leiocampa dictæa* and *dictæoides* and *Drepana falcataria*, must be mentioned, as also the prized *Gastropacha ilicifolia*, feeding on the Bilberry, on Cannock Chase, discovered by Mr. Atkinson. This insect had long been a reputed British species, and only reputed, Mr. A. discovered it, May, 17th, 1851. "It was clinging to a dead sprig of heath, apparently but lately emerged from the pupa. From its great resemblance to a withered leaf, it would

* With respect to bees, it has been observed that those individuals amongst the hive-bees which collect the pollen do not gather the honey, and whilst the former directly enter the flower where the pollen is to be found, the latter always alight on the outside of monopetalous flowers and pierce the corolla near to its insertion in the calyx; here a brown punctured spot may always be found, and each succeeding bee draws the honey from the previous perforation.

not probably have caught my eye, had I not luckily knelt down within a few inches of it, to pin a small Tortrix." *G. quercifolia* is much more common. The following Lepidoptera must be added.

<i>Rusina tenebrosa</i>	<i>Luperina testacea</i>
<i>Triphæna interjecta</i>	<i>Mamestra anceps</i>
<i>Graphiphora triangulum</i>	<i>M. Persicariæ</i>
<i>G. bella</i>	<i>Miana arcuosa</i>
<i>G. umbrosa</i>	<i>Dianthæcia Cucubali</i>
<i>Tæniocampa rubricosa</i>	<i>Acronycta Alni</i>
<i>T. populeti</i>	<i>Thyatira derasa</i>
<i>T. munda</i>	<i>Cymatophora duplaris</i>
<i>Cerastis spadicea</i>	<i>C. diluta</i>
<i>Caradrina Morpheus</i>	<i>C. flavicornis</i>
<i>Calocampa vetusta</i>	<i>Tethea subtusa</i>
<i>C. Exoleta</i>	<i>Cosmia diffinis</i>
<i>Cloantha Solidaginis</i>	<i>Xanthia rufina</i>
<i>Aplecta tineta</i>	<i>X. cerago</i>
<i>Hadena suasa</i>	<i>Cirroedia xerampelina</i>
<i>H. hepatica</i>	<i>Nonagria fulva</i>
<i>Neuria Saponariæ</i>	<i>N. typha</i>
<i>Cerigo Cytherea</i>	<i>N. crassicornis</i>

BOTANY.

Botanists will be interested to know that *Daphne Mezereon* not found for many years in the county, and become generally one of the rarest of plants, has been rediscovered by Mr. Carrington, in the Bincliff thickets, near the retired village of Wetton. *Illecebrum verticillatum* has, it is believed, occurred near Ranton Abbey. Before the cutting of the N. S. Railway, the *Crocus nudiflorus* grew in a field at the Grove, where we unexpectedly stumbled upon several large patches of it. The diminutive *Centunculus minimus* grows near Balterley, with several other rare aquatics. To these may be added, though most of them have been found in other localities, the Henbane, growing in a ruinous enclosure on the summit of Mow Cop, in 1851; *Vinca minor*, in a wood at Hanford; *Epilobium angustifolium*, Cotton woods; *Arenaria tenuifolia*, in Dovedale; *Camelina sativa*, abundant in a corn-field at Penkhull, 1854; *Geranium phæum*, at Belmont; *Doronicum Pardalianches*, in Trentham

woods; *Juncus biglumis*, at Yarnfield; *Alisma Damasonium*, at the same place; *Sambucus Ebulus*, in a waste place at Fenton; *Anthemis arvensis*, in a corn-field near Stafford; *Elatine tripetala*, in South Staffordshire. Of plants which may, some of them, be outcasts or interlopers, have been found *Verbascum Blattaria*, *Anchusa sempervirens*, *Ornithogalum umbellatum*, *Centaurea Calcitrapa*, and the American pest, the *Anochæris alsinastrum*. It is a puzzle to conceive how this plant has got into some of our isolated and elevated sheets of water. The *Limnocharis Humboldtii* is a more beautiful acquisition; we know of a large pool into which warm water from an engine constantly flows, and which has been for some years covered with it, its beautiful straw-coloured flowers, with their dark centres, coming out for the greater part of the year. At Rolleston, the misseltoe has been naturalized upon the lime. The "rocket oak," growing on a site, Highland Park, which was formerly situated in the precincts of Needwood, belongs, as Sir O. Mosley informs us, to the species *Q. sessiliflora*. He thinks that it has been eradicated from some superior properties of its timber.

The *Adiantum capillus Veneris* has been brought us from the limestone rock below Thor's Cavern, but we must add that we have since searched for it there, late in the autumn certainly, without success. In 1854 we found *Botrychium lunaria* in a croft at Thorny Edge. The rare luminous moss, *Schistostega*, grows in a gravel excavation, between Stafford and Colwich. *Bryum roseum*, one of the handsomest of our mosses, was discovered by the late Mr. Massey, a worthy man and good botanist, in a quarry near Armitage. A small species of *Morchella*, or Morell, grows in sandy spots, at Creswell, near Stafford. The pretty *Nidularia campanulata*, Bird's-nest *Peziza*, has sprung up in the author's garden, and even in flower-pots in the house. To these fungi may be added, a beautiful *Agaric*, of the division *Pleurotus*, the pileus forming the greater portion of an exact circle, and of a rich indigo colour, gregarious and imbricated, and growing on decaying timber; also *Rhizomorpha medullaris* springing from the wood-work covering a well, and extending its branches many feet down the sides of the latter, in perfect darkness. *Agaricus Georgii* is a common mushroom, and is often eaten; we have had one measuring 10 inches across, and of excellent flavour when cooked, being a dish for two.

GEOLOGY, FOSSILS, MINERALS, ETC.

Since the publication of the "Staffordshire" horns of the stag have been exhumed at Yarnfield moss, and a pair are deposited from thence in the Stoke-upon-Trent Museum; others have been discovered near Lainton, on the west of the county, and Sir O. Mosley has a noble horn from Tutbury, with those of the *Bos primogenius*, and another from Rolleston. Mr. Bateman has explored a cave on Ham Moor, containing quantities of the bones of oxen, dogs, and a large animal of the canine species. Jasperly chalk flints appear to be common in the drift upon Needwood, and ananchytes of a similar origin are picked up. Lias fossils, such as ammonites, nautili, and *Gryphæa incurva*, have been found in the south-east part of the county, about Codsall and Wolverhampton, on digging below the surface, being perhaps the remains or debris of a bed of lias, once existing there, upon the new red-sandstone. In the beds of flagstone, or mill-stone-grit, found at the extreme northern point of the county, but more fully developed some miles further on, may be noticed ripple marks, little hillocks formed apparently by the castings of annelides or worms, as well as marks of their windings, impressions of bivalve shells, and certain circular or horse-shoe markings which appear in some cases, to be sections of calamites, or hollow reed-like plants, many of them having been inclined in one direction by the same winds which caused the ripple-marks.

A new variety of ironstone, a red earthy hæmatite, containing about one half peroxide, or better than one-third metal, has been discovered in the Churnet valley, and now very largely raised and smelted. A copper-mine was being worked at Ellastone, in 1853, and another old one has been re-opened at Ribden with considerable pretensions.

We may add to our list of minerals sal-ammoniac, found in the North Staffordshire coal strata. We have also obtained specimens of Titanium from the slag at the bottoms of furnaces, at Longton, in North Staffordshire. From the new red sandstone, near the Dane viaduct, yet a little beyond the limits of the county, may be found at the surface beautiful masses of selenite,

or crystallized gypsum, or sulphate of lime. In respect to gypsum likewise, it may be mentioned, that the splendid and very large patera, in the hall of the Jermyn Street Museum, was carved from that of Fauld, in this county.

This new red sandstone is now more precisely subdivided into the lower or Permian, the bunter, consisting of an upper and lower red and mottled sandstone, with intermediate beds of conglomerate and gravel, such as we see at Trentham, and the keuper. The Trentham gravel consists principally of pebbles of red quartzite with whitish cloudy spots, and also, in addition to the components mentioned at p. 205 of the work, decomposed agates, Lydian stone, jaspers, and Silurian fragments.

The most general drift upon the coal strata appears to consist of a brick-clay, with dispersed boulders of grit, chert, granite, and greenstone. Certain beds of conglomerate and red, blue, or greenish clays, situated on the margin of the coal-fields, and valuable for the manufacture of blue tiles and brick, are now referred to the upper coal measures, as are the beds of blue clay and shaly sandstone, with traces of shells, occurring on Needwood, to the Lias.

With respect to the south of the county, much valuable information may be found in Mr. Juke's Geological Survey of the district. It would appear that the Brereton beds of coal are not exactly the lower beds of the South Staffordshire coal-field, but rather the continuance of the Wyrley beds, or the thick coal split up and separated by the intervening measures; the dip also appears to be pretty generally north-west. These measures near Rugeley would have been lost before they got so far north owing to their inclination, and to numerous east and west upshot faults to the north of Wolverhampton, were it not from the great transverse fault at Bentley, with others still more northwards, throwing them down again.

The Dudley trough fault has, with a few others, a north-easterly direction, throwing down the thick coal; the Russell's Hall fault runs south-east. At the south of the field the strata do not dip as usual west, but rather southwards under the Permian, which here, as well as all around the field, except to the north, encircles it. East and west the field is bounded by great faults, and it is probable that here the coal measures have not been carried away,

but are thrown down; at Brereton they evidently dip under the new red formation, though it is probable that the great marginal faults took place after the deposit of that formation. It should be borne in mind that the coal measures may cease under the new red formation from not having been ever deposited, or they may do so from having been carried away before the newer deposit took place.

It is supposed that the imbedded greenstone was deposited before the basalt of Barrow Hill and Rowley, the latter being the most recent of all, and all being older than the Permian, as they are not found in that formation. They are, however, equally with the coal measures, affected by the faults. The coal measures being found upon the upper and lower Wenlock and Ludlow formations unconformably, shews that these must have undergone elevation and denudation before their deposit. The Clent hills are composed rather of trappean breccia than of basalt. A small patch of the Llandovery sandstone, a deeper bed than the Walsall or Dudley limestones, was discovered by Mr. Eglinton on the east margin of the Walsall limestone district. It contained *Pentamerus lens*, a peculiar fossil, with others of the Upper Silurian.

That there has been an alternation of fresh and salt water deposit in the South Staffordshire coal basin, is seen from the occurrence of marine shells in considerable abundance between Oldbury and Portway, in the lower part of the pennystone; also *Producta scabricula* occurs in the white ironstone between Rowley and High Haden. *Avicula quadrata*, *Pecten*, *Lingula*, *Orbicula nitida*, *Conularia quadrisulcata*, a fragment of an *Echinus*, beside *Ichthyolites* of several species, *Cochliodus*, *Pœcilodus angustus*, &c., are found: also *Anthracosia bipennis*, *Myalina quadrata* and *carinata*, *Aviculopecten scalaris*, and traces of *Annelides*.*

* For more particular information see Mr. Juke's Memoirs of the Geological Survey of South Staffordshire, 1859; also a paper by the Author of this work on the Coalfield of North Staffordshire, Rep. Brit. Assoc., 1859. The Rev. Mr. Lister read a notice at the meeting of the same Association at Oxford, 1860, upon some Reptilian Footprints found in the Keuper, north of Wolverhampton.

LIST OF FOSSIL FISH FROM THE NORTH STAFFORDSHIRE COAL STRATA.

At the time when the coal strata were formed, fishes were the dominant organic creatures, but they were of a kind of which we have now but comparatively few representations, being of these two divisions, the Placoid, having an external integument of small plates and points of bone, and an internal cartilaginous skeleton, and the Ganoid, covered by a "continuous armour of enamelled bone, or by great bony plates that look into each other at their edges," the skeleton bony or cartilaginous. In these fishes too, the spine is continued into the upper longer division of the tail, as in the shark, and from their extraordinary weapons, they do not appear to have been in strict keeping with a golden age of universal peace

Pleuracanthus lævissimus. We have a perfect specimen of this barbed and double saw-like sting from Apedale, and have seen fragments from Longton. *Diplodus* has been ascertained to belong to the same fish.

Onchus tenuistrialis. The rays of the fins are common.

Orthacanthus cylindricus. A fine specimen of this curious armature was found by Mr. Molyneux, at the Wood End colliery; not rare.

Leptacanthus.

Ctenacanthus hyboides. A fine and perfect specimen from Fenton Park. Mr. Ward.

Amblypterus. Scales, &c.

Cælacanthus.

Platysomus parvulus and *striatus*; one specimen, nearly perfect.

Diplopterus.

Gyrolepis.

Gyracanthus formosus. The dorsal spine "a mighty spear-head, carved like that of a New Zealand Chief," not rare.

G. tuberculatus. Apedale; my collection.

Holoptychius Hibberti, *Garneri*, &c.

Rhizodus. Of this genus, allied to the last, a fine jaw incurvus,) with the teeth, which are curved at the points, was found by Mr. W., and another new species by Mr. M.

Palæoniscus 4 or 5 sp. Egertoni, Silverdale.

Ctenoptychius apicalis. Several teeth at Longton: also an unknown one with a central large, and two smaller side cusps: others with the summits of the comb-like divisions rounded.

C. pectinatus and *denticulatus*.

Diplodus. The teeth have generally two fangs, but sometimes three, four, or five—*gibbosus*, *minutus*.

Helodus simplex. Curious granulated cone-shaped teeth; rare.

Pleurodus affinis. Teeth allied to the last.

Petalodus.

Acanthodes.

Cladodus.

Ctenodus. Palates with teeth.

Plates of fishes, as of *Megalichthys*, &c., the latter particularly at Longton. The teeth very common.

Vertebræ of *Megalichthys* occur abundantly at Longton open works; some two inches in diameter.

Tooth with striated base, compressed, lancet-shaped, roundish point, and sharp edges; new, R. G.

Teeth? with six or more cusps; new, Mr. M. Ditto, with four branching cusps; also new.

Jaws of a genus allied to *Archæonectes*; new, *ib.*

Teeth, striated, resembling *Saurichthys*, but new; not rare.

Teeth small, finely pointed, and attached to long tapering jaws, the body long and slender, with a dorsal fin opposite the ventral; new.

Supposed new genus with beautifully carved bony scales.

At Apedale and Fenton Park collieries occur remains of fish in a confused fragmentary congeries of teeth, bones, scales, plates, vertebræ, and coprolites, constituting extensive schistose strata.

The other animal remains of the coal strata consist principally of a few shells.

Unio or *Anthracosia*. About seven species of this apparently fresh-water genus may be distinguished, in form—oval, triangular, pinnæform, beaked behind, myæform, ridged, plane behind and above.

Aviculopecten papyraceus. Specimens of this rarer and curious shell from Cheadle coal beds. We have also seen a very large and fine specimen of the same genus, or an allied one, from the South Staffordshire coal field.

Lingula ?

Cypris. A minute crustacean, so referred. It forms a stratum at Shelton.

SILURIAN FOSSILS.—SOUTH STAFFORDSHIRE.

The following may be added to the list at p. 447 and seq. They are principally from specimens in the National Collections. The names of Trilobites and Crinoida have been much altered of late years.

Mollusca.

Phragmoceras pyriforme, Wenlock shale; compressus.

Orthoceras bilineatum, angulatum and perelegans, Lower Ludlow.

Lituites giganteus and articulatus, Lower Ludlow; tortuosus, Dudley; cornu-arietis, Wenlock shale.

Conularia Sowerbii, Wenlock limestone.

Bellerophon dilatatus and trilobatus, Lower Ludlow.

Murchisonia undata, balteata and articulata, Wenlock limestone.

Acroculia prototypa, Chiton.

Euomphalus sculptus, Dudley.

Leptæna (Strophomena) funiculata; antiquata, Grayii, Pecten, Walsall; imbrex, filosa.

Atrypa marginalis, Dudley; reticularis.

Orthis Lewisii, Walsall and Dudley; biloba; biforalus; calligramma; Orbignii; rustica, Bouchardi, equivalvis.

Spirifer (Cyrtia) exporrecta; elevatus, Dudley; sulcatus; plicatellus, Dudley.

Athyris circe; Barrandii, Walsall.

Discina rugata; striata, Lower Ludlow; Forbesii.

Crania Sedgwickii, Walsall.

Obolus Davidsoni, Walsall; transversus, Wenlock shale.

Orbicula, a large species. Dudley.

Terebratula (Rhyconella) Salteri, Grayii, Lewisii, diodonta, Barrandii, Baylii, Pamelii, semisulcata, tumida; marginalis, Hay Head; didyma, borealis, Capewellii.

- Lingula elliptica*.
Pleurorhynchus æquicostatus.
Mytilus mytilimeris.
Ctenodonta semisulcata, rigida, amygdalina.
Goniophora cymbæformis.
Grammysia triangulata, cingulata.
Avicula mira, ampliata.
Pterinea lineatula, planulata; Danbyi, Sowerbii, Lower Ludlow.

Trilobites.

- Lichas Bucklandii, Dudley; verrucosus; Grayii; Barrandii, Dudley; Anglicus; hirsutus; Salteri*.
Phacops Weaveri, Barr.
Deiophon Forbesii, Barr.
Acidaspis vesiculosus, Dudley; quinque spinosa; crenata; Barrandii.
Sphærexochus mirus, Dudley.
Staurocephalus Murchisoni.
Proetus latefrons.
Cyphaspis megalops.
Ceratiocaris.

Annelide.

- Trachyderma squarrosa, Lower Ludlow.*

Crinoida, &c.

- Cyathocrinites tessaracontadactylus; Orbignyi*.
Hypanthocrinites granulatus, Walsall.
Pseudoerinites bifasciatus; oblongus.
Apiocystites pentremitoides.
Prunocystites Fletcheri.
Echinoerinites baccatus, armatus.
Eucalyptocrinites polydactylus.
Pisocrinus.
Cheirocrinus serialis.
Lepidaster Grayii.

Corals.

- Ptilodictya lanceolata.*
Thecia Swindernana.
Labechia conferta.
Heliolites interstinctus, Grayii, inordinatus.
Favosites cristatus.
Chaetetes Fletcheri.
Cænites juniperinus, intertextus, labrosus.
Alveolites Labechii, seriatoporides.
Palæocyclus rugosus.
Zaphrentis lata.
Sarcinula organum.
Cyathophyllum truncatum, angustum.
Arachnophyllum typus.

FOSSILS OF THE MOUNTAIN LIMESTONE OF NORTH STAFFORDSHIRE.

These require a particular notice, as our account in the Staffordshire was scanty. Fortunately, through the remarkable labours and kind assistance of our worthy friend, Mr. Carrington, who adds palæontology to his antiquarian researches, already referred to, we are enabled to give the following interesting account. The Astbury limestone, at the west foot of Mow Cop is rather peculiar, being dark in colour, with blotches of red and green. Corals abound in it with some shells, but especially small species of *Bellerophon*, *Euomphalus*, *Turbo*, *Trochus*, and *Buccinum*, or at any rate, congeneric shells: these are not included in the following lists.

“It is evident that a large portion of our limestone is derived from the remains of pre-existing creatures, which swarmed in the seas during the deposition of that formation. Some of the strata are in a great measure composed of the skeletons of *Encrinites*. The larger corals, such as the *Lithodendron longiconium*, and the *Syringopora laxa*, were so abundant that field-walls may be seen erected from their remains; and even the more delicate species, such as the *Fenestella*, form no inconsiderable part. Although the network is often undiscernable, yet the axis or internal body abounds, presenting very fantastic forms when separated from the enclosing limestone, and when broken, often

found to be hollow within, and composed of layers of different hues. I have had specimens presented to me as petrified bones. Sometimes they have a fan-like appearance, others are branched. The mollusca for the more part lived gregariously, but the different species not apart from others; some are not found congregated, but were every where diffused, as the Patellidea. The *Orthis resupinata* I have found *en masse* in various places, yet individuals are as wide spread as any shell. The *Terebratula flexistria* is as common as the *O. resupinata*, it seems in this particular to be an exception from the generality of the genus *Terebratula*, especially the plaited ones, which are found, generally, congregated in families; particular species, and even the varieties existing apart from other species.

Some shells, as the *Spirifer symmetricus* and *S. integricostatus*, I have found in one very circumscribed locality, but there in abundance; I have not met with one individual of either of those species elsewhere. The *Spirifer trigonalis* is a very common shell, occasionally found in a mass. In bulk, the *Brachiopoda* far exceed all the other classes put together.

The *Cephalopoda*, especially the *Orthoceratites*, are believed to have been the scavengers of the antient seas, yet I have a mass of *O Breynii*, consisting of great numbers of individuals, some of which are pretty large; other species of the genus also congregated together though not in great numbers.

Where *Trilobites* are found pretty numerously, so are the young *Mollusca*, hence we learn that *Trilobites* were predatory animals.

In perpendicular fissures of the rock, I have sometimes found half of a large shell on one side, and the other half of the shell firmly imbedded in the other side; therefore the rock must have been perfectly consolidated when the disruption took place, otherwise the shell could not have been torn asunder: often, when the rent is but a small one, so as to admit of its being filled up with carbonate of lime, I have found the shells that had been rent so joined again.

Thick or irregular strata afford the most fossils.

If one circumstance is not sufficient, we may assuredly learn from the combination of many, that these animals lived and died in the places where we now find them.

The regular series of thin strata in one place, the massy irregular strata in others, the prevalence of fossils at certain depths, with the utter absence of any such remains betwixt, &c., afford materials for the mind far more fascinating than a fairy tale."

ZOOPHYTA.

- Amplexus*, Sowerby.
 A. coralloides.
Cyathophyllum, Goldfuss.
 C. fungistes (Turbinolia).
 C. plicatum, Gold.
Favosites, Lamarck.
 F. incrustans.
 F. septosus.
 F. tumidus.
Fenestella, Miller.
 F. flabellata (Retepora).
 F. irregularis.
 F. laxa.
 F. membranacea.
 F. nodulosa.
 F. polyporata.
 F. tenuifolia.
 F. undulata.
Millepora.
 M. rhombifera.
 M. oculata.
 M. spicularis.
Seriopora.
 S. interporosa.
Flustra, Linnæus.
 F. parallela.
Glaucanome, Gold.
 G. pluma.
Gorgonia, Linn.
 G. zigzag.
Lithodendron, Schweig.
 L. fasciculatum.
 L. junceum.
 L. longiconium.
- Lithostrotion*, Lhwyd.
 L. sociale.
 L. regium (Cyathophyllum Ph.).
 L. striatum (C. basaltiforme Ph.).
 also worn specimens in gravel.
Michelinia, Kon.
 M. tenuisepta.
Retepora, Lamarck.
 R. irregularis.
 R. flustriformis.
Syringopora, Gold.
 S. geniculata.
 S. laxa.
 S. ramulosa, and rolled specimens found in gravel pits.
 Echinodermata, Crinoida, unnamed.
 Pentremites.
 Platycrinus.
- CRUSTACEA, TRILOBITES.
 Entomoconchus Scouleri Mus-
 Jerm.
 Asaphus gemmiliferus.
 A. globiceps (Griffithides).
 A. granuliferus.
 A. quadralimbus.
 Phillipsia obsoleta.
 P. raniceps (Derbiensis).
 P. seminifera.
 P. Jonessii, Alstonefield. M. J.
 Cyprella crysalidea. M. J.
 Cypridina primæva. Pilsbury,
 M. J.

PTEROPODA.

Conularia.

C. quadrisulcata.

HETEROPODA.

Bellerophon.

B. apertus.

B. cornu-arietis.

B. costatus.

P. decussatus.

B. hiulcus.

B. spiralis.

B. tenuifascia

B. Woodwardii. Naut. Sow.
fragmentary.

BRACHIPODA.

Atrypa.

A. expansa, common.

A. fimbriata and a variety.

A. glabristria and a var.

A. lineata.

Leptæna.

L. analoga and a var.

L. distorta (Pr. depressa Ph.).

L. papilionacea, frequent.

L. sarcinulata?

Lingula.

L. elliptica.

L. mytiloides.

L. parallela.

Orthis.

O. arachnoidea.

O. connivens and a var.

O. crenistria.

O. filaria.

O. resupinata and a var.

Productus.

P. aculeatus.

P. antiquatus and 3 vars.
common.

P. comoides.

P. concinnus and a var, abund-
ant.

P. costatus.

P. crassus.

P. Edelbergensis.

P. fimbriatus and 2 vars, not
rare.

P. giganteus, not common.

P. granulatus and a var.

P. hemisphericus and 2 vars.

P. latissimus, abounds at Nar-
rowdale.

P. lobatus, not common.

P. Martini, common.

P. mesoloba and a var., com-
mon.

P. ovalis, rare.

P. pectinoides and 4 vars.
abounds in Wetton Hill.

P. plicatilis, not common

P. punctatus, common.

P. pustulosus, rare.

P. quincuncialis and 3 vars.

P. rugatus.

P. scabriculus and a var.

P. setosus

P. spinulosus. Wetton Hill.

P. striatus. (Pinn. inflata, Ph.)

P. sulcatus.

P. giganteus. J.M.

*Spirifer.*S. acutus (minimus, Sow.)
Wetton Hill.S. attenuatus and 2 vars not
rare.

S. bisulcatus.

- S. connivens.*
S. convolutus, rare.
S. cuspidatus and 2 vars, not rare.
S. decorus, rare.
S. duplicostatus and a var.
S. depressus.
S. fusiformis and a var.
S. glaber and 3 vars, most places.
S. globularis and var, plentiful.
S. imbricatus, not common.
S. insculptus, rare.
S. integricostatus and 3 vars, abundant in one place.
S. lamellosus.
S. linguiferus, common.
S. mesolobus, common.
S. oblatatus and a var.
S. obtusus.
S. ovalis, rare.
S. octoplicatus, rare. Wetton Hill.
S. pinguis and 2 vars, rare.
S. planatus, abundant in one rock in Dovedale.
S. radialis, most places.
S. rhomboideus.
S. rotundatus and a var. Wetton Hill and Dovedale.
S. semicircularis, in some places
S. senilis, rare.
S. septosus.
S. sexradialis, rare.
S. striatus and 2 vars.
S. subconicus.
S. symmetricus and a var, in one place.
S. triangularis, plentiful in one locality.
- S. trigonalis* and 4 vars, very abundant.
S. triradialis, rare.
S. triplicosta.
S. trisulcosus, rare.
 About 72 species or varieties found.
- Terebratula.*
- T. acuminata* and vars.
T. crumena.
T. flexistria, abundant.
T. hastata and a var, common.
T. Mantixæ.
T. obsoleta, rare.
T. pentaedra, common.
T. pleurodon and 2 vars.
T. plicata.
T. sulcata.
T. seminula.
T. pugnus and a var.
T. sacculus and a var.
T. tumida, rare.
T. ventilabrum.
T. vesicula. J.M.
T. reniformis and 6 or more vars.
 Many very small unnamed species.
- CONCHIFERA, DIMYRARIA.
- Arca Linn.*
- A. cancellata.*
A. semicostata. J.M.
A. squamifera. J.M.
- Cardiomorpha, Kon.*
- C. oblonga.* (Isocardia, Sow.)
C. lamellosa. J.M.
- Corbula, Lam.*
- C. senilis*, rare.

Cucullæa.

C. arguta.

C. obtusa.

Cypricardia.

C. glabrata.

C. rhombea, rare.

Edmondia, Kon.

E. cardinia. J.M.

E. unioniformis. (Isocardia,
Ph.)*Isocardia.*

I. axiniformis.

Lucina.

L. laminata.

Venus.

V. parallelea. J.M.

V. elliptica.

Pullastra.

P. bistrata. J.M.

Modiola.

M. elongata.

M. lingualis.

M. squamifera, rare.

Lithodomus.

L. dactyloides. J.M.

Myalina.

M. lamellosa. J.M.

Nucula.

N. attenuata.

N. brevirostrum.

N. cuneata.

N. gibbosa. Hill Dale.

N. lævirostrum.

N. luciniformis.

N. undulata, rare.

Pinna.

P. flabelliformis.

P. angustata (Pteronitis).

Pleurorhynchus.

P. aliformis.

P. armatus.

P. elongatus.

P. trigonalis.

*Sanguinolaria.*S. angustata. } generally
S. sulcata. } imperfect.*Cyclas.*

C. radialis.

Solemya.

S. primæva.

MONOMYARIA.

Avicula.

A. cycloptera.

A. lunulata (Gervillia Ph.).

A. radiata, rare.

A. simplex (Pecten Ph.).

A. sublobata.

Gervillia.

G. inconspicua.

G. laminosa.

G. squamosa.

Pecten, Linn.

P. anisotus.

P. arenosus.

P. deornatus.

P. dissimilis, not rare as most
others.

P. ellipticus and a var.

P. Sedgwickii. J.M.

P. granosus and a var.

P. hemisphæricus.

P. interstitialis.

P. plicatus, having strong but
tubercular ribs, interspersed
with fine ones. One spec.
4½ in. by 4.

- P. stellaris.* *Globulus (Ampullaria).*
Anomia, sp. Longnor, J.M. *G. helicoides* (Pleurot, Ph.)
Posidonomya. *Loxonema, Ph.*
P. Becheri, shale. *L. rugifera* (Melan, Ph.)
P. vetusta. Kon. *L. ringifera. J.M.*
L. constricta. J.M.
L. scalaroidea.
L. sulculosa.
L. tumida.
 GASTEROPODA. *Metoptoma, Ph.*
Acroculia (Pileopsis Ph.).
A. angusta. *M. imbricata.*
A. neritoides. *M. oblonga.*
A. striata. *M. pilous. J.M.*
A. vetusta. J.M. *M. elliptica. J.M.*
Buccinum. *Murchisonia.*
B. acutum. *M. taeniata.*
B. curvilineum. *M. Humboltiana. J.M.*
B. imbricatum. *Macrocheilus.*
B. rectilineum. *M. ovalis. J.M.*
B. sigmilineum. *M. acutus. J.M.*
B. vittatum. *Natica.*
B. globulare, and some others.
Cirrus, Sow.
C. acutus. *N. ampliata.*
C. pentagonalis. *N. elliptica.*
C. rotundatus. *N. plicistria.*
C. tubulatus and a var, rare. *N. tabulata.*
 Dovedale, J.M. *N. lirata. J.M.*
Euomphalus, Sow. *N. variata.*
E. bifrons. New Inn. *N. spirata.*
E. catillns, rare. *Patella.*
E. pentangulatus, not rare. *P. curvata.*
E. pugilis. Dovedale. *P. mucronata.*
P. fimbriatus. *P. retrorsa.*
E. depressus. *P. scutiformis.*
E. æqualis. *P. sinuosa. The genus is wide*
E. calyx. J.M. *spread, but not abundant.*
E. rotundatus. J.M. *Phanerotinus. J. Sow.*
E. Dionysii. J.M. *P. cristatus, a few fragments*
Porcellia. *of the crest.*
P. Woodwardii. Parkhill, J.M.

P. nudus.		<i>Turritella</i> .
P. nidus. Dovedale and Al- stonefield.	T. tenuistria and others.	
<i>Platyceras (Pileopsis).</i>		CEPHALAPODA.
P. trilobatum.		<i>Goniatites</i>
P. tubifer.	G. obtusus.	
P. capulus. J.M.	G. Henslowi.	
P. nobile.	G. crenistria.	
<i>Pleurotomaria.</i>	G. Gibsoni.	
P. abdita.	G. evolutus.	
P. atomaria.	G. Gilbertsoni.	
P. carinata.	G. platylobus.	
P. concentrica.	G. reticulatus.	
P. conica.	G. rotiformis, abounds in one place.	
P. depressa.	G. sphericus, plentiful in shade.	
P. interstitialis.	G. spirorbis.	
P. limbata.	G. striatus.	
P. strialis.	G. truncatus and another	
P. vittata.		<i>Nautilus.</i>
P. Ouralina. J.M.	N. bilobatus.	
E. clausa.	N. cariniferus.	
P. flammigera.	N. costalis.	
P. excavata.	N. compressus.	
P. gemmilifera.	N. pentagonus.	
P. monilifera.	N. intercostalis.	
P. squamula.	N. sulcatus.	
<i>Platychisma.</i>	N. triangularis.	
P. helicoides. J.M.	N. bistrialis.	
P. Poolvashii. J.M.	N. cyclostomus.	
<i>Rotella.</i>	N. discus.	
R. glabrata.	N. dorsalis.	
<i>Dentalium.</i>	N. globatus.	
D. ingens. Park Hill.	N. ingens.	
<i>Turbo, Linn.</i>	N. multicarinatus, fragments.	
T. biserialis.	N. oxystomus, having fine long- itudinal furrows, the edge minutely serrated and tuber- culated, rare.	
T. semisulcatus, rare.		
T. tiara.		
<i>Terebra.</i>		
T. constricta.		

- N. tuberculatus.*
Ammonites Luidii.
Orthoceras.
O. angulare, fragments.
O. arcuatum.
O. Breynii.
O. filiferum, rare.
O. fusiforme, fragments.
O. Gesneri.
O. striatus.
O. laterale.
O. reticulatum, shale.
O. unguis.
O. paradoxicum. This last is
- different in several respects from the one figured by Sowerby, from Ireland; it is more attenuated, and has several thread-like longitudinal elevations on the sides—curved and decreasing, ribbed all round, and when the shell remains, the ribs are tuberculated—with very fine intervening oblique striae the siphuncle close to the beak and bounded on each side by a prominent keel.

Fish, Palates and teeth, but rare.

FOSSIL PLANTS.—NORTH STAFFORDSHIRE.

Calamites sp.? A somewhat heart-shaped fossil, the size commonly being also that of a beeve's heart, to which they are compared by those who find these fossils; somewhat spiral externally, and with the marks of the insertion of a hollow trunk at the base. Fenton Park.

Calamites sp.? A cylindrical stem, sometimes filled with iron or zinc pyrites, two inches or much more in diameter, ending like a cucumber at one extremity, with a slight appearance of two ridges.

Sphenopteris (fucoides G.) Leaf or frond division three inches long, palmated, several times divided, extremities bifid or trifid. Adderley.

S. latifolia, *Hibberti*, *furcata*; sp. with the divisions extremely fine and conferva-like.

Neuropteris cordata. Specimens of this fine fern from the Newcastle tunnel, the leaves being some inches long.

N. acuminata, *conferta*, *heterophylla*, *gigantea*.

Pecopteris (Aleteropteris) aquilina, near Hanchurch; *adiantoides*, Adderley green; *oreopteridea*, Mantelli, *unita*, *lonchitica*, *dilata*.

Sigillaria. We saw specimens of *Sigillaria reniformis* as trunks of trees, some of them near a yard in diameter, in the Harecastle tunnel, during its cutting, they were all perpendicular to the strata, though, as the latter were inclined, not, strictly speaking, upright. Several have also been since that time exposed, and just now, a remarkable one, in the cutting at Fenton manor. The butt of this tree is upwards of a yard in diameter, and at first six feet of it were perfect; at the bottom it divided in an exact cruciform manner into four equal roots, and each root divided into two others, at the same distance, nearly a foot. It was difficult to trace the markings of *Stigmaria* externally on these roots, but internally there was the structure—a central fibrous rod with compressed strap-like processes growing from it, presenting by their sudden disappearance, after a little distance, the semblance of a pinnate leaf, as of *Blechnum boreale*. Fragments of the frond of a *Neuropteris* abounded around, and, what is curious, in all these specimens, there were portions of *Calamites* and other plants in the interior or solid part of the trunks. Single loose ribs of *Sigillaria* are sometimes found, some specimens are fluted without markings, others have only longitudinal dots or marks. It seems difficult to refer certain large dichotomous root-like fossils, dividing, nearly at right angles, with a large and smaller branch, triangular in section, and attached by one side to blocks of shale or ironstone; massive circular depressed irregular cones are found with them.

Hippurites longifolia.

Sphenophyllum Schlotheimi.

Lepidodendron plumarius, gracile.

Lepidostrobus. Newcastle Tunnel.

Halonia gracilis.

Asterophyllites equisetiformis, fine specimens from the last place; *tuberculata, rigida*.

Poacites? A grass-like leaf, rather obtuse, and of considerable length and breadth, with parallel veins, but the mid-rib small; common in fire clay, with fragments of ferns, *sphenophyllum* and *calamites*.

Flabellaria sp.

Tubers—oval with eyes, and sometimes perforations.

Fruits. *Trigonocarpon*, oval-oblong, a pit at the base, three

ribs and some smaller marks departing from the other more pointed end; in sandstone at Apedale: others elongated, with a pit at each extremity.

Ulodendron. We refer to this, the body figured pl. E., fig. 8, but in doubt. There are also certain circular bodies or impressions of a somewhat similar appearance, but smaller and gregarious in the black schist: they have a central granulated prominence and a surrounding laminated surface. Other markings are smooth, convex, or cordiform, reminding one of the leaf of a Nuphar.

Voltzia. New red sandstone.

Fucus? Pitch-like streaks in the limestone shale.

MANUFACTURES.

POTTERY.

Our account of the manufacture of Pottery was one of the first and most distinct accounts, in this country, of an art which has since excited much attention. But in some cases the information afforded is deficient, in a few not quite correct. Thus, we are not aware that cobalt has been discovered in the glaze of any of the figures found with Egyptian mummies, the color being from copper; and, indeed, the term glaze is scarcely correct, the surface being only coloured by a silico-alkaline solution, now called a smear: and with respect to the small jars alluded to, they are in reality Chinese, and not Egyptian; the inscriptions on them being taken from a poet of the 8th century. Again, though the Chinese made pottery, from a very remote antiquity, they appear to have commenced the manufacture of porcelain about the time of Christ, under the Han dynasty.

With respect to Italian pottery, it flourished particularly under the patronage of the Dukes of Urbino. Raphael probably no more painted on majolica, than did Julio Romano, Giovanni d'Udino or Caraccio, though their designs were made use of in its ornamentation. True, or hard porcelain, has never been

manufactured in England, at least as an article of sale, except by M. Arnoux, at Minton's manufactory; and only there since 1849. There is very little similitude between ironstone and hard porcelain, the former being nothing more than a superior earthenware, with more flint, and a notable quantity of pegmatite or Cornwall stone to vitrify it, partially glazed too with lead or borax, at a second easy firing; whilst in porcelain the glaze is felspar, put on by a second firing of intense heat. In fact, none of the English Potteries, at the present time, or formerly, neither Chelsea, Worcester, or Nungarrow, for instance, produced porcelain. With respect to Wedgwood ware, public taste has changed, and the productions of Wedgwood primus (particularly) are much sought after. Two or three hundred pounds have been paid for single specimens. The manufactory still stands high for productions of utility and even of taste.

We have inverted quantities in our account of the composition of Cornwall clay—it may be set down as 60 silica, 38 alumina, with trifling quantities of magnesia, iron, and potash. The alumina is in the state of hydrate, and this form of it, increased by grinding in water, appears essential to its plasticity. The best felspar, perfectly crystallized and brownish red in color is from Arandal. We are not quite correct in our account of the turquoise colour. That used at Sevres, on the glaze of the soft china, (*pate tendre*) was made with copper and a flux chiefly composed of silica and soda, very similar to the color used by the Persians, Assyrians, and Egyptians. There is however a great deal of turquoise body, which is more properly a light blue, formed of cobalt with alumina and oxide of tin. No bone or phosphate of lime is ever used in hard porcelain, nor any alkali in its glazing, as the felspar carries its own alkali. In soft China the transparency is provoked by the Cornish stone, which vitrifies partially the body—also it is increased, as well as the whiteness, by the bone, which however does not seem to enter into chemical composition with the other materials. The Chinese *Hoa-ché* is a steatite (*amphibole blanc*) and eight parts, with two of *petuntzé*, make fine, white, and light porcelain. *Tse-thou* is porcelain clay; *Yeou-Ko*, a material used for glaze; *Kao-Ling* is the name of a mountain from which superior clay and felspar are taken; *Chi-kao* is a fibrous gypsum, and with it the Chinese

form white designs under the glaze, on a greyish body. For their glaze they obtain the dust of ferns, burnt with limestone (potash), and mix it with Pe-tun (felspar), and by insufflation through a bamboo, the end of which is covered with muslin, they produce its sifting. King-to-tchin is the great Pottery of China, and has been so for ages. Two centuries back, 18,000 families were engaged in the manufactory, when European Pottery was only emerging from the barbarism of rude nations. An inferior sort of gilding is made with gold solution, a salt of tin, and balsam of sulphur, leaving on the ware, after burning, a sulphuret of gold, mixed with a small portion of precipitate of Cassius. We have little doubt, that sulphur or carbon also was used, with metallic substances, or the deoxidizing power of flame in producing the much prized iridescence of majolica ware; such tints we see in pyrites, and in vitrescent substances situated in the neighbourhood of smelting works, emitting sulphurous vapours. Parian, or statuary, having a large proportion of felspar in its composition, has been invented, or rather re-invented, by a workman, under the auspices of Messrs. Battam and Copeland, and improved by Messrs. Minton and others, so as to become an important article of Pottery. We use the term re-invented, as many years back, it was made at Spode's manufactory, though the result was obtained partly by the use of cawk or sulphate of barytes in the body. With respect to the much admired pavement tiles, they were invented, or rather re-introduced by Mr. S. Wright, but brought to perfection by Mr. Minton, M. Arnoux, besides making beautiful porcelain, has also revived and improved, in many respects, the manufacture of majolica, and also of Palissy and Saracenic ware. Messrs. Pratt, and the Wedgwoods (primus, secundus and tertius) have excelled in the manufacture of beautiful Etruscan ware, and the former have also introduced colour printings.

INDEX OF PLACES

MENTIONED THROUGH THE WORK.

A study of the names of places, with regard to their signification and derivation, forms an interesting but difficult subject. Generally speaking, the names of our towns and villages have a Saxon element in their construction, but the original designations have been much modified in the course of time and by the changes of the language, therefore some of the Doomesday names of places are almost unintelligible. The British or Celtic element is less seen in our language, but one might expect to find it in the names of places, particularly in primitive districts, as in the appellations of rivers, hills, &c. Mow Cop may as well be derived from moel (tower), and cop (summit), as from the similar Saxon words; perhaps Cloud from clod (praise), Dove from dwfr (water), Trent from tren (force), Terne from tern (vehement), Darfur, the place where the Manyfold sinks underground, from darfod, (a finish or end), Basford or Beeston, from bais (a ford), Painster from pain (bloom), and twr (a tower), Morfe (a moor), Gibtor from jib (orient. a mountain); but Thor's cavern, derived from the awful God of thunder by Darwin, may simply be the cave in the Tor; Lud's church, or Ludlow, may be from llwyd (gray) or lled (broad); Arbor-low, or Arbelow, or Windy Arbour, from arbear (round or convex.) The British words lin, a pool; coed, a wood; cain, white; alt, the side of a hill; bar, a bush; pen, the head; frith, a high wood; seem also to be compounded in some of our names of places, Saxon words are common enough, such as delf, a quarry; greave, a tree; hob, a fiend; hurst, a wood; stile, a step; holt, a wood; lea, a field; meare, a boundary; mere, a lake; meeese, meadows; runnell, a brook; saugh, a trench; stock, a place; shaw, a thicket; slade, a valley; thorpe, a village; wick, a place; yate, a gate; toft, a grove; clough, a hollow. Some of these words are somewhat local, as are the less topographical words—gorse, glede howlet, quecce, mouldewarpe, nurserow, keech, kell, kex, lant, morplew, nesh, and steau. The names of barrows, or cairns, are curious—Bitchin-low, Gally-low, &c.

Abbey Hulton, 125. Supt. 19.	Bagnall, S. 11.
Abbot's Bromley, 114, 546. S. 17.	Bagot's Park, 114.
Acton Trussell, 548.	Barlaston, S. 9, 19.
Adbaston, S. 18.	Barr Beacon, 65. S. 29.
Aldridge 64, 174.	Barrow Copt Hill, 67
Alrewas, 146, 550. S. 23.	Barton-under-Needwood, 146. S. 23.
Alstonefield, 99. S. 12.	Batchacre, 547.
Alton, 22, 73, 95, 544. S. 11.	Beacon Hill, 11, 231.
Aqualate, 23, 137.	Beaudesert, 154. S. 6.
Arley Over, 18, 246. S. 32.	Bednall, 548.
Armitage, 89, 93.	Beeston Tor, 21.
Ashley, 63, 119.	Belmont, 6, 22.
Aston, 117.	Bentley, 86.
Audley, 62, 123. S. 19.	Berkswich, 109.
Audley's Cross, 75.	Berresford, 3. S. 4.
Axedge, 13.	Bescott, 550.

- Betley, 125. Supt. 19.
 Biddulph, 127, 545.
 Billington Camp. 72.
 Bilston, 539. S. 33.
 Blithfield, 114, 546. S. 16.
 Blore Ray, 98.
 Bloxwich, S. 29.
 Blurton, S. 19.
 Blymhill, 138, 548. S. 21.
 Blythbury, 152.
 Bobbington, S. 33.
 Boscobel, 82.
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 Bradley-le-Moors, 544.
 Bramshall, S. 11.
 Brewood, 133.
 Bridestones, 65, 445.
 Brome, 184. S. 33.
 Broughton, 118, 546. S. 21.
 Burslem, 480. S. 19.
 Burston, 546.
 Burton-upon-Trent, 138, 209. S. 22.
 Bury Bank, 71.
 Bushbury, 177.
 Butterton, 541. S. 12.
 Callingwood, 147.
 Calton, S. 12.
 Calwich, 93.
 Cannock, 547. S. 21.
 Cannock Chase, 15.
 Castle Church, 549. S. 21.
 Castle Old Fort, 65.
 Caverswall, 96.
 Chapel Chorlton, S. 18.
 Chartley, 113, 142, 249.
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 Chebsey, 73.
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 Cheddleton, 101.
 Chesterton Camp. 68.
 Chillington, 134.
 Church Eaton, 137.
 Clent, 183, 235. S. 33.
 Clifton Camville, 168. S. 28.
 Cloud Hill, 13.
 Codsall, 25, 178, 550.
 Colton, 116. S. 17.
 Colwich, 115. S. 17.
 Coppenhall, 72. S. 21.
 Corbyn's Hall, 181.
 Cresswell, 110.
 Croxden, 93, 545.
 Cuddleston, 74. S. 20.
 Darlaston, 172.
 Dieulacres, 102, 89.
 Dilhorne, S. 11.
 Dovedale, 12, 19, 228.
 Draycot le-moors, 56, 62, 91.
 Draycot-in-the-clay, 146. S. 5.
 Drayton Bassett, 61, 89, 98, 171.
 Druid's Heath, 65.
 Dudley Castle, 179, 446.
 Dunstan, 124. S. 21.
 Eccleshall, 63, 117, 543. S. 5.
 Ecton mine, 226, 514.
 Edengale, 168. S. 28.
 Elford, 67, 167.
 Elkstone, S. 12.
 Ellastone, 93. S. 10, 38.
 Ellenhall, S. 17.
 Endon, 101. S. 12.
 Enville, 182. S. 32.
 Etocetum, 68. S. 7.
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 Farewell, 153. S. 25.
 Fauld, 146. S. 39.
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 Forton, 137, 548.
 Fradswell, 116.
 Freeford, 166.
 Fulford, S. 19.
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 Gnosall, 137.
 Gratwich, S. 11.
 Greenway Hall, S. 11.
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