
WOOLHOPE NATURALISTS FIELD CLUB
1851

TRANSACTIONS

OF THE

WOOLHOPE

NATURALISTS' FIELD CLUB.

[ESTABLISHED 1851.]

1893—1894.

"HOPE ON"

"HOPE EVER"

HEREFORD:

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1896.

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1894.

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Houghton, Rev. Wm., M.A., F.G.S., F.L.S., Preston-on-Wealdmoors, Wellington, Salop.
Howse, Mr. T., F.L.S., Glebefields, Edgeborough Road, Guildford.
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,, ,, ,, Hon. Secretary :
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Davies, Mr. Gilbert, Grey Friars' House, St. Nicholas Street, Hereford.
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Doughty, Major Chester, Pembroke House, Aldeburgh-on-Sea, Suffolk.
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Lambe, Mr. John, Bridge Street, Hereford.
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Lambert, Rev. W. H., M.A., Stoke Edith Rectory, Hereford.
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Levason, Mr. Peyton, Wallington House, Ross Road, Hereford.
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Lewis, Rev. Plaskitt, C., Oldcastle, Pandy, Abergavenny.
Ley, Rev. A., M.A., Sellack Vicarage, Ross.
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Lilley, Mr. Charles E., Bodenham Road, Hereford.
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Morris, Mr. J. Griffith, 135, St. Owen Street, Hereford.
Nicholl, Mr. D. S. W., F.L.S., F.Z.S., The Ham, Cowbridge, Glamorganshire.
North, Rev. H., M.A., Breinton, Hereford.
Oakeley, Rev. W. Bagnall, Newland, Coleford, Gloucester.
Oldham, Capt. C. Dansey, Hampton Park, Hereford.
Parker, Mr. Alfred, Kington.
Paris, Mr. T. C., Hampton Lodge, Hereford.
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Perry, Deputy-Surgeon-General, W., Hinton Cottage, Hereford.
Phillips, Mr. H. C. B., The Knoll, Tupsley, Hereford.
Phillips, Mr. Thomas, Wellington, Hereford.
Phillott, Rev. Canon H. W., M.A., St. John's Street, Hereford.
Phillott, Mr. G. H., Plâs Trevor, The Park, Cheltenham.
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Pilley, Mr. James B., 2, High Town, Hereford *(Assistant Secretary)*.
Pilley, Mr. Walter, Eign Street, Hereford.
Piper, Mr. G. H., F.G.S., Court House, Ledbury.
Poole, Rev. Wm., M.A., Hentland, Ross.
Powell, Rev. T. Prosser, M.A., Dorstone, Hereford.
Prescott, Mr. Charles Warre, King's Pyon House, near Weobley, R.S.O.
Pulley, Sir Joseph, Bart., Lower Eaton, Hereford, and Green Park Chambers, 90, Piccadilly, W.
Purchas, Mr. Alfred J., Broad Street, Ross.
Purchas, Mr. H. Maurice, Chasedale, Ross.
Rankin, Mr. James, M.P., M.A., Bryngwyn, Hereford, and 35, Ennismore Gardens, Princes Gate, London, S.W.
Riley, Mr. John, Putley Court, Ledbury, Herefordshire.

Robinson, Mr. E. L. G., Poston, Vowchurch.
Robinson, Mr. Stephen, Lynhales, Kington.
Rootes, Mr. Charles, St. Owen Street, Hereford.
Rootes, Mr. W. Rudge, Woodside House, Ross.
Salwey, Mr. Theophilus, Ludlow.
Scobie, Mr. M. J. G., Haywood House, Whitecross Road, Hereford.
Seaton, Rev. Douglas, Goodrich, Ross.
Severn, Mr. J. P., Penybont Hall, Penybont.
Shackleton, Rev. Thomas, M.A., Broomy Hill, Hereford.
Shellard, Mr. Orlando, Barton Manor House, Hereford.
Shepherd, Rev. W. R., Preston-on-Wye, Hereford.
Sinclair, Mr. G. Robertson, The Close, Hereford.
Southall, Mr. Henry, F.R.Met. Soc., The Graig, Ashfield, Ross.
Southall, Mr. H. J., South Street, Leominster.
Stanhope, Rev. The Ven. The Hon. B. L. S., M.A., Byford, Archdeacon of Hereford.
Stephens, Mr. Edwin, Bridge Street, Hereford.
Sugden, Mr. H. G., Warham House, Hereford.
Sugden, Mr. J. P., The Cottage, Ledbury.
Swainson, Capt. E. A., The Woodlands, Brecon.
Symonds, Mr. J. F., Broomy Hill, Hereford.
Trafford, Mr. Guy R., Michaelchurch Court, Hereford.
Trumper, Rev. T. W. Walwyn, M.A., Clifford Vicarage, Hereford.
Turner, Mr. Thomas, F.R.C.S., St. Owen Street, Hereford.
Vachell, Mr. C. T., 38, Charles Street, Cardiff.
Vaughan, Rev. F. S. Stooke, M.A., Wellington Heath, Ledbury.
Vevers, Mr. Henry, Highmore House, Hereford.
Wadworth, Mr. H. A., Breinton Court, Hereford.
Wallis, Mr. E. L., Hampton Park, Hereford.
Warner, Rev. R. W., M.A., Almeley, Kington.
Watkins, Mr. Alfred, Hampton Park, Hereford.
Watkins, Rev. Morgan G., M.A., Kentchurch, Hereford.
Wegg-Prosser, Mr. F. R., Chalcott House, Long Ditton, Surrey.
Weyman, Mr. Arthur, 54, Mill Street, Ludlow.
Wheeler, Mr. G. W., Bodenham Road, Hereford.
White, Mr. J. Eales, Ledbury Road, Hereford.
Whitfeld, Mr. W. C., Baggallay Street, Whitecross Road, Hereford.
Williams, Mr. Thomas, Sub-Inspector of Schools, Leominster.
Williamson, Rev. H. Trevor, M.A., Bredwardine, Hereford.
Wiltshire, Mr. John, Shire Hall, Hereford.
Wood, J. H. (M.B.), Tarrington, Ledbury.
Wood, Rev. R., Colley Batch, Tenbury.

Members Elected.

1892.

Andrews, Mr. Charles D., Leominster.
Baker, Mr. E. J., Thornbury House, Whitecross Road, Hereford.
Banks, Mr. W. G., Little Birch, Hereford.
Bennett, Rev. H., Colwall, Malvern.
Bickham, Mr. Spencer H., Underdown, Ledbury.
Brown, Mr Langton, 4, Shakespeare Terrace, Hereford.
Cockcroft, Mr. J., Free Library, Hereford.
East, Charles H. (M.D.), Enderley, Great Malvern.
Firmstone, Rev. E. R., Kilpeck, Hereford
Harington, Sir Richard, Bart., Whitbourne Court, Worcester.
Harrison, Mr. Spencer H., Burghill, Hereford.
Howells, W. (M.B.), Church House, Talgarth.
James-Trevor, Mr. T. C. G., Bartonsham, Hereford.
Kilpeck, Rev. W. de, Gate House, Widemarsh Street, Hereford.
Lea, Rev. T. S., Tedstone Delamere, Whitbourne, Worcester.
Leigh, Mr. H. G., *Hereford Times* Office.
Lewis, Mr. Richard, The Cedars, Hampton Park, Hereford.
Little, Col. J. C., Meyrick House, Whitecross Road, Hereford.
Morgan, Rev. W. E. T., Llanigon Vicarage, Hay.
Parker, Mr. Alfred, Kington.
Phillips, Mr. H. C. B., The Knoll, Tupsley, Hereford.
Philpott, Rev. F. O., Little Marcle, Ledbury.
Purchas, Mr. H. Maurice, Chasedale, Ross.
Seaton, Rev. Douglas, Goodrich, Ross.
Sugden, Mr. J. P., The Cottage, Ledbury.
Trumper, Rev. T. W. Walwyn, Clifford Vicarage, Hereford.
Wadworth, Mr. H. A., Breinton Court, Hereford.
Wallis, Mr. E. L., Hampton Park, Hereford.
Wheeler, Mr. G. W., Bodenham Road, Hereford.
Wiltshire, Mr. John, Shirehall, Hereford.
Wood, Rev. R., Colley Batch, Tenbury.

1893.

Acton, Mr. J. Arthur, Regent Street, Wrexham.
Bannister, Rev. Alfred, Aston Rectory, Ludlow.
Barrett, Mr. John Harold, Fairfield, Bromsberrow Heath, Newent.
Bayly, Rev. R. Burges, Castle Frome, Ledbury.
Bentley, Rev. Samuel, Bosbury, Ledbury.
Binstead, Rev. C. H., Eardisley, R.S.O.
Burroughes, Rev. E. R., Ashperton, Ledbury.
Child, Rev. Preb. Baldwyn, Kyre Park, Tenbury.
Conder, Mr. E., New Court, Colwall, Malvern.
Corner, Mr. Arthur J., Holmer Park, Hereford.
Craigie, Rev. C. E., The Vicarage, Kington.
Foster, Rev. A. W., Brockhampton Court, Ledbury.
Godwin, Mr. William Henry, The Ferns, Lugwardine, Hereford.
Groom, Mr. Percy, The Poplars, Hereford
Hardwick, Mr. Charles, The Old Weir, Kenchester, Hereford.
Hawkins, Mr. J. F., Kinnersley, Hereford.
Hill, Thomas (M.D.), Eastnor House, Ledbury.
Hopton, Rev. C. E., Stretton Grandison, Ledbury.
Lea, His Honour Judge Harris, Longworth, Hereford.
Merrick, Mr. F. H., Tupsley Lodge, Hereford.
Scobie, Mr. M. J. G., Haywood House, Whitecross Road, Hereford.
Sinclair, Mr. G. Robertson, The Close, Hereford.

RULES

OF THE

Woolhope Naturalists' Field Club.

I.—That a Society be formed under the name of the "Woolhope Naturalists' Field Club," for the practical study, in all its branches, of the Natural History and Archæology of Herefordshire, and the districts immediately adjacent.

II.—That the Club consist of Ordinary Members with such Honorary Members as may be admitted from time to time; from whom a President, four Vice-Presidents, a Central Committee, Treasurer, and Honorary Secretary be appointed at the Annual Meeting to be held at Hereford in the early part of each year. The President and Vice-Presidents to change annually.

III.—The Central Committee shall consist of Five Members, resident in the city or in its immediate vicinity, with the President, Vice-Presidents, Treasurer, Auditor, and Honorary Secretary, *ex-officio*. It shall be empowered to appoint an Assistant Secretary; and its duties shall be to make all the necessary arrangements for the meetings of the year, and take the management of the Club during the intervals of the meetings.

IV.—That the Members of the Club shall hold not less than three Field Meetings during the year, in the most interesting localities for investigating the Natural History and Archæology of the district. That the days and places of such regular meetings be selected at the Annual Meeting, and that ten clear days' notice of each be communicated to the Members by a circular from the Secretary; but that the Central Committee be empowered, upon urgent occasions, to alter the days of such regular Field Meetings, and also to fix special or extra Field Meetings during the year.

V.—That an Entrance Fee of Ten Shillings shall be paid by all Members on election, and that the Annual Subscription be Ten Shillings, payable on the 1st of January in each year to the Treasurer, or Assistant Secretary. Each Member may have the privilege of introducing a friend on any of the Field days of the Club.

VI.—That the Reports of the several meetings and the papers read to the Club during the year, be forwarded, at the discretion of the Central Committee, to the *Hereford Times* newspaper for publication as ordinary news, in preparation for the *Transactions* of the Club.

VII.—That the cost of any lithographic or other illustrations be defrayed by the author of the paper for which they may be required, unless the subject has been taken up at the request of the Club, and in that case, the cost of such illustration, to be paid for from the Club funds, must be specially sanctioned at one of the general meetings.

VIII.—That the President for the year arrange for an address to be given in the field at each meeting, and for papers to be read after dinner; and that he be requested to favour the Club with an address at the Annual Meeting on the proceedings of the year, together with such observations as he may deem conducive to the welfare of the Club, and the promotion of its objects.

IX.—That all candidates for Membership shall be proposed and seconded by existing Members, either verbally or in writing, at any meeting of the Club, and shall be eligible to be balloted for at the next meeting, provided there be FIVE Members present; one black ball in three to exclude.

X.—That Members finding rare or interesting specimens, or observing any remarkable phenomenon relating to any branch of Natural History, shall immediately forward a statement thereof to the Hon. Secretary, or to any member of the Central Committee.

XI.—That the Club undertake the formation and publication of correct lists of the various natural productions of the County of Hereford, with such observations as their respective authors may deem necessary.

XII.—That Members whose subscription shall remain for *three* years in arrear, after demand, be held to have withdrawn, and their names shall accordingly be omitted from the list of Members at the ensuing Annual Meeting.

XIII.—That the Assistant Secretary do send out circulars, ten days at least before the Annual Meeting, to all Members who have not paid their subscriptions, and draw their particular attention to Rule XII.

XIV.—That these Rules be printed annually with the *Transactions*, for general distribution to the Members.

WOOLHOPE NATURALISTS' FIELD CLUB.

PRESIDENTS

FROM ITS ESTABLISHMENT IN 1851.

1851 Club formed in the Winter months.
1852 Lingwood, Mr. R. M.
1853 Lewis, Rev. T. T.
1854 Symonds, Rev. Wm. S., F.G.S.
1855 Crouch, Rev. J. F.
1856 Wheatley, Mr. Hewitt.
1857 Lingen, Mr. Charles.
1858 Brown, G. P., M.D.
1859 Crouch, Rev. J. F.
1860 Banks, Mr. R. W.
1861 Lightbody, Mr. Robert.
1862 Hoskyns, Mr. Chandos Wren.
1863 Hoskyns, Mr. Chandos Wren.
1864 Crouch, Rev. J. F.
1865 Steele, Mr. Elmes Y.
1866 Bull, H. G., M.D.
1867 Hoskyns, Mr. Chandos Wren.
1868 McCullough, D. M., M.D.
1869 Rankin, Mr. James.
1870 Cooper-Key, Rev. H.
1871 Cam, Mr. Thomas.
1872 Steele, Mr. Elmes Y.
1873 Davies, Rev. James.
1874 Davies, Rev. James.
1875 Robinson, Rev. C. J.
1876 Chapman, T. A., M.D.
1877 Morris, Mr. J. Griffith.
1878 Phillott, Rev. H. W.
1879 Armitage, Mr. Arthur.
1880 Knight, Mr. J. H.
1881 Ley, Rev. Augustin.
1882 Blashill, Mr. Thomas, F.R.I.B.A.
1883 Piper, Mr. George, H., F.G.S.
1884 Burrough, Rev. Charles.
1885 Martin, Mr. C. G.
1886 Piper, Mr. George H., F.G.S.
1887 Elliot, Rev. William.
1888 Elliot, Rev. William.
1889 Southall, Mr. H., F.R. Met. Soc.
1890 Croft, Sir Herbert, Bart.
1891 Cornewall, Rev. Sir George H., Bart.
1892 Barneby, Mr. William Henry.
1893 Lambert, Rev. Preb. William H.
1894 Davies, Mr. James.

THE WOOLHOPE CLUB.

Dr. *The Account of Henry Child Beddoe, Honorary Treasurer, for the year ending 31st December, 1893.* Cr.

1893.	£	s.	d.
To Balance in hand brought from last account	9	8	1
,, Entrance Fees	10	10	0
,, Subscriptions received for 1893	90	10	0
,, Arrears of Subscriptions received	3	0	0
,, Three Volumes of Transactions sold	1	10	0
	£114	18	1

1893.		£	s	d
April—By Cash paid Edward Knight for Printing 300 Descriptions of Plates		0	17	6
June ,, W. H. St. John Hope for 300 copies of Index of Archæological Papers, 1891		2	10	0
,, ,, Subscription for 1892 to Annual Congress of Archæological Societies ...		1	0.	0
,, ,, Ditto for 1893 to ditto		1	0	0
Dec. ,, James Townsend for printing 300 copies of Egg of Great Auk, The Cresset Stone, Llanthony, Coloured Geographical Plan of The Woolhope Valley, and Section of the same ...		7	19	0
,, ,, T. H. Winterbourn for 312 prints (Collotype) of Treasure Trove		4	2	6
,, ,, Professor J. F. Blake for Annals of British Geology, 1892...		0	10	0
,, ,, Dr. T. A. Chapman, balance of Guarantee for Illustrations of "The British Acronycta and their Allies" ...		6	0	0
,, ,, Joseph Jones for Stationery		0	11	6
,, ,, Jakeman & Carver, for Printing, &c.		10	9	0
,, ,, H. C. Moore, Hon. Sec., for Incidentals and Postage		5	9	2
,, ,, Ditto, ditto, for Illustrations		1	0	0
,, ,, James B. Pilley, Assistant Secretary, for Postages and Incidental Expenses at Field Meetings, &c.		4	11	1
,, ,, Ditto, ditto, Salary for 1893		10	0	0
		55	19	9
Dec 31st.—Balance in hands of Treasurer, per Bank Pass Book ... 59 8 4				
,, Less Mr. Carless' Subscription for 1894 0 10 0				
		58	18	4
		£114	18	1

Examined and found correct this 12th day of April, 1894.

O. SHELLARD, *Auditor.*

THE WOOLHOPE CLUB.

The Account of Henry Child Beddoe, Honorary Treasurer, for the Year ending 31st December, 1894.

RECEIPTS.

1894.	£	s.	d.
To Balance in hand, brought from last Account	58	18	4
,, Entrance Fees	11	10	0
,, Subscriptions received for 1894	104	11	0
,, Arrears of Subscriptions	5	0	0
,, Eight Vols. of Transactions sold	4	0	0
	£183	19	4

PAYMENTS

1894.	£	s.	d
April 21.—By paid Mr. E. J. Holland, Leominster, for correcting plan of Priory Church	1	1	0
,, Orphan Printing Press, Leominster (per Mr. H. Newman, for block of Priory Church)	0	19	6
,, Jakeman & Carver on account	100	0	0
,, Cheque Book	0	4	0
June 11.— ,, Mr. H. St. John Hope, Subscription to Archæological Society's Congress ...	1	0	0
Oct. 29.— ,, Jakeman & Carver, balance of Account for Printing Transactions, &c. ...	50	2	0
Dec. 22.— ,, Mr. H. C. Moore, Honorary Secretary, for Postages, Editorial Expenses, Preliminary Expenses for Field Meetings, &c., &c.	5	0	6
,, James B. Pilley, Assistant Secretary, Salary, 1894	10	0	0
,, Ditto for Postages, and Expenses at Field Meetings	5	16	8
,, Mr. Joseph Jones for Stationery, &c. ...	1	3	9
	175	7	5
Balance in hands of Treasurer ...	8	11	0
	£183	19	4

ASSETS

	£	s	d.
To Balance in hand brought down ...	8	11	11
,, Arrears of Subscriptions due ...	0	0	

LIABILITIES.

	£	s	d.
By Jakeman & Carver, A c. for Printing, &c. ...	10	8	0

April 3rd, 1895.

Audited and found correct, O. SHELLARD.

Illustrations.

Contents.

1893.

1894.

ADDITIONS TO THE FLORA OF HEREFORDSHIRE.

PAPERS PUBLISHED BY THE SOCIETY OF ANTIQUARIES.

TRANSACTIONS FOR THE YEARS 1893, 1894.

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Woolhope Naturalists' Field Club.

TUESDAY, APRIL 4TH, 1893.

THE Annual Meeting was held in the Woolhope Club Room, Hereford, on Tuesday, April 4th. In the unavoidable absence of Mr. W. Henry Barneby (the retiring President), the chair was taken by the President elect, the Rev. Preb. W. H. Lambert. The following Members were present:—Revs. H. A. Barker, J. O. Bevan, E. R. Firmstone, C. S. Hagreen, E. J. Holloway, A. W. Horton, H. B. D. Marshall, H. North, M. G. Watkins, and H. Trevor Williamson; Colonel J. C. Little; Captain de Winton; Messrs. F. Bainbridge, W. G. Banks, H. C. Beddoe, C. G. Blathwayt, Langton Brown, J. Carless, Jun., R. Clarke, G. Davies, James Davies, Dr. J. B. Fitzsimons, T. Hutchinson, O. Shellard, H. Southall, H. G. Sugden, J. P. Sugden, H. Vevers, and Alfred Watkins, with Mr. H. C. Moore, Honorary Secretary, and Mr. James B. Pilley, Assistant Secretary.

The following were elected Members:—The Rev. C. H. Binstead, Eardisley; Mr. E. Conder, New Court, Colwall; The Rev. A. W. Foster, Brockhampton Court, Ross; and Mr. J. F. Hawkins, of Kinnersley. Six names were proposed to be balloted for at the next meeting: The Rev. E. R. Burroughes, Ashperton, Mr. Arthur Corner, the Rev. C. E. Craigie, Kington, Mr. Percy Groom, His Honour Judge Harris Lea, and Mr. F. H. Merrick.

The financial statement, representing a balance of £9 8s. 1d., was presented by the Treasurer, Mr. H. C. Beddoe.

The Assistant Secretary observed that the past year had been most successful, both numerically and financially. A volume of the *Transactions*, 1886, 1887, 1888, 1889, had been published at a cost of £126, and after every liability incurred, a balance remained to the credit of the Club. The number of Members during 1892 was 195, including an unusual addition of 30 new Members. In 1884, when the total, 191, most nearly approached this maximum, the receipts were £83 in comparison with £108 in 1892; and the arrears in 1884 were £41 against £4 10s. in 1892. The losses by death and resignation had been smaller than usual. Two deaths had occurred—those of the Rev. E. A. Ely, of Trewyn, and Mr. T. B. Arton, of Wrexham. Five Members had resigned, and two, having failed for three years to pay their subscriptions, had been struck off the list in compliance with Rule 3. The number of Members on the list on January 1st, 1893, was 186, in comparison with 164 on January 1st, 1892. Although the original Members had all passed away, Mr. Thomas Blashill, who joined the Club in 1853, two years after its institution, had this year attained his fortieth year of membership.

A letter was read from Mr. James W. Lloyd, proposing that on the circular detailing the programme of the last field meeting of the year, members should be invited to submit to the Honorary Secretary, before January 1st following, suggestions for places of field meeting for the year, giving full particulars of objects of interest, modes of conveyance, distances, condition of roads, accommodation, &c., such programmes to be considered at a previous meeting of the Central Committee, whose report and recommendations should be brought before Members at the Annual Meeting, one day's excursion being, in all cases, reserved for the suggestion of the President of the year. This proposal was favourably received and recommended for adoption.

BOOKS RECEIVED.

Books received during the year, partly by purchase, but chiefly by interchange of publications with kindred societies, were placed on the table. *Annals of Geology*, by Prof. J. F. Blake; *The Official Year Book of Learned Societies of Great Britain and Ireland* for 1893; *Report of the British Association*, Edinburgh, 1892; *The Church and Monastery of Mocke Malvern*, presented by the Author, James Nott. Publications of the following Societies:—Bristol Naturalists' Society, 1891-1892; Cardiff Naturalists' Society, 1891; Cotteswold Naturalists' Field Club, 1891-1892; Dudley and Midland Geological and Scientific Society and Field Club; Essex Field Club; Marlborough College Natural History Society; and Yorkshire Naturalists' Union.

Mr. Moore exhibited 112 pages, already printed, of the forthcoming volume of *Transactions* for the years 1890, 1891, and 1892, on the completion of which volume during the course of the present year, the many years of arrears will have been made up.

ARCHÆOLOGICAL MAP.

The Rev. J. O. Bevan and Mr. James Davies, Honorary Secretaries of the Archæological Map Committee, exhibited, in an advanced state of progress, the Map of the City of Hereford, and the Map of the County of Hereford, the latter on the scale of one inch to the mile, indicating the site, and, by means of symbols, the nature, of ancient remains, sub-divided into Præ-Romaa, Roman, Anglo-Saxon, and Mediæval.

Mr. James Davies read the following Report:—"The Honorary Secretaries of the Herefordshire Archæological Map Committee are called upon to report what progress has been made since the last Annual Meeting of the Woolhope Club towards the completion of this much-desired work. In their report last year it was stated that upwards of seven hundred of the forms of prospectus and tabular return had been forwarded to the clergy, magistrates, county councillors, and principal landowners, with a request that they would kindly note any objects of Archæological interest in their respective neighbourhoods, but your Secretaries regret to say that these circulars and returns were not very numerously answered, and in the result your Secretaries themselves carefully looked over the whole of

the Maps contained in the three volumes specially bound together for the Woolhope Club, and in this way and with the assistance of many friends who have kindly responded to their application and forwarded returns, they have compiled the draft of a topographical index of about five hundred Archæological objects of varied character, under the several heads of the Præ-Roman, Roman, Anglo-Saxon, and Mediæval, and are now denoting the same upon the large Map of Herefordshire on the scale of an inch to a mile. In this work they have much pleasure in stating that they have received much able assistance from Mr. Robert Clarke. Your Secretaries now desire the aid of the Members of the Woolhope Club in checking, as well as adding to, the draft index, for it is feared that there may be many objects of antiquarian interest which may be known only to residents in the different localities where they are situated. And your Secretaries suggest that their draft index shall be passed round to such Members as will kindly peruse the same, with the view of rendering it as perfect as possible. A hint has already been given in the public periodicals that it would be desirable to form an Historical Society for Herefordshire, and your Secretaries consider that this index and map would form a good basis for work in that direction. As respects the funds, your Secretaries have to report that they are exhausted, and an appeal will have to be made for further assistance. The total amount of donations to the present time are £27 1s., and the payments £27 5s. 8d. In the meantime it is hoped that those members of the Woolhope Club who have not already subscribed to the Archæological Map Fund, will kindly assist with donations to enable the work to proceed until it is completed."

On behalf of the Club, Mr. Moore thanked the Honorary Secretaries for the highly creditable work they had performed, which displayed a considerable devotion of time and labour upon their part, notwithstanding the comparatively small assistance they had received in reply to their seven hundred applications to residents in the County. At the same time, he called upon the Members of the Woolhope Club to give without delay all the aid in their power to bringing this subject to an early completion. With reference to the formation of an Historical Society for Herefordshire, Mr. Moore pointed out how easy of execution this was by calling upon the Members of the Club to form a section, which should devote their interests and pursuits towards local history. The Club, although originally instituted as a Club for the study of "Natural History in all its branches," had given many a page of Historical and of Archæological subjects in its *Transactions*. The *Transactions* teemed with the Local Botany and Geology of the County, in addition to the Geology of the fourteen districts described in the volume for 1866, and revised by the late Rev. W. S. Symonds in the first pages of the *Flora of Herefordshire*, in which the Botany of the whole county had been so excellently given. The volume for 1887 contained a very satisfactory list of the Lepidoptera of the county. In course of time more might be added to the *Birds of Herefordshire* published in 1888.* The resources of our naturalists had been so drained that, as would be seen by an inspection of the *Transactions*, they had been compelled to

* The "Ornithology of Herefordshire," from 1889 to 1893, by W. C. Ashdown, F.Z.S., occupying pages 381 to 386 of the Volume 1890-92, had not at this period been published.

draw upon local history to fill up the pages. They were all well aware that the many papers on historical subjects had gained many attentive hearers. Whilst deprecating the formation of any independent Historical Society outside the Club, Mr. Moore showed that the Woolhope Naturalists' Field Club was competent to grasp this branch of study. If objections were raised that archæology and local history did not come within the objects for which the Club was established as the "Woolhope Naturalists' Field Club," he would move upon some future occasion, of which a preliminary notice was now given, the addition of a few words to Rule 1, so as to embrace Archæology and Local History within their lawful and constitutional attention. Mr. Moore earnestly called upon Members who had not assisted the funds of the Archæological Map Committee to send donations to Mr. James Davies, 132, Widemarsh Street, where the maps and the manuscripts might be inspected, and he quoted from a letter from the Society of Antiquaries that "If the map be prepared and the prefatory remarks and index communicated, the Society of Antiquaries would bear the expense of preparing the map and setting the index, &c., in type, and the Woolhope Club could have what copies were wanted at the mere expense of print and paper."

DATES AND PLACES OF FIELD MEETINGS FOR THIS YEAR.

These were fixed as follows:—Tuesday, May 23rd, the Brown Clee Hill; Thursday, June 29th, Ledbury, for South of Malvern Range; Thursday, July 27th (the ladies' day), Water-break-its-neck, near New Radnor; Tuesday, August 22nd, Kyre Park oak trees, &c.

METEOROLOGY.

Our member, Mr. H. Southall, writes to the *Ross Gazette*, of April 27th, under the Heading of

HEAT AND DROUGHT IN MARCH.

March, 1893, will long be remembered in Ross as well as in other parts of Great Britain, as one of the most remarkable months on record. The only rain throughout the whole month, enough to wet the ground, fell during the early morning of the 3rd, with a high and rising barometer, in the form of a misty drizzle, yielding when measured, just one-tenth of an inch in quantity. A few flakes of snow on the 17th, not enough to cover the ground, was all that fell in the month. There were no gales, or strong easterly winds, and very little of that cold, overcast, and bleak weather, of which we have had so much in recent spring seasons.

The total amount of rainfall for the month was ·21, or one-fifth of an inch. This is less than that of any March since 1840, when ·05 was registered at Dewchurch, by the late Captain Pendergrass. March, 1852, according to the late Mr. Purchas, had ·23, or about the same as the present year. The smallest amount registered by myself since 1859 was ·75 in 1879—but as the drought continues at the time of writing this to be still unbroken, I may have again to refer to it by way of comparison.

The amount of bright sunshine and the clear and cloudless skies which have prevailed, with but little break, for so long, are also special features of interest. On 17 days the sky was almost free from cloud at 9 a.m., and on many other days when overcast early, the sky has become clear by noon.

The air at times has been very dry, and on several occasions, as much as 14 degrees difference was observed between the readings of the wet and dry bulb thermometer. This state of things, accompanied by the hot sunshine, has much dried up the surface of the ground; and the range of temperature, that is, the difference between the heat by day and cold by night, has been unusually great, and has probably amounted to at least 80 degrees in the 24 hours. There were 22 ground frosts during the month, that on the night of the 19th showing more than 12 degrees of frost. The number of frosts at four feet above ground was 12, the lowest temperature recorded in the screen being 24·0 or eight degrees of frost. From the 17th to 31st, inclusive, there was frost every night; so many consecutive frosts are very unusual, even in mid-winter.

The number of days on which the temperature exceeded 60 degrees in the shade was 13. This, as far as I know, is entirely unprecedented for March. The hottest day was the 30th, when 69·0 was recorded, and is equal to the average for June. The mean of the highest by day for the whole month being 58.8, which is about five degrees more than in 1882, the highest previously recorded.

The wind has been variable, about 20 days more or less westerly, and 11 days more or less easterly.

Tha barometer was high almost throughout the month, and very steady, tha old proverb referring to "March, many weathers," being for once incorrect, In fact antiocyclonic conditions generally prevailed, possibly connected with the constancy with which the exceptional rigour, which has prevailed this winter over Northern and Eastern Europe and Siberia, has continued up to the present time, for although the cold has now somewhat abated, the Gulf of Bothnia was so firmly frozen after the middle of the month that traffic was carried over it, in at least two different routes, in carts.

The effect of the hot sunshine has been very striking on vegetation. Fruit trees have blossomed from three to four weeks earlier than usual. Apricots and peaches appear firmly set. Cherries, plums, and pears are going off, after flowering magnificently. The apple trees are now many of them in full bloom, others are thickly in bud. The more shallow-rooted plants are dwarf and withering, under the combined influences of hot sun, cold nights, and drought. The grass cannot grow, and great complaints of the want of keep for live stock are heard on all sides. Cistus and other half-hardy plants were largely killed by the severe frost of December and January last, having no covering of snow to protect them; otherwise the spring frosts do not appear to have done much damage. The question asked frequently, "Shall we pay for all this?" cannot be answered with any certainty. In 1840 there was one of the most abundant fruit seasons ever known, and a glorious summer after a similar spring—but in that year the drought continued till May 7th, after lasting 82 days. In 1852, the long drought which terminated on May 10th, was followed by eight months of exceedingly wet weather, culminating in the great flood of November, known as the Wellington Flood. The month of July was, however, intensely hot, and would have been dry but for the heavy thunderstorm of the 6th, during which Ross spire was struck with lightning.

The Graig, Ross. H. SOUTHALL.

The drought has been so remarkable this Spring that it is considered desirable to record it by publishing the following letter in *The Times* of April 18th, under the title of

THE END OF THE ABSOLUTE DROUGHT.

Strictness of definition is at the same time an indication of and a necessity for progress in any branch of investigation. This has been found as true in rainfall work as in everything else. Years ago no uniformity existed as to what was to be considered as a "rainy day," and of two observers in one town the one would record twice as many rainy days as the other. We have changed all that, and now throughout these islands we have the definition of a fall of 100th of an inch of rain.

So with droughts there was an entire absence of definition. It would be presumptuous for me to suggest that absolute uniformity has been reached, but two definitions which I proposed some years since have not hitherto been challenged. These definitions are:—

Absolute drought.—A period of more than 14 consecutive days without any measurable rain.

Partial drought.—A period of more than 28 consecutive days with a total rainfall of less than 0·01in. per diem.*

Having, I hope, made the definitions clear, I proceed to say a few words respecting the absolute drought which was brought to an end by the very insignificant shower in the early hours of this morning. It was the longest absolute drought since my record was commenced in 1857, for it has lasted 29 days. In the 35 years there have been 11 instances of three weeks' absolute drought, but until the present drought there had been but one instance (August 9th to September 5th, 1880) of four weeks, or 28 days; and this in 1893 has been exceeded by one day, making it, as before stated, the longest absolute drought on my record.

But it is more than this, and how much more we cannot yet tell, for the partial drought which began with February 28th and has lasted 48 days, or nearly seven weeks, is still unbroken, while the longest previously was 45 days, from April 16th to May 30th, 1880.

As far, therefore, as my record of 35 years is concerned, the drought has had no equal; but if it be permissible to write from my own memory, corroborated by other records kept before I began mine, I believe that one of the wettest years of this century (1852) was as noteworthy for its spring drought as it was for its excessively wet autumn and early winter.

G. J. SYMONS, F.R.S.

62, Camden Square, N.W., April 17th, 1893.

Effects of the long-continued drought upon vegetation are exhibited in the following results:—Messrs. W. N. White & Co. write from Covent Garden, London, under the date of May 3rd, 1893, informing us that they have on this day received from the growers of Saltash, Cornwall, their first consignment of Strawberries grown in the open, being the earliest on record; in 1892 the first consignment reached Covent Garden on June 4th, and some years it has been as late as June 10th and 12th before they have been received. On May 2nd the first large supply of French Cherries in flats was received, which was not received in 1892 until May 16th.

This long-continued drought happily terminated on Monday, May 15th, on which day rain fell heavily in many places after ten weeks of almost uninterrupted dry weather; about a quarter of an inch was registered in the Hereford district, which is about as much as had been registered there for the previous seventy-two days.

* On this subject compare the drought of 1887 on page 163 of the Volume of *Transactions*, 1886, 1887, 1888, 1889.

Woolhope Naturalists' Field Club.

FIRST FIELD MEETING, MAY 25TH, 1893.

ON Thursday (May 25th), the Members took train to Ludlow, where they were met by four carriages, which conveyed the party, numbering nearly forty, by Heath Chapel to Clee St. Margaret at the foot of the Brown Clee Hill. From this secluded village the Members ascended that height of the Brown Clee Hill called Nordy Bank, as far as the opening called Burwarton Pole, between Nordy Bank and the more northerly elevation, Abdon Burf, 1792 feet high, the highest in Shropshire (Sheet 166, Ordnance Survey). A third height of the same range, situated more southerly, is called the Clee Burf. From Burwarton Pole the Members descended the hill through the beautifully wooded park of Burwarton Hall, Lord Boyne's residence, to meet the carriages, which had made a *détour* of five miles round the hills, at the Boyne Arms, close to the Hall, and close to Burwarton Church. From this village of Burwarton the return drive of ten miles to Ludlow, along the Bridgnorth and Ludlow road, was mainly down hill, and presented most favourably the aspect of the slightly lower but more precipitous elevation, Titterstone Clee Hill (about seven miles south of the Brown Clee), the height of which is given in Sheet 181, Ordnance Survey, as 1749 feet.

A paper on "The Clee Forest and the Clee Hills" was read at the Titterstone meeting of the Severn Valley Field Club, June 25th, 1868, by William Purton, Esq., who stated that, according to a document at Faintree (which purported to be the minutes of the proceedings of a Court Swainmote for the Forest of Clee in the fifteenth year of James I.) the meaning of the word *clees* is open downs, or the common of the hill above the woods and inclosures of the surrounding townships and parishes. The forest is called therein Les Clives, *alias* Clees, *alias* Clee, sometimes the Clives. Clives is an old English word for hills, from the Latin *Clivus*. It had been contracted into *Clee* before the Conquest. Eyton says, in his account of Cleobury North, that "the Clee Hill is so called from the Saxon for Clay," but a very natural objection to this Etymology is that all the Clee Hills are singularly devoid of clay. They, moreover, were not called the Clee *Hills* till comparatively modern times.*

According to the printed programme the route was to be direct to the Church of Clee St. Margaret, where, at 11.30, the party was to be met by the Vicar, the Rev. A. Clowes, and also by one Thomas Turner, who had been kindly sent as a guide by Mr. W. I. Dodgson, F.S.I., Lord Boyne's estate agent. The

* An Extract from *The Shrewsbury Chronicle* of June 2nd, 1893—Signed; Lawley.

driver in charge, avoiding the steep road up the Whitbatch Hill which would have taken the party direct to Clee St. Margaret, took, at the distance of two miles from Ludlow, the north-west turning which conducted to Heath Chapel through Stanton Lacy, Lower Hayton, Great Sutton, and Bouidon. The perturbation of mind of the Honorary Secretary can be imagined when he found himself and the Members landed at 11.30 in a two-acre field, occupied by a cow and the very ancient rectangular building called Heath Chapel. One of the drivers was immediately despatched to Clee St. Margaret, distant one mile and a half, to discover the two other parties to the contract, and to make known to them the position of the Members who had failed to meet at the appointed hour and rendezvous. The Honorary Secretary is supposed to have the master key to every building in Herefordshire or any of the adjoining counties in his pocket, and to be able to produce it immediately on demand at any moment; for a few minutes it was not forthcoming. In this secluded part of Shropshire inhabitants and buildings are few and far between. A messenger was sent to the farm building, Heath House, on the opposite side of the road, to make inquiries respecting the key of the Chapel, and, awaiting its arrival, the opportunity was seized of taking a photograph of the old Norman doorway in the south wall, with its richly-moulded semi-circular arch with zigzag pattern, and carved capitals to the columns, enclosing a tympanum, free from ornamentation, but marked with fine faint tracing of incised cross lines. There are indications of a sunken road and embankments in the western end of the field in which the building is situated, but otherwise there is no trace of any mound or grave. From Kelly's "Shropshire" we learn that the village is a chapelry annexed to the vicarage of Stoke St. Milborough, or Milburg, from which it lies two miles and a half distant N. by W.; and from Anderson's "Shropshire," page 253, we read that probably its altar was unserved during the greater portion of the first four centuries of its existence, as no record does so much as mention it during that period. As regards the exterior of the building, the diminutive window lights, very suggestive of loop-holes, attracted much attention; so also the flat projecting buttresses at the angles at both the east and west ends, with a central buttress in each of these two walls, each central buttress pierced with a small Norman light in its face, a very unusual, perhaps unique feature. The buttresses are formed of well-dressed stone work, the intermediate spaces being filled in with more rough walling. Access to the interior of the chapel having been obtained on the arrival of the key, an examination of its interesting early work was eagerly commenced, and perhaps the greatest surprise to all was to find that the building was so well lighted by these simple diminutive lights, so small externally, but deeply splayed, especially their sills, internally, though it must be added that in modern times a square window of larger dimensions has been inserted in the north side of the nave.

HEATH CHAPEL.

MR. ROBERT CLARKE has supplied the following notes :—Heath Chapel is a small building in the early Norman style, consisting of nave, chancel, chancel arch, and south doorway to nave. All the windows are simple very small Norman lights, with the exception of one modern square window in the north side of nave. The chancel arch is semi circular, with capitals and columns. The chancel roof has a modern flat plastered ceiling, underneath, perhaps, the old high-pitched roof. There is a square plain aumbry in the south wall of chancel. The nave roof is Early, with tie beams across, supported on wooden plain brackets. The pews and pulpit are in the Jacobean style, but in one of the chancel pews, as also in one in the nave, are to be seen the remainder of a large moulded and battlemented beam, which, probably, is portion of the original rood screen loft. The font is ancient, Early Norman, being simply a long cylindrical drum with traces of incised semi-circular work on its upper outer face. The steps at its base are modern. There is a small bell in the west end of the nave roof. Under one of the seats in the nave are a stone base and column, probably belonging to the south Norman doorway. Some mason's marks, a square with an enclosed cross, are to be seen on the west end of the nave.

Heath Church is said to be the mother Church to Stoke St. Milburgh, situated two miles south of Clee St. Margaret.

The manor of Stoke was given by Earl Roger to the priory of Wenlock, and in Domesday book it was stated to belong to the Church of St. Milburgh at Wenlock: it was originally called Gode-stock, *i.e.* God's place—Stoice or stoc, *a place*, Saxon. Services at Heath Chapel are conducted by the Vicar of Stoke St. Milburgh.*

The register of the Church at Stoke St. Milburgh dates from 1654. Saint Milburga was one of the three daughters of Merewald (and Domneva his wife) son of Penda, king of Mercia, who is said to have built a monastery at Wenlock about A.D. 680.

From Heath Chapel the drive was continued down hills of unpleasant declivity, and by "The Cross Roads" to Clee St. Margaret, passing, just on entering the village, on the left hand of the road, a spring of beautifully clear water, within a few feet, both in horizontal distance and in vertical level, of a running stream with which it is perfectly unconnected.

The Rev. A. Clowes, having met the members, conducted them to the eastern end of the churchyard, from which point of vantage, at the word "halt," was exhibited to their astonished eyes a grand and charming display of herring-bone

* Since the period of our visit we have been glad to have received the information that the Rev. J. T. Smith, vicar of Stoke St. Milburgh, is collecting funds, not for the restoration of Heath Chapel, but, as he terms it, for its better and more sound preservation in its primitive character.

masonry upon both the east and north walls of the chancel. Time being limited, the Vicar called attention to the following five points:—1. Herring-bone masonry on exterior of Church. 2. Segmental arch of doorway. 3. Thick wall dividing nave from chancel, pierced by two squints. 4. Massive old oak of seats. 5. Primitive font. From Anderson's "Shropshire," page 265, we learn that Clee St. Margaret is mentioned in Domesday. It is noticed in the Taxation of 1291, being entered as the Church of "Le Cleye St. Milburge," in the deanery of Ludlow, and is said to belong to the Hospitallers of Dinmore. In 1534-5 the Chapel of "St. Margaret de Lee Clee" was valued at £3 per annum, out of which 14s. was payable to the "Commander of the Commandery of St. John of Dynmore."

CLEE ST. MARGARET CHURCH.

The following notes were taken by Mr. ROBERT CLARKE during the short half-hour at the disposal of the visitors to-day :—

Clee St. Margaret is a small Church containing nave, chancel, chancel arch, a small porch, and a wooden bell turret at the west end of the nave. Large masses of herring-bone masonry occupy a considerable part of the east and north walls of the chancel. There is one narrow lancet window in the east end of the chancel, and a Decorated window and an Early square-headed priests' doorway on the south. In the nave is another Decorated window of one wide light, the mullions apparently having been removed. The porch doorway, Norman and Early English, has a segmental arch very much less than a semicircle, its greatest height being only five feet ten and a half inches. The chancel arch is very narrow, a combination of semi-Norman and Early English, its arch being pointed. The wall on each side is pierced with a square-headed hagioscope, giving a view of the altar from the nave. On the north side of the nave there is a modern vestry. The font is a plain circular bowl on a modern base. In one of the chancel pew-ends is carved an inscription in relief with the date 1639. Church Wardens F.S. and R.M. The three figures, 6, 3, and 9, being cut the wrong way, as they would be seen at the back through a transparency. There is an aumbry in the north side of the chancel. The registers date from 1576.

Heath Chapel is the most ancient ecclesiastical building in Shropshire, its primitive simple architecture is sufficient to indicate its early date in the absence of historical connections. The herring-bone masonry on the east and north walls of Clee St. Margaret Church, and its primitive font—a plain circular bowl devoid of even so much as a mason's mark in the way of ornamentation—made, perhaps, before the art of ornamentation had been conceived by the rude ancestry, all point to an antiquity reaching the earliest introduction of Christianity into our island.

Thanks having been given to the Rev. A. Clowes, at one o'clock the members left Clee St. Margaret, and, under the guidance of Thomas Turner, a native who knew the country well, found their way to Nordy Bank, commanding a fine prospect of the Longmynds, Wrekin, and other hills of Shropshire, and also of

the Radnor Forest. Nordy Bank is a fine entrenched camp, following generally the configuration of the ground. In the lowest part of the camp are several excavations and walled in circular places, many of which may have been made by miners in modern times in the search for road metal or for coal, or, if the imagination be carried a few centuries further backwards, by the earlier British inhabitants of these heights. On the ascent towards Burwarton Pole (still so-called, although the excellent landmark of the pole has not been replaced since it fell), is seen a well-formed sunken roadway, about six feet wide at the bottom; then across the hill to the left the deep track can be seen leading direct to the encampments on the summit of Abdon Burf. Before reaching the Pole there is a smaller roadway or track conducting to a rounded eminence or tumulus. Time neither permitted an exploration of this track, nor of several other entrenchments, the tracings of which were visible along the slopes of the hill. The exploring party, during the ascent of Brown Clee Hill, extended the extraordinary length of two miles, calculating from the vanguard of pioneers, only four in number, who had reached the summit of Abdon Burf when the busy explorers in the rear had only just recently completed their examination of the fosse of the Nordy Bank encampment.

Is there a man with soul so dead who can traverse the grounds of South Shropshire without admiration of the diversified forms of the mountains, peaks, and ranges formed by the mighty cunning sculptor, Nature? Here he sees displayed before him in one *coup d'œil* the forces of eruption and denudation, the latter force so well exemplified in the outlier of carboniferous rocks between points so distant as the Pen Cerrig Calch near Crickhowell, in Monmouthshire, and the Clee Hills in Shropshire. Let him "compare together the semi-lunar ridges of the Wrekin or Caer Caradoc, the sharp straight line of Wenlock Edge, the hog's back elevations of the Longmynd, the serrated outline of the Stiperstones, the tabular summit of the Titterstone Clee, and the triple diadem of the Breiddens" (Dr. Charles Callaway, annual meeting, Severn Valley Naturalists' Field Club, 1889). The bright clear atmosphere of the day proved highly favourable for the study of the geography of all the adjoining counties, whilst the rich and varied verdure after the recent warm rains rendered the scene more charmingly refreshing.

Anthropology, so far as it referred to the occupation of this district by the earlier inhabitants of our island, came in, to day, for its share of consideration.

"E'en here
Man, rude untutor'd man, has lived and left
Rough traces of existence."—*Carrington.*

When we consider how the surface of the Brown Clee has been riddled with the excavations of miners in more recent years in their search for coal and for road metal, and how miners are wisely in the habit of making refuges for themselves on the hills as sheltering harbours from snow storms and rain, it seems in the present day beyond the powers of any ordinary mortal to distinguish their handiwork from the cave pits and cave hollows, and the hut circles of the ancient inhabitants, especially when there is no evidence to corroborate the presence of the latter

by the discovery of coins, or tumuli containing the usual implements which are found buried in sepulchral mounds.

The Geology of the district was well treated, as it was sure to have been, when in the hands of the Rev. J. D. La Touche, to whom the physiography of this county is well known. The latest views following the most recent examination of hut hollows and hut circles in the ancient encampments of Nordy Bank and Abdon Burf were given in his paper. It is not the first time he has contributed to our knowledge of this district; his address from the summit of Titterstone Clee Hill, will be found on page 102 of the *Transactions* for 1868. Members should also refer to *Transactions*, 1876, pages 208, 258, for further information connected with the locality. The Club most highly appreciates the time and trouble so disinterestedly devoted by the Rev. J. D. La Touche. He was unable to be present, but has forwarded considerably the interests of the Club by his contribution.

With reference to Ornithology, it must be mentioned that the following rather rare birds were observed, in this, their breeding season, on the heights of Abdon Burf:—Black Game, Curlew, Ring Ousel, and Snipe.

As regards the Botany we have as yet no notes to hand. All we know is that when the members left Ludlow the Rev. Augustin Ley was reported missing, and was left behind traversing Shropshire on foot. Such is no unusual occurrence. He was known to have the Ordnance Map in his pocket, and his cool head, sure foot, reputation for agility, and powers of endurance are so well known to us that we entertained no alarm or fears for his safety.

At the period of the middle ages the country traversed by the Club to-day separated the two great Royal Forests of the Long Forest (which included the Wenlock Hills, the Stretton Hills, and the Longmynd), and the Clee Forest, and there is no doubt that a great portion of this district was true forest. From Domesday we learn that Corfham (the castle is situated two miles westward of Heath Chapel) was, before the Conquest, a manor belonging to the Anglo-Saxon kings; and we learn from the records of a later period that it was granted to Walter de Clifford, the father of Fair Rosamond. Graves, hewn in the solid rock (one containing the body laid on its back) with some iron implements, were found about forty years ago on Sutton Hill (four miles west of the Brown Clee Hills). This would indicate a cemetery of the Anglo-Saxons, such as are found in Kent and throughout all Wessex, in contra-distinction to the places of interment found amongst the people of East Anglia and Mercia, who cremated the body before burial and deposited the ashes in an urn. The West-Saxons first occupied these border lands about the end of the Sixth Century. In 577 they took the three great Roman cities of Gloucester, Cirencester, and Bath, and it is very probable that in seven years afterwards they spread over this district. According to the Anglo-Saxon Chronicle, "in 584 the West Saxon Kings Ceawlin and Cutha fought against the Britons at Fethanleag, and took many towns and great booty." If this place is represented by Fretherne on the Severn, or by Faddiley near Nantwich, in Cheshire, this date would fix the occupation by the West Saxons, who afterwards extended their area of occupation as far west as the river Wye. The

Northumbrian Angles under Ethelfrith took Chester in 606, thus exposing the northern part of the border to its invasion by the Angles; but, says Mr. Thomas Wright, "it was the Mercian Angles who finally included Shropshire in their kingdom, and they only came in at a still later period." Hence we may infer that this district was occupied by the West Saxons, succeeded by the Mercian Angles.*

The scattered party, having traversed the grounds of Burwarton Park, passing Burwarton Hall, re-assembled at the appointed time at the "Boyne Arms," near the entrance gates of the park.

At Burwarton, the old Church was visited by a few of the members. It was roofless, very small, in the Norman style, consisting of a nave and chancel, with small Norman windows. The chancel arch is semi-circular, and above is a pointed opening giving light from the nave into the chancel, somewhat similar to the example seen by the Club last year on their visit to Middleton-on-the-Hill Church, near Leominster. A large new Church, built by Lord Boyne, adjoins the churchyard, and in the churchyard are deposited the remains of the late Venerable Archdeacon Waring, formerly Canon of Hereford Cathedral, whose face was familiar to many members of the Club only a few years ago. The vicar of Burwarton, the Rev. A. James, overflowing with offers of hospitality, was deterred from extending it to the members, owing to the limited time at their disposal. Upon returning to Ludlow an attempt was made by a small party to visit its Church of St. Lawrence, but it was closed. In their disappointment, refuge was taken in the Castle. One or two visited Ludford Church, which they found to contain some good brasses and monuments of the Charlton family, of Ludford House. The majority of the members, however, sat down to refreshments and dinner at the "Feathers' Hotel," after which a paper, by the Rev. J. D. La Touche, on the subject of the Brown Clee Hill, so far as concerned its geology and its occupation by early inhabitants, was read, in his absence, by Mr. Moore.

A list of members and visitors attending the meeting is given:—The Rev. Preb. Wm. H. Lambert, president; the Rev. Morgan G. Watkins, vice-president; Sir Herbert Croft, His Honour Judge R. W. Ingham, His Honour Judge Harris Lea, Colonel J. C. Little, Captain C. Dansey Oldham, Drs. T. A. Chapman, C. H. East, and J. H. Wood; Revs. H. A. Barker, E. R. Firmstone, C. S. Hagreen, E. J. Holloway, A. G. Jones, T. S. Lea, Augustin Ley, H. North, F. S. Stooke-Vaughan; Messrs. W. H. Banks, J. Carless, R. Clarke, Luther Davis, Richard Lewis, James W. Lloyd, G. H. Piper, W. Pilley, C. Warre Prescott, H. G. Sugden, J. P. Sugden, H. A. Wadworth, John Wiltshire, H. C. Moore (Honorary Secretary), and James B. Pilley (Assistant Secretary) with the following visitors:—Messrs. — Daniels, R. P. Dansey, W. M. Simpson, Francis Young.

* On this subject see "Essays on Archæological subjects by Thomas Wright," Vol. 1, p. 169, and the accompanying map. (Published 1861 by John Russell Smith, Soho Square).

FURTHER NOTES ON THE GEOLOGY OF THE BROWN CLEE DISTRICT.

By the Rev. J. D. La Touche.

Nearly twenty-five years have rolled by since I last had the honour of addressing the Woolhope Club on the geology of this neighbourhood. In the ardour of a science which was at that time comparatively new to me, I find, on reading over my discourse on that occasion as recorded in your *Transactions* for the year 1868 (*Transactions* 1868, pages 102 to 111), that I ventured on a task which I should now hesitate to undertake, for I attempted to give not only a description of the structure of these hills, but of that of the whole district within the circle of our horizon. One of the lessons which advancing years impress upon us is the very limited scope of our powers and our knowledge, and in looking back on the past we often have reason to shudder at the audacity with which we attacked the subjects that once engaged our attention, and experience teaches us to be more modest in our aims. I shall therefore on the present occasion limit the few remarks which I have been invited to make to what I have been able to ascertain about the formation and the history of the two remarkable hills which are the subject of your exploration to day. Let me first remind you of the conditions under which these hills and the surrounding district, in which they are so conspicuous a feature, were formed. You have then to carry the imagination back to a time when the Silurian and all the preceding strata, an enormous thickness of rocks, had been deposited. A gradual upheaval stretching from South Wales to central England had interposed a barrier of dry land between the ocean towards the west and what was now becoming a vast inland fresh water lake, comparable to the Caspian sea. Into this, as it deepened, the waters of the surrounding higher grounds carried the materials from which the Old Red Sandstone was constructed, and which in some places attained a thickness of 4,000 feet or about ¾ of a mile, such being the astonishing depth which this great lake must have attained. Subsequently, through the depression of the intervening barrier, the ocean again encroached upon the land and a new state of things commenced. First the Carboniferous limestone was deposited in the deep water, and over it, as it became more shallow and shore conditions prevailed, the Millstone grit, and lastly, over the dreary waste of the slowly rising land, in the estuaries of sluggish rivers and a vast expanse of marsh, the beds of coal were laid down that extend over these hills and northwards into Staffordshire.

You will observe that throughout the changes that have so far been mentioned we find no indication of any violent convulsion, no sudden dislocation of strata. All seems to have been the result of a gradual imperceptible oscillation in the level of the earth's surface, altering from time to time the boundaries of land and water, and thus bringing about the deposition of a succession of sedimentary deposits. But here we have evidences of a mighty change. At the close of the

carboniferous epoch the long quiescence of previous ages was for a time interrupted. Through fissures in the previous strata streams of lava issued forth and covered large tracts of land. Possibly in some places these igneous outbursts took the form of active volcanoes, but so far as this district is concerned there is no evidence that such was the case here. Professor Geikie has observed that in very much more recent times Western America was the scene of a similar eruption, a vast territory being covered with eruptive rocks which welled up through the cracks or faults in the strata beneath. Such was evidently the origin of the basalt which caps the Clee Hills. What the extent of this outflow may have been originally we have now no means of ascertaining. No sooner had the fiery stream ceased to pour forth upon the land and become consolidated into hard rock and the district had settled down to its previous quiescence then the usual process of denudation set in. There can be no doubt whatever that at one time the beds of coal which are found on this Brown Clee Hill were continuous with those of the Titterstone upwards of seven miles to the south, and that the whole of the intermediate valley has been eaten away by the gradual process of denudation, each winter's frosts disintegrating some portion of the rock, and each shower that fell on its surface carrying off to the ocean its quota of the soil thus formed. Thus the surface of all the surrounding country was gradually lowered, leaving these hills protected by the cap of hard igneous rock that covers them. Around the Titterstone the regular succession of strata, the Old Red, the Carboniferous limestone, the Millstone grit, and the Coal measures may be fairly made out in their relative position, but here the extreme disturbance to which the district has been subjected has resulted in such an amount of faulting that the sequence is much less distinct.

And now a few words on what is perhaps the most striking feature in the geology of these hills, the eruptive rock which covers their surface. On the Abdon Burf this does not exist *in situ*, but on Titterstone the clearest evidences have been established of its origin. It had long been known that in sinking pits for coal, the miners encountered a sheet of Dhu stone of a thickness in some places of 64 yards, proving that it must have been erupted subsequently to the deposition of the Coal measures; but the source of this outflow was finally determined and has thus been described by Sir R. Murchison: "To prove the width and nature of the basaltic dyke or Dhu stone fault. . . . a shaft was sunk close to the side of the wall of basalt, which there (on the Titterstone) rises to the height of 50 to 60 feet above the lower ground, where the mouth of the shaft was placed. . . . After penetrating about 20 feet of rotten Dhu stone, various measures were passed through, and three of the four beds of coal so well known in these hills were proved." On following up these seams of coal in the direction of the basaltic mass they were found "to change their character, to become lighter and of little value, and still nearer the basalt they were completely changed into a sort of dull, sooty substance in which the structure of coal was lost, but in which were disseminated many small flakes of anthracite." Those seams of coal were moreover found to be slightly turned up as they approached the eruptive rock, which is just what might be expected from the protrusion of this mass through

their substance. The width of the basaltic dyke was ascertained to be about 150 yards, and thus the existence of a subterranean cone of solid basalt which in its heated condition charred the coal seams which it penetrated, was well established.

Sir Roderick Murchison tells us that, though similar evidence has not been obtained of a like core of igneous rock at Abdon Burf, there is every reason to believe that beneath the summit of this hill there exists a solid unfathomable mass of this rock, that "this was a funnel of eruption, and that from this point the igneous matter flowed over and covered the Coal measures of the Clee Burf, for there the basalt is a mere sheet, which has repeatedly been penetrated in search of coal. If such were the case, however, vast changes must have taken place since the emission of the basalt, for there is no longer any continuity between the mass on the summit of the Clee Burf and the point of eruption on Abdon Burf, the higher and the lower summit being separated by a depression occupied by the Old Red Sandstone. The relative altitude, however, of the two hills tends to favour the belief that the basalt capping the lower hill originally descended from the higher point of eruption, the intervening or connecting mass having since been denuded."

One of the most important additions to our knowledge of geological facts of late years has been in that department of it to which the name petrology is given. The study of the character and constituents of the rocks has enlisted the labours of the chemist, the crystallographer, and the mineralogist, and, with the aid of the microscope, a most unexpected light has been thrown upon the succession of eruptive rocks, their history, and the changes they have themselves undergone, as well as those they have caused in the rocks with which they are in contact. Some twenty or thirty years ago geologists were content to apply the vaguest terms to this class of rocks. Some were called trap, some basalt, some wacké, and so on. At present their classification, though far from perfect, has made a great advance. Indeed, the accumulation of names given to the minerals which compose them, as well as to the aggregate in themselves, has become well nigh appalling. It will be sufficient, however, here to state that there are two great families into which these rocks are divided, marked by the predominance in the one of quartz, which is silica in combination with oxygen. These are called acid, while those in which the percentage of oxydised minerals is small are named basic. Now there is good reason to believe that in the case of volcanic eruptions the more acid lavas of which the specific gravity is comparatively small are the first to be poured forth while the denser basic ones, succeed them; and being of a more fluid consistency, they flow to much greater distances. In the igneous rock of these hills we have a good example of these latter lavas. The term now given to this rock is dolorite, and its ingredients consist of augite, a peculiar kind of felspar termed plagioclase, olivine, magnetite, and a few other accessory minerals. No one who has had the opportunity of seeing a thin section of these rugged stones under the microscope with the aid of polarised light can fail to admire the marvellous display of colour, the beauty of form of the crystals, and the many curious phenomena which they exhibit.

Among other things which petrology has established none is more important

than the identity of the eruptive rocks in the most remote epoch with those that are emitted from modern volcanoes. The spectrum analysis has taught us that the very same metals with which we are familiar on this earth are found in a state of incandescent vapour in the sun, and we here learn that however vast the time is that separates us from that when these localities were the scene of tremendous outbursts of igneous matter, the same conditions existed as to its production and its elements as those which are found to hold in the present day.

Having thus cast a cursory glance at the phenomena which marked the formation of these hills, let us transfer our thoughts for a few moments to the time when man appeared upon the scene, leaving in the vast piles and embankments which crown their heights evident traces of his existence, as well as an ample stock of problems to exercise the ingenuity and imagination of archæologists. Speculations as to the habits and condition of prehistoric man have a great attraction for most minds, partly from the natural desire to ascertain what kind of people our remote ancestors were, and partly because the scanty and shadowy nature of the evidence itself affords a wide field for the imagination. I have, through the kindness of Mr. Phillips, been furnished with a paper in which he has collected the remarks of two observers, Mr. Hartshorne and Mr. Lines, on this locality. Mr. Hartshorne tells us that the Roman station of Nordy Bank was by far the most perfect work of the period with which he was acquainted, that it is 210 paces from west to east and 144 from north to south, that the vallum is 26 feet at its base and 6 feet across its crest. It must have been a very important post for the Romans to occupy, since it gave them the command of Corve Dale, as well as in a certain degree of the Clee Hill valley on the southern side of the Burf.

In the relation to Abdon Burf, he is disposed to derive the latter name from the Celtic British word *buarth*, an enclosure. His opinion is that it was a British work for religious purposes. The enclosure, of oval form, measures from north to south 1,317 feet, and from east to west 660 feet. At the north-west point a Carnedd rises 8 feet above the level of the hill, standing upon a base that is 60 feet in diameter, and there is an appearance of another Carnedd on the east side, and of another below the vallum on the same side. Upon examining the southern end of this Burf, among the smaller masses of igneous rock which strew the surface, he especially notices one huge block measuring 6 feet 4 inches by 4 feet 6 inches and 3 feet high, called by the natives of the hill the Burf Trickling, a name which he derives from the Saxon Gothic *tryg*, and which signifies "a mass so ponderous that with the utmost difficulty it could be moved." But Miss Jackson, in her useful Shropshire Word Book, makes merry over this flight of fancy, saying that the name implies the fact that the stone "trickled" down the side of the hill, and compares the term as used in this part of Shropshire to denote the droppings of sheep! However, Mr. Hartshorne satisfied himself, by having the stone undermined, that it could not have formed part of a Cromlech; in fact he leaves the point undetermined. He also notices another unhewn prostrate stone in a slight hollow on the south-west side bearing the name of the Giant's Shaft. This is nearly 9 feet long, 2 feet 4 inches wide at the base, and tapers to 1 foot 8 inches at

the upper end, and he presumes that it originally stood upright and was, of course, connected with the mysterious lives of the Britons.

Mr. Lines, who visited the Burf in 1870, observes one remarkable feature omitted by Hartshorne, viz., a group of what he supposes to have been the pit huts of the ancient inhabitants, easily distinguished from the coal shafts of the coal miners. These are, he says, in good preservation, are nearly 7 feet deep, their diameter across the top 15 feet, and are surrounded by a mound 5 feet wide. This group is placed on the inner slope and at the base of the north vallum, near a Carnedd. The writer goes on to describe the heaps of basalt which strew the surface of the hill, and to speculate on their origin. He says that "Amidst all this dire confusion he could detect some numerous indications of artificial pre-arrangement, that he could not avoid the conclusion that the chaos before him was an overthrown building of enormous proportions." He noticed under the confused masses, a base or substructure of definite form, consisting of "great blocks laid in regular courses of one stone squarely placed over another" and he expressed a strong belief that we have here the ruins, of "a prehistoric building of colossal dimensions which once occupied the ground," in short "one of the great Hypethral temples of former times," and he attributes its destruction to the operations of the Roman army encamped on Nordy Bank.

Upon the various points suggested in these remarks, and the obscure subject of prehistoric archæology, I shall not venture to give any opinion. I have quoted them, that the attention of the members of your Club may be drawn to the different objects referred to, in order that they may be fully investigated. There are, I am informed, the remains of a distinct wall in the similar mounds which crown the Titterstone, and probably Mr. Lines is correct in stating that such a wall is to be found here, too. Mr. Lines has done useful work in recording many of the observations he made during his visits to secluded parts of the country in his avocation as an artist; but the inferences he drew from these facts are another matter; and it seems to me that it may well be questioned whether there is any evidence that the Britons anywhere possessed such a colossal temple as he supposes once existed here. In conclusion, I would direct your attention to the traces of stones arranged in a circular form which may be seen within the ring enclosure on the top of the hill.

Woolhope Naturalists' Field Club.

TUESDAY, JUNE 27TH, 1893.

ON Tuesday, June 27th, at the Second Field Meeting of the year, the members, under the guidance of Mr. George H. Piper, who acted as Director for the day, were intellectually treated to a plethora of information upon subjects of historical, genealogical, geological, archæological, and otherwise, generally of local interest, as they journeyed from Ledbury through Pendock and Tewkesbury to Deerhurst, thence homewards by crossing the Severn over the Haw Bridge, returning by the Gloucester Road, through Staunton and Redmarley, to meet the evening train at Ledbury.

Mr. Piper contributed papers on the following subjects:—The Battle of Ledbury, on Tuesday, June 22nd, 1645; the Battle of Redmarley, on July 27th, 1644; and Pendock and its Church. He also gave a short description of the Saxon Church of Deerhurst.

Punctuality was the order of the day most faithfully adhered to. Starting in large brakes from Ledbury Station, the backs of the large party were turned upon the exposure of the Transition beds between the Old Red Sandstone and the underlying Silurian system, so well exhibited in the railway cutting and over the tunnel. Our Director can never view these geological strata without a lamentation that his proposed paper on the "Geology and Physiography of the Ledbury District" has not yet come to the Press, and that geologists have meanwhile to rest contented and thankful for the extracts from one of his addresses reported on page 136 of *Transactions*, 1884.

Passing through the town of Ledbury with its picturesque black and white town hall, the "New House," the residence of Mr. Michael Biddulph, M.P., with its numerous gables, originally built in 1595 by Edward Skynner, was pointed out as the party entered the Worcester Road. The old pigeon-house at the lodge is recorded in Mr. Alfred Watkins's list of pigeon-houses of Herefordshire. The next object on ascending the hill was the old Gloucester Road on the right, the road along which Massey effected his retreat after the Battle of Ledbury either through Conigre Wood, or by Bullen Bank on the present Gloucester Road. Mr. Piper here contributed a history, by one who was present, of the Battle of Ledbury, followed, for the sake of comparison, by Massey's description of the Battle. The New Road from the corner of the new water tank to the Crab tree Corner, opposite Mr. Martin's lodge, was made about the time of Charles the Second. At Crab-tree Corner, on the left, is the old way into Ledbury. Proceeding onwards, on the left is the Ridgway, or old Roman road to the station Vigornia (Worcester). On the right stands out nobly the imposing Eastnor

Castle, on ground formerly a Roman Station. This property dates from the days of Clynton, of Castle Ditch, who proclaimed King James in Ledbury streets in the year 1603. About the fifth year of King James I., it was purchased by Cocks, of Bishop's Cleve. The family of Cocks were landowners in Kent, temp. Edward the First. For the history of this moated Castle and its capture by Sir Richard Hopton, of Canon Frome Court, "see Webb's History of the Civil Wars in Herefordshire." It was retaken on the following day by the Governor of Hereford. Mr. Cocks, of Castle Ditch, was made Baronet in 1772, Baron in 1784, and Earl in 1821. On the left is seen the obelisk originally erected to the memory of Lord Somers, the Chancellor in the time of George the First. Still nearer on the left is seen Bronsil Castle, gradually becoming more ruinous; its last remaining tower fell in the winter of 1892-1893. See Buck's map of 1731, and history of the Castle in *Transactions*, 1880, p. 228. This is the last house which received licence to crenulate, temp. Henry VI.

GEOLOGY OF THIS DISTRICT.

A few words may be here given on the Geological formation of the ground traversed by the members on this day's carriage drive. On Leaving Ledbury, immediately after passing Ledbury Church on the left hand, the members who had been journeying over miles of the Old Red Sandstone of Herefordshire now left that Geological formation, and entered upon the Lower Ludlow ground of the Silurian, then, after crossing a few hundred yards of Wenlock Limestone, the Lower Ludlow is again re-entered.

After passing the road leading on the left to Worcester, an exposure of Upper Ludlow, not represented in the Ordnance Geological Map, appears on the left. The positions of the different strata are better understood by referring to the coloured diagram which Mr. Piper had prepared.* After passing the grounds of Eastnor Park, a stratum of May Hill, or Upper Llandovery, is crossed, followed by Lingula flags, otherwise Cambrian sandstone or Hollybush sandstone, in which occur nine exposures of a basaltic rock, greenstone, containing hard heavy bosses which, from their formation and desquamation in concentric layers, have been known by the natives under the name of "onions." One of these erupted or protruded exposures is on the road-side on the right hand, as shown in the diagram. Two of them on the right hand of the private roadway leading to Fowlet Farm are strikingly suggestive of diminutive volcanoes. About half a mile north of Howlers' Heath is a small quarry in a plantation of a most excellent building stone, with most durable qalities, called Rowick conglomerate. A house close by Eastnor School is built of this stone, and many specimens of it can be seen in the rockeries of Mr. Bickham, at Underdown. Shortly before leaving the Lingula flags to enter upon a stratum of Laurentian granitic rocks and gneiss is a private farm road on the right-hand side leading to White-leaved Oak, where there is an exposure of black shales, and, still continuing along the prolongation of this road towards Chase-end Hill, is the locality where the late William Knight literally wasted so much of his strength, time, and money in a fruitless search for coal. The name of Hollybush Pass is given to the pass between Ragged-stone Hill on the right and Hollybush Hill on the left. Chase-end Hill, south of the Ragged-stone, represents the southern termination of the Great Malvern Chase of old.† The depression upon the left between Hollybush Hill and Mid-summer Hill (this being the only part of this long range of hills which is double), conducts direct to the storing places for water of the ancient Britons for the use of their

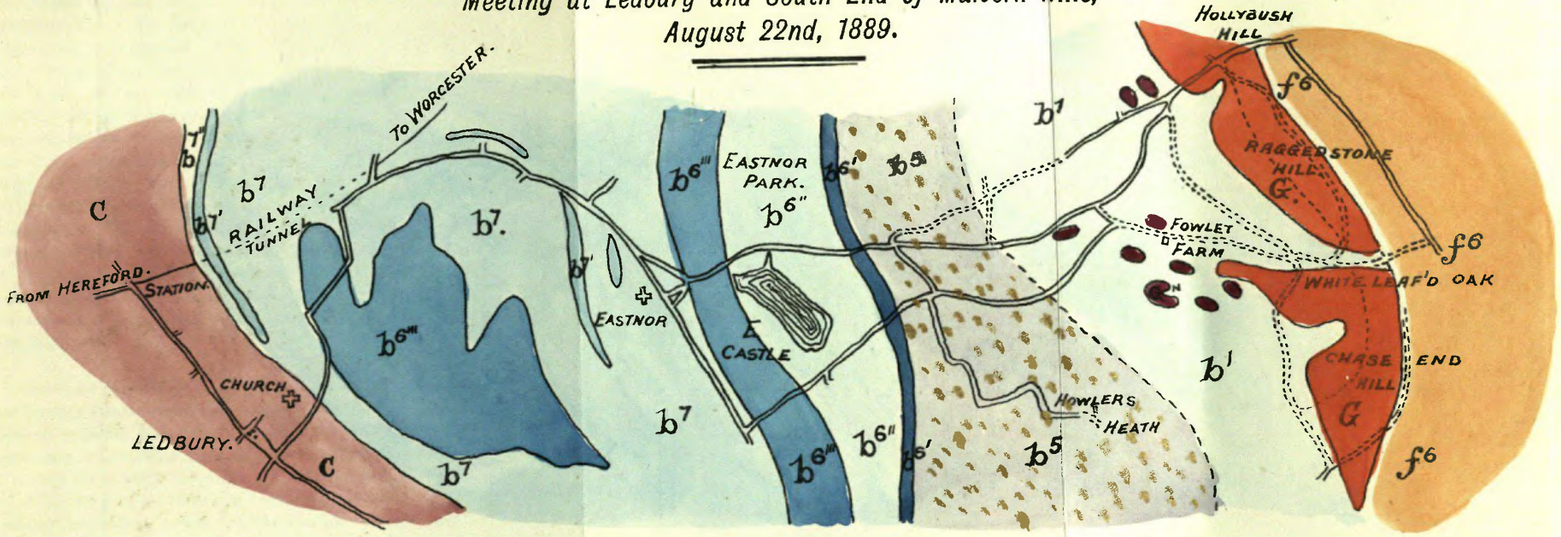
* This geological diagram had been originally prepared for the Meeting of August 22nd, 1889. See the footnote on page 376 of *Transactions* for that year.

† The boundaries of Malvern Chase lying westward of the Malvern Hills belonging to the Bishops of Hereford are thus given in a Survey taken in the year 1577 :—"Beginning at Primeswell, you ascend to the crest of the hill *(ad cornam montis)*, and so to Baldeyate, and from Baldeyate along the foss to Brustenyate, and from Brustenyate to Swyneyate, and from Swyneyate to Shakellyate, and from Shakellyate to Dead Orle, and from Dead Orle to Chaylemersh Poole, and from Chaylemersh Poole to Clengfore's Mill, and then to Eastnor Church, and from Eastnor Church along the Ruggeway as far as Ffroglone, and from Ffroglone to Bartongate and Brodeley, and so back to Primeswell."

Primeswell is elsewhere in an earlier record written as Prommeswell and Prommeswall.

THE WOOLHOPE FIELD CLUB.

Meeting at Ledbury and South End of Malvern Hills, August 22nd, 1889.



Scale. 2 Inches to 1 Mile.

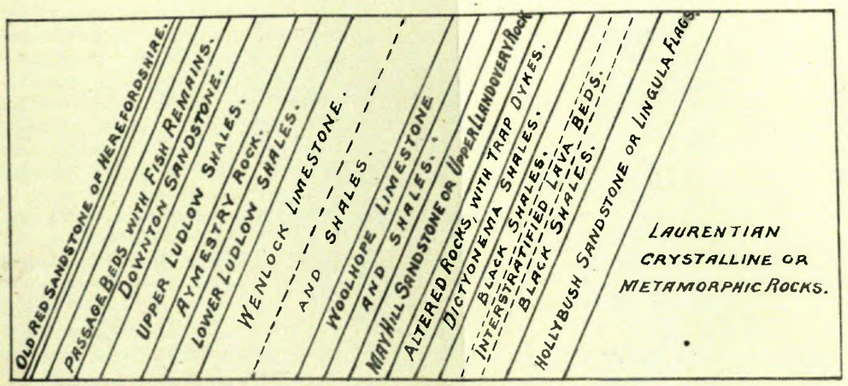


DIAGRAM OF SUCCESSION OF PALÆOZOIC STRATA DIPPING WESTWARD FROM THE MALVERN HILLS. BY G. H. PIPER, F.G.S.

f6 KEUPER RED MARL.
C OLD RED SANDSTONE.
b7'' UPPER LUDLOW.
b7' AYMESTRY LIMESTONE.
b7 LOWER LUDLOW.
b6''' WENLOCK LIMESTONE.
b6'' WENLOCK SHALE.
b6' WOOLHOPE LIMESTONE.
b5 MAY HILL OR UPPER LLANDOVERY.
b1 LINGULA FLAGS.
G LAURENTIAN GRANITIC ROCKS & GNEISS.
G1 GREENSTONE.

THE WHITE LINE SHEWS THE FAULT.

JAKEMAN & CARVER, HEREFORD.

encampments on those two hills. For the site of the ancient British town and the excavations of the hut-hollows on Mid-summer Hill see the diagram in *Transactions*, 1889, opposite page 376, and for an excellent paper on the subject refer to *Transactions*, 1880, page 217. The great quarry on the left of Hollybush Pass consists of Laurentian rocks, horneblende, diorite, greenstone, and gneiss. In all the geology of this district the most remarkable feature of the changes of our earth's surface is exhibited in the fault represented in the diagram by a white line. Its situation is at the eastern base of the Hollybush, Ragged-stone, and Chase-end Hills, the fault representing the absence of the whole of the successive strata which lie between the Laurentian and the Keuper Red Marl, a vertical depth of many miles. From this point the members travelled to-day over about twenty miles of Red Marl and Keuper stone of Worcestershire and Gloucestershire, and on their return journey over about two miles of Bunter of the New Red Sandstone to re-enter, after passing Haffield Camp, visible upon their left hand, at the distance of about three miles from Ledbury, the Old Red Sandstone of Herefordshire.

The view from Hollybush pass overlooking the vast valley in which the Bredon Hill stands out in the foreground, an outlier of the Cotteswolds (which form an extensive background), although separated from them by a distance of some seven or eight miles, presents a marked contrast to the broken hilly ground of the last five miles of the county of Hereford now left behind.

Journeying onwards to the bottom of the pass, opposite curious garden grounds on the left, is seen the old mansion where Counsellor Cocks used to reside. Having now entered the parish of Berrow in Worcestershire, we have to mention near Rye Cross, the old manor house on the right, the birthplace of General Sir Joseph Thackwell, afterwards renowned for services at Waterloo and in India. His sister, Mrs. Ann Webb, died August 4th, 1881, aged 102. An old public-house, the Duke of York, on the right, dates from the time of Edward IV., 1461-1483, and half a mile further, also upon the right, is the "Murder House," within whose walls occurred in 1780 a tale too horrible to relate. At Pendock Church, on Keuper Sandstone, the members halted to inspect the Church, of which their much-esteemed member and intelligent observer of nature, the Rev. William Symonds, was Rector for forty-two years. His memory will ever be lovingly enshrined in the hearts of his colleagues of the Woolhope Naturalists' Field Club. The gravestone, a low coped stone on the south side of the churchyard bears the following inscription:—"Here rests the body of the Rev. William S. Symonds, 42 years Rector of this parish, who died September 15th, 1887, aged 68 years. In Thee, O Lord, have I put my trust." Near his gravestone, a paper, prepared by Mr. Piper, and descriptive of Pendock and its Church, was read by Mr. Moore.

Leaving Pendock Church, the next object of interest visible on the left is Payne's Place,* a farm house in the parish of Bushley, where Queen Margaret

* For particulars of Payne's Place, Bushley, see a paper by Rev. E. R. Dowdeswell in *Transactions*, 1881, page 5.

rested on the night following the battle of Tewkesbury, so fatal to her interests. The whole camp where the scene of the battle was laid is visible from the windows of this house. Approaching Tewkesbury, the Severn is crossed over a noble bridge, and at a short distance from it, the Avon is crossed over the Long Bridge, originally built by John, when he was Duke of Cornwall. King John reigned from 1199 to 1216. A welcome under a decorated arch to the ancient borough of Tewkesbury, a welcome fit for royalty, seemed prepared for our members as they entered the streets decorated with banners of various colours and designs, until they were undeceived by the information that the whole town was *en fête* to give the local Engineer Volunteers a deserving reception. Luncheon at the "Swan," excellently prepared, and admirably served, was despatched without delay, and after three members had been elected by ballot and four gentlemen nominated, some important business was executed, for which reference must be made to the minutes.

The temptation to visit the magnificent Abbey building could not be resisted, but it was only a flying visit, and limited to the most active of the party, who could barely cast more than a glance at the beautiful tombs and exquisite chapels and chantries grouped round the choir. The majority by far of the party had to remain satisfied with a view of its exterior, of which the most prominent features are the central tower extraordinarily rich in decoration for a Norman tower—its ornamental work displaying arcades and round-headed windows with a profuse use of the chevron or zig-zag ornament, and the beautiful large semi-circular arch, recessed in six orders supported by lofty shafts, which encloses the west window. Tewkesbury was visited by the members in 1881—see page 9 of *Transactions* of that year. Time did not permit of further delay upon this occasion. The grand parish Church of Tewkesbury is perhaps the largest in England save St. Alban's Abbey, now a Cathedral, and the noble Minster Church at Beverley in Yorkshire. The nave was the ancient Parish Church. To the glory and honour of its inhabitants let it never be forgotten that, by Royal Letters patent dated June 24th, 34th H. VIII., *i.e.*, A.D. 1543, they ransomed from the king the choir and the monks' end of the building.

Punctually to the minute seats in the carriages were resumed; and the town with its many beautiful and picturesque timber-framed houses had to be left behind, the Honorary Secretary endeavouring to appease the members, as they cast lingering looks behind, by reminding them that at this season of the year a return ticket, Hereford to Malvern, might be obtained for 2s. on every Monday and Thursday; from Malvern a ticket can be taken to Tewkesbury, allowing five hours in the town.

At the site of the battle of Tewkesbury, which took place on Saturday, May 4th, 1471, the carriages were halted for Mr. Piper's demonstration. The Bloody Meadow, the Park, and the respective positions of the opposing forces were all pointed out.* Thence onwards for four and a half miles to our goal, Deerhurst, where a halt was made for one hour and a half.

*See *Transactions*, 1881, page 8. For a very interesting account of the battle of Tewkesbury, read "Malvern Chase," an episode of the Wars of the Roses, by the late Rev. W. S. Symonds, rector of Pendock. The 3rd edition was published in 1883. Tewkesbury, Wm. North, 139, High Street.

DEERHURST—ITS SAXON CHURCH AND SAXON CHAPEL.

DEERHURST, Anglo-Saxon Deor-hurst, forest of wild animals, is a parish, which has perhaps the unique position, in England, of possessing two Saxon Churches. Of these, one is the small pre-Norman Chapel which was only re-discovered by the vicar, Rev. George Butterworth, so recently as August, 1885, separated by a two acre churchyard from the Abbey Church which is at a distance of about eighty yards north of the chapel. In the absence of documentary evidence as to the date of the erection, Mr. Butterworth writes—"we are probably safe in assigning it to either the 9th or the 10th century—unless, indeed, it belongs to the 8th." The ancient Church at Bradford-on-Avon dates from about A.D. 700 (*Freeman's English Towns and Districts*, pp. 134—141), and as to the antiquity of Deerhurst Abbey the deed of conveyance exists of grants of estates (Codex Dipl. Ævi Sax.) by Ethelric, son of Ethelmund, Ealdorman in the Hwicciau district of Mercia in the year 804, the period when the kingdom of Mercia embracing the central and western parts of England was being gradually again Christianized after a period of successive raids over Roman Britain by the wild and lawless Northmen.

The rude and Early Saxon architecture of the Priory Church is interesting not only from its antiquity but also from the extent of its remains. For its descriptive detail in a volume of 250 pages, fully illustrated, which in 1890 reached its second edition, under the title of "Deerhurst," we are indebted to the former vicar, Rev. G. Butterworth, who was both an antiquary and an ecclesiologist. We cannot do better than allow this volume to take us by the hand as we trace out the history and the architecture of the building.

Deerhurst Abbey became an alien Priory in 804, when Edward the Confessor bequeathed it to St. Denis, near Paris, and when, in the first year of the reign of Henry V., almost all the alien priories were dissolved, it escaped confiscation, and was made denizen 19th Henry VI. Having been very soon afterwards (1469) given as a cell to Tewkesbury Abbey, it continued such until the general suppression of monasteries in 1539.

Originally it consisted of tower, nave, choir, sacrarium or presbytery, and choir aisles. Almost the entire ground plan of the original building can be ascertained, including even the foundations of a semi-circular apse amongst the out-offices of the contiguous farm building. Thus it remains a surviving type of a Saxon Monastic Church, almost entire, and, as Mr. Butterworth remarks: "it may seem a little singular that no trace of pure Norman work should find a place in it" (p. 120). Externally the building appears more modern, due to the addition—in a later period—of the nave aisles. The tower is very lofty, consisting of four stories, the upper half alone being more modern; the lower portion has herring-bone masonry. The tower is longer from west to east than from north to south, giving the appearance of two towers built contiguous to each other, which are curiously divided by a middle wall. A notable feature in the tower is a two-light window

looking from its middle stage into the nave. This window has massive and short fluted pilasters with triangular headings, the whole surmounted by a square label, presenting a primitive Romanesque appearance. The roof of the nave is of the Perpendicular character. In former days a transverse wall pierced by an arch separated the congregation in the nave from the monks (Benedictine) in the chancel. A relic of Puritanical days is still retained in the chancel, namely, substantial oak benches, with desks in front, on the north, south, and east sides of the altar. The seats on the north and south sides are now used by the village choir.

The large tub-shaped font, of oolite stone, has ornamentations resembling patterns found on Irish crosses and in very early manuscripts. Our notes inform us that there is some not very dissimilar carving on the font at Bisley, near Stroud. The bowl of the font stood for many years in the courtyard of a neighbouring homestead, whence it was rescued in 1843. About 25 years afterwards the stem was found by Miss Strickland, near her residence at Apperley Court. The whole was very cleverly restored, and the stem and bowl were replaced in their proper positions.

Other peculiar features are triangular openings or windows in the nave and tower, round-headed doorways with their jambs built in long and short work, in several instances with their lower parts splaying out wider than the upper, the heads of archways with the arch of the lintel cut out of a single block, in other instances a flat lintel, a segmental* arch in the west wall of the ancient choir aisle, the original semi-circular apsidal end whose foundations, discovered by Mr. Butterworth, are obscured among the contiguous farm buildings, and the large amount of herring-bone masonry in the walls and lower portions of the tower.

A farmhouse which adjoins the church buildings on the south-east corner was evidently incorporated originally with the Church as a portion of the monastic building; in an upper room is a good moulded and panelled ceiling in oak, n Perpendicular style, with a walled-up doorway or opening into the south wall of the Church. Along the south wall of the Church and on the west walls of the farmhouse the position of the roof over the cloisters may be traced by the remains of the projecting stone corbels. In the cellar is a single stone pillar, about six feet eight inches in height, supporting one of the large oak beams of the upper floor. The capital is square, with voluted ornamentation, rudely carved, with double neck moulding, separated by a distance of some inches; the shaft is circular, its diameter about ten inches, the base has three circular bead mouldings in the square basement, the whole standing upon a circular slab, five inches of which are exposed above the ground level. It presents a very decided Saxon appearance, but we believe it has been pronounced to be a very Early voluted Norman column. The pillar was most probably brought to this situation from some other original position.

* The segmental arch is not common, and fortunately so, seeing that in constructive principle it is bad, in design it is inelegant, and in some cases inconveniently and dangerously low, as for instance that over the south entrance door of Clee St. Margaret's Church, which we visited last May, where it would admit a tall man six feet high with his hat on under the central portion only of the segment.

THE SAXON CHAPEL.

In August, 1885, the Ecclesiastical Commissioners proposed to convert the picturesque 15th Century Manor Lodge, eighty yards south of the Church, called Abbot's Court, from a farmhouse into cottages. The attention of the Vicar being drawn towards an ill defined semi-circular line on the plaster which covered the central portion of the building, he was led to an exploratory examination with the builder, Mr. T. Collins, of Tewkesbury, with the result of the discovery of this little ancient chapel. The building is rectangular, consisting of nave and chancel, with a rude somewhat horse-shoe shaped chancel arch, supported on massive jambs in irregular long and short courses, a round-headed north and south entrance opposite each other, a north and south window in the nave also opposite each other, and a 16th century window in the north wall of the chancel, the total length of the whole structure being about 46 feet: the width of the nave was about 16 feet, and width of chancel about 11 feet. It was singular that it should have been so thoroughly incorporated with the rambling store-rooms, and domestic apartments of the farmhouse, that its original sacred use should have faded completely out of recollection and tradition. The nave, as appears probable from the now-walled-up west wall, seems to have been used as a kitchen, whilst the roof of the chancel, ceiled with flat boarding, may have served as a small domestic apartment, or possibly an apple store-room, reached by a ladder.

Strange and valuable revelations followed:—In a chimney-stack Mr. Butterworth discovered what was, no doubt, the ancient dedication-slab of the the altar, bearing an inscription deciphered as follows:—

✠ IN HONORE S̄CE TRINITATIS HOC ALTARE DEDICATV̄E

which may be translated, "This altar was dedicated in honour of the Holy Trinity." The stone, unfortunately, is mutilated, and bears indications of having been worked into the heading of a Lancet window. It is now fixed on the east wall of the chancel, alongside a copy of another larger stone, of which the original was discovered in a neighbouring orchard in the year 1675, by Mr. John (afterwards Sir John and Judge) Powell. The Latin inscription on this stone is as follows:—

✠ ODDA DUX IVSSIT HANC REGIAM AVLAM CONSTRVI ATQVE DEDICARI IN HONOREM S̄ TRINITATIS PRO ANIMA GERMANI SUI ELFRICI QUE DE HOC LOCO ASSV̄PTA. EALDREDUS VERO E P̄S QUI EANDEM DEDICAVIT II IDIBVS APL VIIII AUTEM ANNOS* REGNI EADWARDI REGIS ANGLORVM.

The original stone is preserved at Oxford, and, before the discovery of this Chapel, was always supposed to bear reference to Deerhurst Church, although many features in the Church itself pointed to a much more early date. The translation of this inscription may be thus rendered:—"Earl Odda had this royal hall built and dedicated in honour of the Holy Trinity, for the good of the soul of

* *Sic* in orig.

his brother Elfric, which in this place quitted the body. Bishop Ealdred dedicated it on 12th April, in the 14th year of the reign of Edward, king of the English.' Odda was a relative of William the Conqueror, and his name appears in the Anglo-Saxon Chronicles. The authority for the date of 1056 for the building of Odda's Chapel is hereby assured.

Elfric died in 1053; hs and his hrother Odda were both buried at Pershore.

This neighbourhood is full of historical interest. The annals of Deerhurst are all found in the volume by the Rev. George Butterworth, to which ws owe all the information we have been able to condense. Vestiges of raised embankments in orchards around the monastery are visible: these may have been what are in Hsrefordshire called stanks, built with the object of kseping back the overflow of the Severn at a period when

"The flood of the Severn Sea flowed over half the plain."

In ths year 1016, Cnut the Dane, after his victory at Assundun in Essex, over Edmund Ironside the Saxon, met him at a place callsd Olney, where they agreed to divide the kingdom for which they had been fighting. The place of meeting has been identified with a six acre meadow in this locality, formerly an island in the Severn, now called Naight, a corruption of "Eyot," or river-island. Olney signified "islet of alders."

In this cursory outline of the proceedings of this day we must not dwsll any longer upon Deerhurst, beyond expressing our thanks to the Vicar, the Rev. D. G. Lysons, nnd to the host and hostess of the farmhouse for their hospitality.

Deerhurst was left punctually at 4.50. A distance of four miles was saved in tbe return home by journeying southwards to cross the Severn over the Haw Bridge, distant three miles from Deerhurst, thsnce westerly to meet the main Glaucester road at Staunton, where a halt was made to give water to the horses, and to hear our President read a paper by Sir Harbert Croft on the connection of his ancestor, Sir Richard Croft, with the captnre of ths infant prince Edward. Shortly after leaving Staunton village, upon the left, attention was directed to the two-acre, three-acre, and four-acres allotments instituted before the middle of this century by Feargus O'Connor, M.P., containing from fifty to a hundred neatly-built cottages scattered over hundreds of acres—a most disastrous failure.

The next temporary halt of the carriages had for its object the description of the battle of Redmarley, on July 27th, 1644, upon the left of the route, the details of which may be read in the paper written by Mr. Piper. Redmarley Park was formerly a favourite residance of Ridley, Bishop of London, 1555. About twenty-five years ago, Lord Beauchamp pulled down the old house, and built the present brick house.

The memhers, leaving the connty of Gloucester to re-enter Worcestershire, alighted from the carriages to walk up the steep hill leading from Broomsberrow to Haffield. The ancient Haffield Camp, 260 yards east by west, 150 yards north hy south, is within 50 yards of ths road upon its left side in the park. Ledbury railway station, after a drivs nf fifteen miles from Deerhurst, was reached in time for the train leaving at elsven minutes past seven o'clock.

The following is a list of the members and visitors who attended:—Rev. Preb. William H. Lambert (President), Mr. G. H. Piper, F.G.S. (who was President of the Club in 1883, and again in 1886), Rev. M. G. Watkins, and Mr. James Davies (Vice-Presidents); Members—Mr. C. D. Andrews, Mr. W. H. Banks, Rev. H. Bennett, Rev. Charles Black, Mr. C. G. Blathwayt, Rev. W. K. Brodribb, Mr. Langton Brown, Mr. R. Clarke, Mr. E. Condor, Mr. Luther Davis, Major C. Doughty, Dr. C. W. East, Rev. E. R. Firmstons, Rev. J. E. Grasset, Mr. William Hebb, Rev. E. J. Holloway, Rev. A. G. Jones, Mr. John Lambe, Mr. P. Levason, Mr. R. Lewis, Colonel J. C. Little, Rev. H. North, Mr. W. Pilley, Mr. A. J. Purchas, Mr. H. M. Purchas, Mr. John Riley, Rev. W. R. Shepherd, Mr. G. Robertson Sinclair, Mr. J. P. Sugden, Mr. Hatton G. Sugden, Mr. O. Shellard, Rev. T. Walwyn Trumper, Mr. H. A. Wadworth, Rev. H. Trevor Williamson, Mr. H. C. Moore, Honorary Secretary, and Mr. James B. Pilley, Assistant Secrstary. The visitors were—Rev. S. Bentley, Mr. A. J. Bull, Mr. William Davis, Mr. H. S. Durrant, Mr. W. Malcolm Nott, Mr. Jnmss Nott (author of "Moche Malverne), Mr. J. Prohert, Mr. L. W. Hippisley-Smith, and Rev. A. Sudball.

PENDOCK.

By GEORGE H. PIPER, F.G.S.

THE name of this place has been spelt in various ways. In some Saxon charters it is called Peonedoc. In "Domesday" it is written Penedoc and Peonedoc. Pendoc, Pendoke, are other forms of spelling. Some would trace it to Penda, King of Mercia; Pendock—Penda's Oak. The word Pen is Celtic and Phœnician, and signifies head, hill, eminence. Many place-names have the prefix Pen, but possibly some of these may have originated from sheep or cattle having been penned there—the Anglo-Saxon word Pennan means a small enclosure. "Pëond," "pund," signifies a place enclosed or fenced in. Peonedoc may stand for "peonedhoc," or "peoned-hook," and originally signify the corner of a hedged field.

There are several places in and about Pendock called by Celtic, Roman or Saxon names. The most probable derivation of Pendock, is the Celtic word Pen, a head or hill; and Dyke, the great earthwork, entrenchment, or boundary, which may still be seen. There can be little doubt that this was an ancient British station, and afterwards occupied by the Romans. The land around the Church has many mounds and trenches affording strong evidence that extensive buildings once occupied the site. Roman coins have been found on the edge of the dyke, and the Roman port, or military way, called "The Pendock Portway," which runs in the direction of the great camps or towns on the Midsummer and Hollyhush Hills and the Herefordshire Beacon—part of it for about half a mile in the parish of the Berrow—clearly proves Roman occupation, and affords one instance, out of innumerable others which go to show that they frequently located themselves in ancient British stations. The north-west end of "The Pendock Portway" is crossed by the Ledbury and Tewkesbury road. Northward of the church, and nearly half a mile distant, on rising ground overlooking Longdon Marsh, are mounds and depressions indicating former structures of considerable extent. Some pools and hollow places west of the churchyard are traces of a foss-way that existed in Roman times, from Upton to Gloucester, passing close to Gadbury Banks, an isolated earthwork in the parish of Eldersfield not far distant. The dyke—which is distinct from the Portway—extended from Castlemorton across the parish of Pendock to Corse Lawn, and was probably a boundary line of British or Saxon tribes. It has a history, not yet recorded—some day the pickaxe and the spade may make plain what is now wrapped in mystery and conjecture.

PENDOCK CHURCH.

IT is mentioned in a charter of King Edgar, that Ceolwulf, King of the Mercians, gave Peonsdoc to the Monastery at Worcester.

The Church is a plain old building, and consists of nave, chancel, and square tower. Early Norman, or perhaps Saxon, work may be seen in many parts of the structure. The north and south doorways, opposite each other, are Early Norman, with oak doors of great age, the arch of the former being ornamented with zigzag work under a row of circular knobs, 17 in number, carved in a shallow channel. The tympanum is plain. The north door has a sanctuary ring. The pillars and capitals of the chancel arch are Norman, but the arch itself is of the transition period leading to Early English. In the chancel is a piscina well preserved, with a triangular head, and a brass has been placed to the memory of William Wadley, who died in 1784, for nearly 50 years Rector of the parish. The rood loft has been taken away, but the approach to it may be seen by an open doorway in the south wall of the Church, above the pulpit and immediately under the wall-plate. The pre-Reformation seats are still in good order. The font is Early Norman, plain, circular, with a deep cavity. The only entrance to the tower is through the church. All the capitals appear to be hatchet work. Happily, the Church has escaped the horrible process called "restoration"—long may it continue to do so!

THE BATTLE OF LEDBURY.

By GEORGE H. PIPER, F.G.S.

THE great insurrection of the people of Herefordshire, in the month of March, 1645, against the Sheriff of the county, and their refusal to pay contributions and submit to levies, had, by the judicious conduct of Colonel Scudamore, Governor of Hereford, assisted by Prince Rupert, been overcome. The Prince was engaged in gathering a force about Hereford and Leominster with the intention of marching northward, when he learned that Colonel Massey, Governor of Gloucester, had advanced to Ledbury. The Prince resolved to attack him there, and marching with indefatigable alacrity at the head of a strong party during the whole of the night, was by daybreak on Tuesday, the 22nd April, within half a mile of the town, when its occupiers were for the most part unprepared, and after some sharp fighting suffered a complete defeat. Ledbury was not unknown to Massey, as he had visited the town on the 14th of the previous month of March, during the insurrection, accompanied by a force of 500 foot and 150 horse. He contemplated the construction of earthworks, and leaving a garrison there, but the intention was not carried out.

The following exact copy of the account of the battle was evidently written by one who witnessed what he described: it was published at Oxford in the Mercurius Aulicus, on Friday, April 25th, 1645.

A ROYALIST'S DESCRIPTION OF THE FIGHT.

"'Twere endlesse to reckon what's printed at London, for then should we repeat all Master Massey's flying Victories, who on Tuesday last was sent broken and bruised to Gloucester by his Highnesse Prince Rupert. For Master Massey last weeke, taking opportunity of the encrease of his horse by addition of a Convoy to Gloucester, drew out, and marched to Ledbury (with intention, as 'tis conceived, to fall on a new Garrison of his Majesties at Cannon Frome) where he staid, thinking to draw Prince Rupert after him, and upon his Highnesse retreate to creep againe towards Hereford, to have gained time, and disturbe the Prince, but not to fight with him, though the man talkt high on purpose to revive his Forresters of Deane. But his Highnesse having intelligence of his quarters, numbers, and security (for Massey was then busy at a Court of Warre to hang up one of Prince Rupert's souldiers) advanced presently, and came neare Ledbury on Tuesday morning last. At whose approach the Rebels horse drew to arms, having barricaded the streets with Carts, &c., the Lord Astely's foot were ordered to fall on first, and were seconded by Colonell Washington's and some others; their horse kept out his Highnesse foot a-while, but within halfe an houre the barricado was opened, and then the way was made for his Highnesse Horse to charge; the first charge was committed to the Lord Longborough with command (if he could), to make a thorough charge, who (like himselfe) did it most gallantly, and

that without any hurt to himselfe though shot five times through his cloathes and upon his armes; He was seconded from his Highnesse asverall wayes, so that Massies horse beaten out of the Towne (while the foot fell into the woods and enclosures) were persued up a very steepe hill which yet could not hinder the Rebells from galloping. The persuit was committed to Colonell Thomas Sandys, who after he had chased the Rebells 4 miles, came to a Village harricadoed by the Rebells, though this also could not hinder the chase, which was continued through the Towne, or farther even up to the Rebells Garrisons, the Rebells having galloped their horse into Lard, till they were able to trot. There were killed in this Towne and persuit 120 Rebells (besides many hiding their wounds in the woods) more had been slaine, but that his Highnesse rode up and downe, and commanded to give quarter. Among the dead there were one Major (conceived to be Kirle who betrayed Monmouth), neare 400 prisoners, whereof 27 Officers, Majors, Captaines, and Lieutenants, one of those is Major Backhouse that betrayed his Majesty in the delivery up of Gloucester; many hundreds of armes, all their baggage and amunition, with Master Massie's owns Sumpter, and all this with the losse of 5 common Souldiers (but not one officer) oaely Colonell Lingham is shot in the leg, and some other gentlemen had hurts, whose names we yet have not. His Highnesse Horse did most gallantly, leaping hedge after hedge to come at the Rebells, so as the foot acknowledge themselves much indebted to the Horse for disengaging them at the barricado, and vow (when time serves) to make a faire requitall. Massey himselfe was observed to charge well in the fight, and to drive off his foot in the Reare to make them run faster away. Which yet would not serve him, but that at last he was glad to slip off towards Tewkesbury, and with 80 horse spur home to Gloucester."

In addition to the foregoing particulars, History has preserved another account of the battle written by Massey himself to the Speaker of the House of Commons; wherein he claims to have defeated the Royalists and caused them to retreat. There can be no doubt that Massey was handsomely beaten, and that he deserted his foot in their retreat to Gloucester, and escaped himself to Tewkesbury as best he could. Massey's despatch was read in the House of Commons on the 1st May, 1645.

MASSEY'S ACCOUNT OF THE FIGHT.

"Sir,—On Tuesday last, the 21st of this instant, Aprill, Prince Rupert marching all that night came the next Morning, Wednesday, the 22, before Ludbury; where I then was, but the enemy intercepting 8 Scouts, we had no Intelligence, till they were neere at hand. The Enemy advanced, and charged into the Towne upon us; and myselfe (with divers Gentlemen, viz., Major Harlow, Leivtenaut Collonel Kerle, Major Bacchus, Captaine Gifford, Captaine Mors, and Captaine Baily, with some others and some common Souldiers, with the assistance of 200 Musketiers out of the Countie forces) received them; And so soone as we received the Alarme, we drew out upon them, and marching close up to them, fell on them, beat them to a retreat, and made it good against them, so long till my Foot might retreat a secure way to Glocester. After the Foot, we marched off,

and out of the Towne we had two or three hot Charges upon them, where we slew neere 40 of the Enemies men, and many of them that were killed were Officers, at which Charge (as it seems) the Lord Hastings with some others of quality were slaine. On our part we had very few killed, not above 6 or 7. But I was inforced myself to charge in the head of all my troopes, to encourage all the Warwicke and Northampton horse; I aad my Officers berring the beate of the Day.

"At length, intending to retreat to our place of advantage (some horse of those sent to me not standing to it, as they should have done), the Eneme got in amongst our Foot, but we redeemed that againe, and marched off into the field.

"The enemy hava sent us a List of the Prisoners which they took from us: the number hy their own list is 110 Prisoners, hut above 80 of those were none of my men, only such Country people as they swept away with them in their retreat, that did never beare Armes, only they carried them away to cause them by mony, or making frisnds for exchange, to redeams themselves. My Major, Sergeant-Major Bacchus, is desperately wounded in ths head, and was carried away Prisoner by the Eneme to Hereford. Major Harlow had a sleight wound in tha Head, and another in the Arme, hut came bravely off; Captaine Baily and Captaine Foster, with some other common men of ours, are taken Prisoners hy them. I have sent for their freedome hy exchange of some of those Prisoners I tooke from them, many of them being of quality, enow to redeeme them all if they were thrice as many.

"Prince Rupert sent me word by my Trumpeter that I sent, that in the fight he sought me out, but knew not till after, no more than I knew him. But it seemes we charged each other, and he shot my horse nuder me, and I did as much for him. At that Charge many Commanders of theirs fell.

"Prince Rnpert is (I heare) very much enraged to undertake so great and toilesome a march, and so much to misse his end. I had hy God's blessing my intendment, and stopt his present march Northward, to God be the glory.

"Prince Rupert's Army, hy the Report of the Countrey, is noised about to be 6 or 7,000 Horse and Foot: who are now upon their march againa towards Ludlow, and so, as I hears, intend for Salop, if they bee not prevented againe, which must be by a more considerable strength than I have.

"The forces that wsrs with mee, were in all about 5,000 [*sic*] Foot and 350 Horse, nor wers these all with me at Lydbury, for my Guards were not coms.

The Eoemy brag little of their getting, hut lament much: the names of the Commanders and Officers that were slaine hy us I shall send you by the next.

"Your humble servant,

"Aprill the 25, 1645." "E. Massey."

Prince Rupert, writing about it, says "Massie was soundly beaten yesterday, his foot quite lost, and his horse beaten and pursued within six miles of Gloucester. He himself and some of his Officers made a handsome retreat."

Truth does not always prevail, and Massey's representation of the affair had tbe effect of obtaining the thanks of the Parliament for his "extraordinary valour and gallantry in this fight," with a gratnity of £200 and £1,000 per annum ont of ths King's Revenne.

THE BATTLE OF REDMARLEY.

By George H. Piper, F.G.S.

In ths month of July, 1644, Colonel Nicholas Mynne hald the town of Roes for the King. Prince Rupert, beaten at Marston Moor on ths 2nd of that month, had mads his way to Brietol. Massey governed Gloncester with a small garrison. Mynns believed that he could get possession of Gloucester, and with the sanction of Prince Rupert, marched from Ross to within half a mile of the City and did considarable damage, hut afterwards returned to Ross. Information having reached Colonel Mynne that Massey had gone down ths river to oppose Lord Herbert at Aust Passage, he mads speedy arrangements to effect a junction at Corse Lawn with certain forces out of Worcestershire, and to march thence upon Gloucester, and lay waste the whole intermediate district to the very gates of the City. Wlth these intentions, Mynne advanced to Hartpury, on the evening of July 26th, expecting on the morrow to be strengthened hy several hundred foot and horse from Worcester. Massey, who had been reinforced by three troops of Colonel Stepheas' horse and two of Edward Harley's regiment, returned with all speed to Gloucester, and, in addition to a considerable body of horse, ordered out 220 musketeers, and sent to Tewkesbury for 100 more men to meet him on his march. Late in the evaning of that day Massey's forcs crossed the brook at Highleadon, and having waited until darkness came on, attacked an outpost and took a few prisoners. Mynne, being in a state of uncertainty as to the strength of the enamy, and in hourly expectation of reinforcements, retreated hy way of Brand Green and Payford, to Redmarley, whils the Roundheads missing them wandered about in pursuit and reached Eldersfield, where they rested for two or three hours to refresh themselves and their horses. At sunrise on July 27th, the little armies were two miles apart, and Mynne drew his men together. He had 160 horse and 860 foot, whom he formed into companies among some enclosurss, lining the hedges with musketsers. The Worcester forces, 150 horse and 500 foot, had not joined him, when he saw ths Gloucestar soldiers in two bodies, led on hy Massey in person, marching up to him in order of battle. Three troops of horse, one of them under Colonel Harley, son of ths celebrated Lady Brilliana Harley, were in the van, seconded hy three others commanded hy Captain Backhouse, who was killed at tha Battle of Ledbury, nine months afterwards. Each body nf horse was flanked with foot, and a single troop of horse with the remainder of the foot brought up the rear. Others were stationed as a reserve near Redmarley. Massey charged the Royalists vigorously, heat them from their defences, and with his superior strength in cavalry, put their horse to flight and broke in upon the centre of ths foot, cutting down many and making more prisoners, shattered their whole body and won the fight. Mynne, with 170 of his veterans, fell upon the spat. The prisoners were upwards of 30 officers and sergeants and 300 common soldiers. Those who escaped fled to Ledbury. Lieut.-Col. Passey, who commanded the party from Worcester, was riding np to Mynne to announce their

approach when he was intercepted and killed. It is believed that he held intelligence with Massey and could have joined Mynne's forces earlier if he had so chosen. Passey's troops continued to advance until they came in view of the fugitives and their pursuers, and halted at a short distance only from the main body. While they paused, and hesitated to approach him, Massey collected his stragglers and retired. On both sides they parted, as it were, by mutual consent; he unwilling to disturb his success by urging his weary men to renewal of the fight, they as unwilling to hazard an encounter with him in the excitement of victory. Massey marched back with his prisoners to Gloucester, while the Worcester men retraced their steps to Ledbury. Tradition points out a field on the Ledbury side of Redmarley where the principal fighting occurred and Mynne was killed. Massey, in his despatch, states that when the enemy retreated to Ledbury he went back to Redmarley. Mynne's plan, well laid, was ill executed; otherwise, had a junction been effected previous to the battle, it might have proved, by Massey's own confession, his inevitable destruction; all Gloucestershire would have been cleared, and the men Rupert was bringing from the north might have followed him safely to Bristol. As it was, the results of this apparently trivial encounter were to the King most disastrous. The body of Colonel Mynne was conveyed to Gloucester, honoured by his foes, who gave him a stately burial in testimony of his worth and valour, but the parochial records of that city do not give the date or place of his sepulture.

The Register at Redmarley contains the following entries, which would seem to refer to men who died of their wounds some days after the battle:—

1644—Soldiers slaine, 9	August 3.
and more, 5	August 4.
and 1	August 6.
and 2	August 8.

The following Notes by Sir HERBERT CROFT, with reference to the battle of Tewkesbury, were in his unavoidable absence, read by the President.

SIR RICHARD CROFT AND PRINCE EDWARD OF LANCASTER.

SIR RICHARD CROFT came of a fighting family, he being the grandson of Sir John de Croft, of Croft Castle, Herefordshire, who was Captain of Merk Castle, near Calais, in the 4th Henry IV. (1402), and was frequently employed in negotiations in Flanders between that year and 1404. Sir Richard's grandmother was Janet, daughter and co-heiress of the renowned Owen Glendower, and his father was William Croft, Esq., who was summoned to the French wars in the 7th Henry VI., 1427—1428. Sir Richard was William Croft's eldest son, and (says Sir Harris Nicholas) was one of the most celebrated soldiers of his time.

Edward of York (says Mr. Edgar in his "Wars of the Roses"), was a native of Rouen. In that city he was born in 1441, while his father ruled in Normandy. At an early age he was brought over to England to be educated at Ludlow Castle, under the auspices of Sir Richard Croft, a warlike Marchman, who had married a kinswoman of the Yorkist Princes, viz., Eleanor, a daughter of Sir Edward Cornwall, Baron of Burford, and widow of Sir Hugh Mortimer, Knight, of Kyre, who was called "Ladye Governesse" to the young Princes at Ludlow. Under the auspices of Sir Richard and Lady Croft, Edward (IV.) grew up a handsome boy. Among the warriors who fought at the battle of Tewkesbury was Sir Richard Croft, and passing, after the battle of Tewkesbury was over, between the town of Tewkesbury and the battlefield, Sir Richard Croft encountered a youthful warrior whose elegance arrested his attention, and whose manner was like that of one strange to the place. On being accosted, the youth, in an accent which revealed a foreign origin, acknowledged that he was *heir of Lancaster*, and on being assured that his life was in no hazard he consented to accompany the stalwart Marchman (Sir Richard Croft) to King Edward IV. Towards the market place of Tewkesbury Sir Richard Croft conducted his interesting captive. It was to a house in the neighbourhood of the Town Hall of Tewkesbury that King Edward IV. repaired after the battle, and there Prince Edward of Lancaster was brought into the King's presence in pursuance of his gracious proclamation.

Notwithstanding the assurance of King Edward IV. that his life should be spared, either at the instigation of Richard, Duke of Gloucester, or of his brother the Duke of Clarence, Prince Edward of Lancaster was barbarously murdered, whereupon (says Habingdon) "when the good knight, Sir Richard Croft, was aware of it he repented what he had done, and openly professed his service abused and his faith deluded."

Of this sad event the poet Drayton says:—

"The Princes sonne, who sees his friends thus fall,
And on each side their carcasses lie heap't,
Making away in this most piteous plight,
Is taken prisoner in his tardy flight.
And forth by Croft before the Conqueur brought
His proclamation cleering every doubt
Of the youth's safety."

And again in the Polyolbion :—

"Now all is Edward's own,
And through his enemies' tents he marched into the town,
Where quickly he proclaims to him that forth should bring
His person to be safe. Sir Richard Croft, who thought
His prisoner to disclose before the King, then brought
That fair and goodly youth."

We all know that Edward Prince of Lancaster had ere this married Ann Nevill (daughter of the Kingmaker), whom Richard III. afterwards hunted in London, and married by main force, and finally tried to poison in Middleham Castle, in the North Riding of Yorkshire, in order that he might marry his own niece, Elizabeth of York, to which alliance the Pope refused a dispensation. Elizabeth afterwards healed the feud between York and Lancaster by marrying Henry VII.

Sir Richard was Sheriff of Herefordshire in 10th Edward IV., 1470, when he was described as an Esquire, and the 11th Edward IV., 1471, when he was styled as a Knight, and was 17th Edward IV., in 1477, Knight of the Shire, that is M.P. for the County of Hereford, when he was styled a Knight. In the first Henry VII. (1485) he was Treasurer of the King's Household, and at the battle of Stoke (East Notts), 6th June, 1487, he was created a Knight-Banneret. He was one of the Council of Arthur Prince of Wales for that Principality 1497-8, and was at Ludlow Steward of Prince Arthur's household at His Highness's death in 1502.

This distinguished soldier, Sir Richard Croft, died on the 29th July, 1509 (1st Henry VIII), being then seized of Croft, leaving by Eleanor, his wife, who survived him, Edward Croft, his son and heir, who was seven times High Sheriff of Herefordshire. This paper is written in memory of his ancestor, Sir Richard Croft, by his lineal descendant, Herbert Croft, of Lugwardine Court, Hereford.

EFFECTS ON A TREE STRUCK BY LIGHTNING.

By Rev. H. T. Williamson.

On Wednesday afternoon, June 14th, 1893, a very heavy storm of thunder, lightning, and rain passed over Bredwardine. About 4 p.m. I was out on a hill called the Common. I did not expect the storm would reach me for some minutes. In fifteen minutes I was driven to seek shelter in a cottage.

Whilst engaged in conversation with the tenant, a tremendous crash of thunder suddenly exploded apparently right above us. I remarked "something has been struck very near to us." Hearing on the next day that a tree had been struck near the cottage in which I had taken refuge, I visited the locality to inspect the damage done.

The tree, an ash, was situated on the outside fringe of a plantation a few hundred yards below the Lower Knapp, and at the distance of about forty yards from a small cottage. The tree was about 60 or 70 feet high, growing with other ash trees on either side of it. The people about there say that the ash tree is rarely struck by lightning. All that was left of the tree consisted of a maimed jagged stump about 20 feet high, the top being simply a thin sharp splinter. Only a small strip of bark remained upon its east side, whilst splinters were exposed hanging out on all sides. I am of opinion that the tree must have been struck about the middle, where there was a fork upon the west side. A portion of the uppermost growth of the tree fell upon the north side, the remainder to the south side. The wreckage of the tree was strewed over the ground for a distance of forty yards from the base; one piece of bark fell at the very cottage door. One splinter, five and a half feet long, was hurled over a high hedge into an adjoining field to a distance of forty yards. The measurements of some of the fragments of boughs were 12 feet, 15 feet, 18 feet, and 26 feet long, and there were altogether some eight or nine pieces. What struck me, however, beyond all the other results, was the fact that a huge wedge at the least 12 feet in length, 11 inches in breadth, and 8 inches in depth had been, as it were, scooped out of the trunk upon its west side, and hurled to a distance of seven yards.

It has for years been a habit with me to inspect trees struck by lightning, but never has it been my lot to have seen a tree so completely wrecked as this ash tree, or to have witnessed the terrible power of electricity so strikingly illustrated.

TRANSFER OF THE PARISH OF FWTHOG FROM HEREFORDSHIRE TO MONMOUTHSHIRE.

By H. C. Moore.

The transfer of the highest elevation belonging to Herefordshire will be regretted, especially by those who have spent so many days in learning its botany. The student of "The Flora of Herefordshire" cannot fail to observe how frequently this elevated district, bounded on the west by the river Grwyne Fawr, is referred to.

With reference to elevation there is a Trigonometrical Station,

△ Cen. 2227.2 Sur. 2228.0 Chwarel y Fan, situated 750 links, or

about 500 feet north-west of the boundary stone which denotes the junction of the boundaries of Hereford, Brecknock, and Monmouth.

It is given on { Brecknockshire, Sheet xxx., S.W. / Monmouthshire, part of Sheet i. / Herefordshire (Detached), part of Sheet xliii.

It is a question I have as yet been unable to truly determine whether the elevation of the boundary stone exceeds that of the highest recorded elevation, which I have been able to find in the Ordnance Maps of Herefordshire, namely that of 2,145 feet in the township of Craswall on Map { Herefordshire, xxxvii., S.W. / Brecknockshire, xxiv., S.W. } on the scale of six inches to one mile. This locality is intermediate between B.M. 2126.1 and B.M. 2139.6 at the distance of about 500 yards east of the boundary line of the counties, and close to it is the source of the river Olchon. I am disposed to think that in the transfer of Fwthog parish we must submit to having our greatest elevation near Chwarel y Fan taken away from us. At the Herefordshire Midsummer Quarter Sessions it was announced (see *Hereford Journal*, July 1st, 1893) that notifications had been received of the transfer of the parish of Fwthog from Herefordshire to Monmouthshire, and that of Edwin Loach from Worcestershire to Herefordshire.

The inconveniences of administration in so remote a locality were considerable —especially when at an inclement season of the year the Coroner was suddenly called upon to send his summoning officer to precede him and to collect a jury from the parish of 2,101 acres, with a population of 89. The rateable value was £575. The parish, for Poor-law purposes, was in Abergavenny Union, and for police was attached to Monmouthshire; and the solitary publican had to go to Abergavenny Police Court for his licence. It was not in any way a School-Board district. The voters had to go to Longtown to vote, a distance of about eight or ten miles.

The terms of transfer (*Hereford Times*, January 7th, 1893, page 11) demanded simply the repair of the bridge, Pont Esgob (Bishop's Bridge), and the restoration of the Herefordshire approach for a distance of two hundred yards, which as estimated by the County Surveyor could be executed at a cost of £40 to £50.

The Rev. John Davies, of Pandy, near Abergavenny, who, as a Welsh Scholar, has contributed valuable information to our *Transactions*, has again rendered service by kindly giving his sanction to publish the following letter which he sent to the *Hereford Times* of January 21st, 1893. It will be observed that Mr. John Davies adopts the spelling of Fwddog:—

"At a formal enquiry held at Abergavenny, on the 30th ultimo, with regard to the proposed transfer of the hamlet of Fwddog to Monmouthshire, Mr. Bircham, one of the Local Government Inspectors, is reported to have said that "Fw" in Fwddog was the old Welsh term for "rapid fall." "Fw" forms no part of the root of Fwddog. The name by which the hamlet is generally called at present is a corruption, or an abbreviation of Ffawyddog, which means a place abounding with beech trees. *Fagus* in Latin, *Phegos* in Greek, and *Ffawydd* in Welsh, come from the same root. The Greek noun *phēgos* is, no doubt, from the Greek root *phagō*, to eat, beechnuts and acorns being the food of our remote ancestors. The hamlet of Ffawyddog seems to have taken its name from a farmhouse of that name, which, at one time, was surrounded with beech trees. A little higher up the valley than the farmhouse which goes by the name of Fwddog, there is another farmhouse called the Ffawydd, which means beech trees —Ffawydd being the noun out of which the adjective Ffawddog is formed.

Right opposite the Ffawydd, on the other side of the river, there is a farm by the name of Ffawydden, being the singular *(Fagus sylvatica)* of Ffawyd. The soil of the hamlet altogether is congenial to the growth of beech trees, as appears from the prevalence of beech trees in the brakes on the uncultivated pastures, and in the hedges.

It is uncertain when this small strip of country assumed the name Ffawyddog. When beech trees became common in this country is a question for the botanist to decide, but it appears that the present name of the hamlet is not very old. It is almost certain that this district was not known as Fwddog some six or seven centuries ago. By an act of the 27th of Henry VIII., the border line between England and Wales was shifted further to the west, and considerable districts lying on the east side of the Black Mountain, including the hamlet of Fwddog, were transferred from Wales to England. In the tenth century, the district, now called Fwddog, was included in the Kingdom of Glamorgan, but its present name does not appear among the possessions of the Prince of Morganwg. It must have belonged then to Euas. Morgan Mawr annexed to the Kingdom of Morganwg, not only Gwent proper, but Euas, Ergin, and Ystrad Yw. In an ancient MS. called "Cwtta Cyfarwydd," printed in the "Myvyrian Archæology," the seven hundreds of Glamorgan are given, the seventh being "Gwent-udh-Coed," and it is added that Euas and Ystrad Yw are the two sleeves of upper Gwent—"Dwy lawes Gwent-udh-Coed." Fwddog was included in the "Euas-Sleeve." Euas was that part of Herefordshire and Monmouthshire lying between the Dulas and the Grwyne. Ystrad Yw embraced nearly the whole of the hundred of Crickhowell, in Breconshire. It would be interesting to know whether the hamlet, which is proposed to be transferred from Herefordshire to Monmouthshire, went by the name of Ffawyddog prior to the shifting of the border line between England and

Walss, furthsr to the west. The district is mentioned by local historians, but not under the name of Fwddog, in connection with a tragedy that took place here sometime at the end of tha 14th centnry. It appears that one of the Lords of Abergavenny Castle was passiag through the district to visit his estates in Breconshire, when a band of Welshmen rushed out of a wood, and murdered the Baron and some of his attendants. On the top of the mountaio, about the middle of the hamlet, there is a "Maen Hir," now somewhat mutilated, called "Careg-y-Dial" or stona of revenge, so called, it is said, because it was set up to commemorata an act of reveage on the natives who murdered the nableman rsferred to. There is a place, hard by "Careg-y-Dial," called "Coedias"; soma say that the name should be Coed-y-Dial, Wood of revenge. The real name of this place, no doubt, is "Coed-Eaus," a wood in the conntry of Euas.

With regard to the stone bridge, the only stone bridge in the bamlet, Mr. Tannar, the Monmouthshire County Surveyor, is reported to have said at tha inquiry that Poatesgob, the name of the bridge, was supposed to have been given by a Bishop. As a matter of fact, it was not given by a Bishop, but given hy the inhabitants on acconnt of an Archbishop having passed this way. Arcbbishop Baldwin and Giraldns Cambrensis commenced their crusade mission at New Radnor in the year 1188. In a few days after they began their preaching tour they visited Talgarth. From Talgarth they ascended the Black Monntaia hy way of "Rhiw Cwnstable," and theu descended the Vale of Grwyne Fawr; ultimately they arrived at Partricio Church, where they preached. The service being over, these two dignitaries, according to tradition, cama down to the cornar of Partricio parisb, and crossed tha river Grwyns on their way to Abergavenny, near the place where tha present bridge stands. To commemorate the visit of the Archbishop, the bridge that was erected shortly after his Grace's visit, over ths river at this place, was called Pontesgob—Bishop's bridge."

Pandy, Abergavenny, JOHN DAVIES.

Jaauary 18th, 1893.

Mr. JAMES DAVIES, solicitor, Hereford, adds the followiag Notes:—

In the "Life of St. Beuno" in Rev. W. J. Rees' Cambro-British Saints," it is said tbat Ynyr Gwent, King of Gwent, became a discipla of St. Beuno, and gave him three estates in "EUAS."

In the Notes of Mr. T. Wakeman, he writes that it is "a district in the western parts of Herefordshire from which "Ewyas Laci" and "Ewyas Harold" take their names, and where Beuno built a Church upon land given him by Ynyr Gwent, or more probahly by his son Iddan, who was contemporary with St. Teilo The place is wsll known and retains the name of LLANVEINO, near Longtown."

Woolhope Naturalists' Field Club.

THURSDAY, JULY 27TH, 1893.

ON July 27th, ths third Field Day of this year, it beiag the Ladies' Day, more than four-score members and their friends visited the waterfalls of Water-break-its-neck, two iailes west of New Radnor. On arrival at New Radnor railway station, the party was met by a waggonette from ths Eagle Inn, to convey towards, and as close to, the waterfalls as carriage can rsach—half-a-mila—those who preferred to save themselves the two and a half miles of walking. The pedestrians meanwhile walked direct through the old town of New Radnor, now a mere village, passing at its entrance the elegant, sadly weather-worn, memarial cross to the memory of her most distioguished soo, Sir George Cornewall Lewis (obiit 1863), and thence to tha Castle Hill upon ths opposite sids of ths town, distant not more than half-a-milc from the station, whence, from an elevation of 900 feet, a sommanding view was obtained of the town, on tha elevation of 750 to 780 fset abova sea level.

The town has seen troublous times. The tradition is that New Radnor was erected out of the ruins of Old Radnor, situated two and a half miles sonth-east, the town and castls of which were demolished hy Rhys ah Gruffudd, Prince of South Wales, in the reign of King John; but, accordiug to *Archæologia Cambrensis*, 1858, Vol. IV., 3rd Series, historians reject that tradition in favour af New Radnor being first farmed hy Earl Harold in 1064. It was a royal demesne of the Norman sovereigns of England. In Domsday we read "Rex tenet Radrenove. Comes Haroldus tenuit. Ibi suat 15 Hidæ. Wasta fnit et est." By the general term *Wasta* is not meant land unappropriated, but land unenclosed. Tha town, comprising an area of twenty-six acres, was dsfended by an enceinte of earthwork (still visihle on the western and southern sidas), commanded on its north hy the castle, on tha alsvation 150 feet above, which also dafended the approach by the valley on tha west. The castle was a square structure with a strong keep, a circular towar at each of its anglas, and an outer courtyard on its western side called "Baili-glâs" or "Green court." In 1091 the fortifications wers repaired by Reginald, nr Ralph, de Mortimer. In 1188, when Radnorshira was in the possession of the third Mortimer, Roger, the place was visited by Archbishop Baldwin, who, starting from Hereford, proceeded by New Radnor, Old Radnor, Hay, and Glasbury, to Llanddew near Brecon, where resided the Archdeacon Giraldus ds Barri, afterwards known as the historian Giraldns Cambrensis, who accompanied him in his crusading taur through the Principality of Wales. In the commencement of the 15th century the castle and town were devastated hy Owen Glendower, and their desolation rendered more complete under the orders of

Henry IV., in whose reign the great barony of Wigmore became an appanage of the crown, Wigmore castle beiog the seat of the great Mortimer family. When Leland, in the time of Henry VIII., visited New Radaor, the whole was a ruin. Leland writes: "The castel is a ruine but that a pece of the gate was amended. The towne was defacyd in Henry ths fourth dayes by Owen Glindour." Again ha writes: "After he wonna the castel he took a 3 scora mea that had the garde of the castel and causid them to be beheddsd on the brink of the castel garde, and that sins a certaine bloodeworth groweth ther wher the bloode was ahedde."

The Church is modern, having been rebuilt less than half a century ago upoa the site of the old Church. It possesses nothing of antiquity beyond two recumbent effigies (coffin slabe) preserved on the floor under the tower. In the town, in High Street, nearly opposite the King's Arms Inn, is to be seen the verandah of a quaint old house, and upon the same side, a few score yards nearer the Porth, or western ancient entrance, is seen, built into the wall, a slah bearing an Early English incised cross.

To reach the falls of Water-breah-its-neck, the routes ara as follows:—

Pedestrian route.—Leaving the town hy the Porth, or western gate, proceed along tha Penybont and Rhayader road for nearly half a mile until, upon your right-hand side, you come to Haines' corn mill. Turn up the lane here along the brooklet Cwm Nês, which must be crossed. The first footpath on the left, at the very hase of the hill (Vron Hill), over a prominent raised footpath, with an excavation upon its hill-side, leads over three fields direct to Vron Farm. Observe, as you cross it, at the extremity of the first field, the elevated embankment extending right across the valley, the continuous parapet, or rampart, serving as an advanced defensive line of outwork, and styled in the Ordnance Map, the "Ditch Bank." Leaving Vron Farm upon your left hand, follow the path or wheel-tracks along the base of the hill until, at the distance of ahout half a mile from Vron Farm, you arrive at a gate in the Larch plantation on your left, which open, and follow the pathway therein until you reach the falls at the base of the hill, at the total distance of less than two miles from the western exit from New Radnor.

Carriage Route, No. 1.—Drive along the main road for the distance of one mile and a third, thence down the road on the right, which leads to Vron Farm, where the carriage must be left, thence proceed from Vron Farm by the pedestriaa route, as above.

Carriage Route, No. 2.—Drive along the main road for more than a mile and a half, and quit tha carriage before you come to the hridge over the hrook, taking the footpath on tha right which leads over the stream to the falls in the ravine only a little more than half a mile distant. Do not ascend the hill too much, bearing in mind that the falls are at the base of the hill.

When tha party had assemhled at the Falls, the business of the Club was transacted, and four members were elected. Dr. T. A. Chapman had brought for exhibition a few moths of several of the species, and also a living caterpillar of

three of the species, to illustrate his paper on "The Acronycta and their allies," a paper far too long and of too special details to be read upon this occasion. He writes:—"Tha paper treats of a genus of moths, the Acronycta, so far as it is represented in these islands, or at least treats of those stages of the insect which have been most naglected, viz., the eggs, the young caterpillars, and the chrysalida; the full grown caterpillars and the moths have long been weH-known and amply described. The observations have been made in the spare moments of several years, and have involved the close study of the successiva atages of a number of closely allied forms, and, though they are not by any means so complete as they ought to be, I have learat, whilst making them, what, if I had further opportunity of studying them, would hring some nf the facts to light which would make a fairly complete history of these species, or at least, one has taken a step or two on the way towards seeing that wider horizon that ever extends further the further ona goes; and to find that even in auch a subject as this the more ona learns there is ever mora to learn. The eggs of these moths are very beautiful objects, and they, as well as the small caterpillars that hatch from them, present certain characters that are common to the whnle gronp, and are not found in other mnths, and thna prove them to ha a natnral group of forms, and disprove some suggestiona that they ought to he distributed separately among other families." Dr. Chapman's paper is beautifully illnstrated with nine plates.

Mr. Moore raad a paper on a supposed Roman well, or basia discovered in the grounds of the New Weir, Kenchester,* which he himself did not suppose to he Roman, but rather, mediæval. Mr. Moore called attention to the publication of a pamphlet by Mr. John Lloyd in 1873, printed by the *Hereford Times*, under the title, "Papers relating to the History and Navigation of the Rivers Wye and Lugg," in which we learn (page 25) that there were "above fifty mills on Wye." From this pamphlet we cannot gather any information connected with thie particular site, nearer than the names of three "Milles on Way" (paga 14) above Hereford, viz., 2 Att Monington Wear (Monnington), 2 Att Brye (Bridge Solers). 3 Att Suges, †Mr. Simenens (Snggwas); and on page 44, Weares upon Wye, brot. down hy the Act of ye 7th and 8th of Wm. 3d—Monington, Bridg, Suggas, all above Hereford. In the same pamphlet, on page 44, we read that "a fire occurring at the private office of a former Clerk of the Peace, destroyed a great many old county papers, and among them probahly the navigation records." Is there then nnt left a ray of hope? On page 6 we read: "Transcripts of the decrees in connection with the act A.D. 1661, Anno 14 Car. Reg. II., being 'An Act for the making aavigahle of the River of Wye and Lugg, and the Rivers and Brooks runaing into the same in the Counties of Hereford, Gloucester, and Monmouth,' shall be delivered to the several Clarks of tha Peace of the respective counties of Gloncester and Monmouth." Whilst we look in vain for information in our recently published Manuscripta (Historical Manuscripte Commission) of the Corporation of Hereford, let us yet hope for some record remaining in either the connty nf Gloucester or nf Monmouth.

* This paper is published in *Transactions*, 1891, page 244. It also appeared in *The Antiquary*, for October, 1893, page 144.

† *Syn.* Symonds, ancestor nf our present Mayor, J. R. Symonds.

Mr. Moore afterwards read a paper on the masonry abutments in the grounds of the New Weir, proving that no bridge ever crossed the Wye in this locality, the abutments probably being those in connection with a quay or landing place. His paper concluded with the assertion that there must have been some bridge of communication, a little more than half a mile lower down the river, connecting Stone Street at Huff Pool, twenty yards above Sir Joseph Pulley's boundary fence, on the right bank of the river, with the buried road directly opposite, discovered last April in Mr. Charles Hardwick's Wye meadow, at Old Weir, on the left bank, leading direct to Kenchester (Magna Castra). Both papers were illustrated by photographs taken by Mr. Robert Clarke and Mr. Walter Pilley.

When the papers had been read the large party broke up into small detachments. Some pursuing their botanical, others their geological, tastes; some endeavoured to follow the course of the stream to its source. The country was explored in all directions. The forethought of the President had supplied tea, sugar, and milk, placed in the charge of Mrs. Stokes, of Warren Farm, the house immediately above the falls, and very cheering and refreshing was the afternoon tea found by the members on their return in successive parties from their forays.

At 5.55 p.m. the scattered party re-assembled at New Radnor railway station for their return to Hereford.

The party of Naturalists and their friends was composed as follows:—The President: Rev. Preb. W. H. Lambert. Members: Surgeon-General W. Perry, Major J. E. R. Campbell, Revs. R. B. Bayly, J. O. Bevan, J. E. Grasett, C. S. Hagreen, M. Hopton, A. W. Horton, A. G. Jones, H. B. D. Marshall, and H. North, Dr. T. A. Chapman, Dr. J. B. Fitzsimons, Messrs. J. Edy Ballard, H. C. Beddoe, L. Brown, J. Carless, G. Davies, L. Davis, M. J. Ellwood, C. Hardwick, T. Hutchinson, J. W. Lloyd, A. Parker, T. Phillips, H. J. Snyden, J. P. Sugden, A. Watkins, G. W. Wheeler, H. C. Moore (Hon. Secretary), and James B. Pilley (Assistant Secretary). Visitors: Mrs. Ballard, Bayly, Campbell, Chapman, Chave, Fitzsimons, Grasett, Hagreen, Hall, Hands, Hardwick, Marshall, Moore, Morris, Mynors, Perry, Phillips, Burnell Phillips, H. G. Sugden, Watkins. Misses Baker, Bayly, Carless, Chave, Chapman, L. Chapman, Davies, Davis, F. Jones, Horton, G. Horton, E. Lloyd, Marshall, Mynors, Paterson, Perry, Edith Sale, and Young. Gentlemen: Dr. Hall, Rev. Hamilton Kingsford, Messrs. A. E. Boycott, Caffull, W. J. Davis, Fitzsimons, Hoyle, E. A. Jones, Hugh Lambert, S. M. Parker, Wheeler, with others whose names were not ascertained.

WATER-BREAK-ITS-NECK.

"Nature never did betray
The heart that loved her; 'tis her privilege
Through all the years of this our life, to lead
From joy to joy."
WORDSWORTH.

It was The Ladies' Day. The early morn opened with a soft haze and sheets of supersaturated clouds concealed from view the distant hills. Some clouds showered a sprinkling of their supersaturation upon the thirsty land. The timid, unable to summon resolution to jaunt to Water-break-its-neck, near New Radnor, tarried at home. The weatherwise knew that it was but "the pride of the morning," and betokened heat. We know the Persian proverb, "where one hundred wise men meet together, they will all hold one and the same opinion." Not one hundred wise to be found! howbeit, more than fourscore, fitly clad for the occasion, and exuberant in spirits at their temporary release from the busy hum of life, sallied forth merrily to hold their revels over the Radnorshire hills.

By the various branches of railway service a concentration of the forces was effected at Titley Railway Station. *En route* for New Radnor, two hundred yards beyond Titley Station, a portion of Offa's Dyke comes into view in the valley on the right, more conspicuous beyond Kington, where, for a length of two miles it contours from the summit of Rushock Hill, round the crest of Herrock, commanding the debatable ground of old upon its west, and carrying reflections back to the weakness of the powerful Mercian monarch, tempted by his ambitious spouse to unhallow the connubial feast prepared for King Ethelbert and their daughter Elfrida.

On leaving Kington the traveller leaves behind him the Old Red Sandstone and Cornstone hills of Herefordshire, to enter upon Silurian ground. The entrance from Herefordshire into the Welsh Borderland in Radnorshire presents a pleasing picture close to Stanner Railway Station, with the rugged eruptive black old lava rocks of Stanner, 1,000 feet high, in the foreground, flanked on the right by Bradnor Hill, supported on the left by the wooded conical peak 900 feet high of Worsel, and the more lofty peaked Hanter, 1,200 feet high, bounded by the horizontal range of the Hergest Hill. Here the geologist views limestone strata metamorphosed and rendered crystal line by heat; here he sees eruptive rocks of syenite, greenstone, and hypersthene, protruded through sedimentary deposits of Woolhope and Lower Wenlock limestone and Wenlock shales. More of the Geology of this district may be learnt by reference to *Transactions* of the Woolhope Club, 1888, page 207. On the trap rocks of Stanner flourish *Lychnis viscaria*, *Scleranthus perennis*, and other rare plants, gathering yearly into closer and happier fellowship on inaccessible heights, fearing not the ruthless hand of the spoiler. For further information on the Botany, see *Transactions*, 1888, page 218. No halting here; New Radnor is our goal. When at New Radnor we trod upon the site of the ancient Castle, over whose buried masonry

Nature has thrown her green veil, in place of Bloodwort (*Rumex sanguineus*),* reputed to overshadow the scenes of horror and devastation wrought here in the times of Owen Glendower, we discovered that the mountain nymphs had been before us, bequeathing as a legacy one of the choicest foods of our flowerless plants, Fungi, *cryptogams* without *chlorophyll*, the fairy ring *champignon*, *Marasmius oreades*.

With a pleasant *compagnon de voyage* from New Radnor to the falls of Water-break-its-neck the distance appears a short two miles, and the aspect of the pastures rendered more verdant by recent sparse July sprinklings, adds fresh charms to the surroundings. An earthen embankment, locally, the Ditch Bank, extending from base to base of opposing hill, in earlier days barred the mouth of the valley from the attacks of the Welsh legions. As we approach nearer to our goal smoke issuing from an horizon of timber on yonder knoll betrays the habitation of man. Here a larch plantation, redolent of terebinthinate juices, its verdant soil productive, prematurely, of autumnal fungi, affords for a brief space a welcome shelter from the sun's rays, and soon the lullaby of a stream murmuring through the gradually contracting defile heralds the approach towards the waterfalls. The volume of water is not great, the fall not vertical, but down a steeply sloping inclination from 50 to 60 feet high, the width of the receiving basin below varying from 20 to 30 feet. With no sound beyond the music of the rippling waters, the *dolce far niente* feeling takes possession of our senses, and with no whisper of unrest to mar our quietude, idly reflecting that time was made for slaves, we calmly survey the sunlit cascade, its spray flashing in the sunbeams, as a pretty centre piece, wide-spreading dogwood trees luxuriating in the foreground, the steep bosky scree on either side overgrown with verdure and underwood, ferns of endless variety and inaccessible, sprouting green and fair from the ever widening crannies in the rocks, surmounted by a graceful capital, suggestive of a scarlet tasseled parasol, on the highest summit conspicuous, on nearer view betraying its identity of Mountain Ash.

"The Mountain Ash
No eye can overlook, when 'mid a grove
Of yet unfaded trees she lifts her head,
Deck'd with autumnal berries that outshine
Spring's richest blossoms; and ye may have marked
By a brook-side or solitary tarn,
How she her station doth adorn: the pool
Glows at her feet, and all the gloomy rocks
Are brightened round her." WORDSWORTH.

The picture is such as to excite the inspiration and the despair of the artist.

Satiated with over much gratification—was it not the lamentation of the most distinguished son of New Radnor, the late Sir George Cornewall Lewis, that "Life would be endurable were it not for its pleasures"?—we change the scene from the base of the waterfall on an elevation of 962·8 feet to the heights above, 1,200.5 above mean sea-level, to the source of the volume of smoke we sighted on

* According to Leland: "a certaine bloodewort groweth ther wher the bloode was shedde" of the three score men beheaded by Owen Glendower "on the brink of the Castel garde."
"Bloodwort" is said by Prior (*Popular Names of British Plants*, p. 25) to be the Red veined Dock, *Rumex sanguineus*. *Sambucus ebulus*, Dwarf Elder, on the same authority, p. 63, is said to be "Daneworl" or "Dane's blood."

our approach. Progressing leisurely up the devious incline through a wilderness of bracken, with the fragrant Mountain fern as common as the Male fern, we are impelled in our ascent to halt awhile, fascinated with these lovely flowerless children of the shade, universal favourites, charming us with their graceful forms, yielding perennial pleasure by their exquisite colours, their young fronds sometimes opening with a deep crimson colour gradually changing into the normal green, varying from the palest to the deepest green, and in their decaying hours assuming every shade of ochre, sienna, and even lake, changing as they die into deep brown.

Reaching the plateau above the slope, we find ourselves on a green sward encircled by trees, forming a pleasaunce to a substantial masonry farm-house, Warren Farm. Under the trees we hear the hummings of busy insect life above. The rabbits have been a vanished race for thirty years. The railway, not distant, is here unseen; the postal delivery a matter of unconcern and uncertainty. The Major-domo is absent engaged in gathering in his hay harvest, so long delayed through the parching spring and summer of this year. The gude wife is obliging and accommodating to all visitors. Logs are placed on the crackling fire, and an afternoon tea, provided by the forethought of the President, is served on demand to any one wise enough to accept the cheering cup in this our trysting place.

"Happy, I said, whose home is here,
Fair fortunes to the mountaineer."

Why is it that civilised man is so prone to enjoy a day's gipsying? Whilst evolution keeps pace with civilisation, the influence of heredity will assert itself, and beguile into the primitive nomadic life when man hunted for his daily food by the sweat of his brow. It must be admitted without hesitation that a charming picture was presented by a detachment of the party encamped upon the verge of the precipitous heights, enjoying their refreshments *al fresco* on an aromatic carpet redolent of wild thyme, under the shadow of a Rowan tree, well chosen site, for not yet have Board-Schools uprooted the superstition that "witches have no power where there is Rowan tree wood." A stunted Yew tree. bearing evidence of many a battle with the elements, guards the approach to their Refectory.

Why this sudden stampede? Why this apparent battling with invisible air? Has the enemy entered the camp? A solitary wasp has scattered the host, not the large deep golden coloured *Vespa germanica*, but the small "anchor-faced" English wasp, *Vespa vulgaris*, which has made this year memorable by its ubiquity, for it has literally come upon us in myriads, like a plague of Egypt. Leave the wasp alone; give him some over-ripe fruit, and he, revelling in its juices, will lapse into intoxication; when he recovers he may live to pursue his recognised duties in the economy of nature; he is surely entitled to some reward for services rendered in the early spring by ridding our fruit trees of noxious aphides, flies, caterpillars, and even in this period of the year by intoxicating himself in the scavenging of worthless windfalls, undergoing alcoholic fermentation on decomposition of their sugar. We note that this year 1893 is memorable for its early summer, its long drought, its nearly tropical heat, and its plague of wasps.

We are above the falls: let us leave the parties at their revels, and trace the babbling waters to their source. Descending, we find ourselves in a Fairy Glen, the reign of Nature here supreme. On inaccessible heights flourish Oak ferns, Beech ferns, Stagsborn, Club moss, Male fern, and on an island a majestic Lady fern. Stonecrop and Navelwort fill up the fissures in the rocks, and White Valerian vauntingly displays its terminal panicles conspicuous.

Amidst this revelry of Nature, the art of man has bridged over the ravine with a graceful curve. To-day its arch is but a dry tunnel or empty drain whose soffit sparkles with glittering diminutive stalactites, and whose furrowed abutments show that it is not always thus, for we are visiting the defile after a drought unparalleled in the lifetime of our generation. The piers of the arch, the smooth-worn bed of the brook, the overthrown tangled branches of trees, overgrown with trailing foliage of creepers, here presenting a formidable barricade, there offering a friendly aid in the labyrinthine ascent of the moss-grown dell; the dislocation, at a spot below another and upper waterfall of twelve feet vertical height, of a huge mass of the superficial crust of the earth, evidently undermined and fallen from its higher estate, reclining at an inclination of 45 degrees, whilst all rocks around preserve a strictly horizontal formation; all these are indications that sometimes here is a rush of more mighty waters. For an object lesson, visit this spot after heavy rainfall, and see the miniature brooklet transformed into a mountain torrent, carving out the ravines deeper and deeper still.

> "And surely the mountain fadeth away,
> And the rock is removed out of its place,
> The waters wear away the stones:
> The overflowings thereof wash away the dust of the earth."
> Job, chap. xiv. v. 18, revised version.

Still scrambling and toiling happily through the ravine, pursuing upwards the course of the gradually diminishing runnel, the murmur becomes a tinkle, and as the banks approach closer its music is silent. We pause, bewildered. Here the source appears to arise from a spring in the plateau on the left; elsewhere it is re-discovered higher and higher still—we cease to wonder that so many centuries have failed to discover the source of the Nile! See here, in this baby rivulet, again and again the stream is lost to view, only to reappear purified after passing through a natural superficial filter bed, or through a treacherous green bog of Sphagnum moss on the treeless expanse of hillowy elevations and breezy moorland.

Let us retrace our steps to the bridge over the stream, an enchanting spot. Surely here must be

> "Where elves hold midnight revel,
> And fairies linger still."

See on yonder islet the Lady fern, her graceful fronds mirrored in surrounding silver pool; the crystalline brilliancy of curving miniature waterfalls, with there a sparkling rainbow playing o'er foam crested wavelets. Halt! Hold solitary communion in this Grand Cathedral of Nature. Such hand-in-hand fellowship is sweetening to the temper, and prompts us to advance down stream for further study of her secrets. In the bed of the defile a huge monolith obstructs, a natural

warning beacon, on which seems inscribed "Lasciate ogni speranza, voi ch'entrate," Leave every hope (outside), all ye who enter (here), standing sentinel at the verge of the precipice over which the stream, pursuing its headlong career, *breaks its neck*, adown the slope in a ruffled sheet of spray, only to rise again, first foaming, soon smiling, thence, fickle travellsr, babbling with ceaseless splash along the valley to mingle in frolic with the Summergill Brook, passing south of New Radnor to form the Endwell River under the heights of Knill Garraway, (by the charming spot, Knill Court), and to feed three miles below Presteign the River Lugg, a tributary emptying near Mordiford into our beautiful Herefordshire Wye.

Are here no birds to charm us with their melody? Man has made himself a suspicious enemy to the feathered tribe by his ruthless mistaken persecution—they shun him. The outlawed clan of pirates here have a sanctuary. A solitary Raven, king of his tribe, dreamily soared above, but uttered not his harsh croak, omen of evil. A huge Hawk sailed with motionless wing in high air, his keen eyes idly surveying on his forage the wide expanse. Kites and Buzzards have found fresh fields and pastures new since the rabbit warren was abolished thirty years ago. The Wheatear flicked his white tail over the bushes, and the more rare Ring-Ousel was disturbed in the valley. On the hills peaks of Red Grouse—one strong pack of 18—were startled by the visitors. And in all this vast expanse is there found no welcome to persecuting man? Yes, most charming sight and sound of all. Amidst all the revelry, a confiding Robin scanned us with his bright black eye, and, as we stayed our passing steps in admiration of his perky ways, he jauntily gave utterance to sweet treble melody. Oh, Robin! gay deceiver! since we knew thee better, and found thee at heart a pugnacious little brute, our youthful sentiments have changed: with all thy faults, we love thee still.

Nought comes amiss to him who cultivates familiarity with nature. One naturalist goes in quest of shells of land, and fresh-water, molluscs. Here *Limnæa peregra*, var. *lacustris*; *Ancylus fluviatilis*, var. *albida*; *Chilotrema* (*Helix*) *lapicida*; and a host of others more common are found, and taken home for observation, not crushed beneath the feet.

Despise not the gatherer of snail shells. On the authority of Cicero, such men as Scipio and Lælius have not thought such a pursuit beneath their notice in their hours of relaxation. Is not the Cowrie used as money? Is not the common Clam (*Venus mercenaria*) used in commercial transaction by the North American Indians. Is not the Cameo cut from the Queen-conch of Madagascar and other species of the genus *Cassis*? Is not the Pearl—although the result of a diseased secretion—valued as an adornment of great price and beauty? Is not the Oyster a delicacy to the epicurean palate of the man of the period? and was it not a chief staple of the food of prehistoric man? Is not the snail of our largest native land shell, *Helix pomatia*, a favourite dish to those who have dared to encompass it? Has not many a rustic pinned his faith on the snail and its pulverized shell as an antidote to consumption, long before the microscope revealed the myriads of tubercle bacilli? Does not the slug-like *Testacella*, with its little cap (apology for a shell) upon its tail instead of upon its head, benefit our garden produce by its

non-vegetarian diet of worms? Did Brunel evolve the Thames tunnel from the burrowings of the ship-worm, *Teredo navalis*? Has our iron-clad Navy arrived by a process of evolution at its present supremacy from the primitive sailing boat, supposed by the ancients to have been invented by a close observer of the *Nautilus pompilius*, exposing, from without its chambered shell, its numerous tentacles to the favouring breezes? If we gather shells from youth to age let us not throw them one by one away. In them there is much for the student to observe, and for the philosopher to admire.

Some few of the more active and adventurous explored the wide breezy uplands and scarped dingles of the almost treeless Radnor Forest, attaining an elevation of 2,166 feet at the Ordnance trigonometrical pole. A treeless forest on first thoughts savours of *lucus a non lucendo*. This is no misnomer, since a forest it is both legally and technically, although for the most part bare of trees. By an inquisition of the foreet of Radnor taken on October 3rd, 1564, in the sixth year of Queen Elizabeth, it "consisted of 3,000 acres, extending in length about three miles, namely, from Maes Moelyn to Sarnau Cerrig, and one mile and a half in breadth, from Quarrel Rhys ab Dafydd to Stalbaig." From Domesday Book we read that "The King holds Radnor, Earl Harold did hold it. It contains fifteen hides which are and were waste grounds. In this land are thirty carucates. Hugh Lasne saith that Earl William gave this land to him, when he gave him the land of Turchil, his predecessor."

Whatever lands the Norman hunters chose to denominate wastes, they declared should be forests. The etymologist derives the word forest from the mediæval Latin word *Foresta*, which is said to appear first in the Capitulars of Charlemagne. We may add that there may be an extensive continuity of primeval woods not entitled to be designated a forest. In English legal phraseology the term forest was from an early period applied to a royal hunting ground, and, according to Manwood, its essential characteristic was that it was set apart for the conservation and huntiag of game. It must either have beasts of venery, such as hart, hind, hare, boar, and wolf; or beasts of chase, such as buck, doe, fox, marten, and roe; otherwise it is no forest at all.

From Warren Farm House, as a centre, Vron Hill rises on the north-east 1,716 feet; Mynd, locally pronounced Mund, half a mile south 1,568 feet. To reach the highest elevation of the Radnor Forest, the pedestrian must proceed directly north from the hill, Crin Fynydd, on which Warren Farm House is situated; still advancing, keeping Warren plantation on his right-hand, ascend the spur, at least one mile in length, in front of him, called Esgair-Nantau; thence for the next mile bear a little east of north, when he will find himself after a walk of two miles and a half at a trigonometrical station of the Ordnance Survey, on an elevation of 2,166 feet. Crin Fynydd, immediately above Warren Farm House, rises to 1,457 feet, and half a mile further west, Nyth Grûg rises to 1,767 feet. In the valley between these two latter elevations is collected, in the Cwm Du, the waterflow which forms the source of Water-break-its-neck Falls, emptying in the valley below into the Summergill brook which, flowing south of New Radnor and becoming the Endwall, supplies the Hindwell brook which, flowing through the

parish of Knill between Knill Court and Knill Garraway, and thence by Broadheath, forms a tributary of the Lugg about three miles below Presteign. The Lugg falls into the Wye on its left bank at Mordiford, four miles distant by road below Hereford.

The ford at the base of the falls of Water-break-its-neck is 962.8 feet above mean sea-level; the Warren Farm House on the heights immediately above the falls stands on an elevation of 1,200·5 feet.

The following elevations of the principal hills in the neighbourhood of New Radnor are all taken from the Ordnance Survey Maps, on the scale of six inches to one mile:—Radnorshire Sheets, xxiv., N.E., xxiv., N.W., xxiv., S.E., and xxiv., S.W.; whilst the distances given are horizontal distances only, or, "as the crow flies." Half a mile north is Knowl Hill, 1,270 feet high. One mile and a quarter N.N.W. is Whimble Hill, rising to 1,965 feet, standing out as a prominent Knoll, conspicuous from the north-west parts of Herefordshire, and singularly so from Wapley Camp, 1,100 feet high on The Warren. About five hundred yards due north of Whimble are the Whinyard rocks, 1,629 feet high. Bâch Hill, two miles north of New Radnor, formed a trigonometrical station on a height of 2,002 feet. The Smatcher Hill, immediately south of New Radnor rises to 1,396 feet.

Some of the naturalists with their geological hammers were busy in search of fossils; nothing however of special interest was found to-day. At Water-break-its-neck the formation of the Upper Silurian rocks passing upwards from Wenlock shales into the Lower Ludlow series is represented. See Symonds' "Records of the Rocks," pp. 162 and 186.

Some members of the party in their botanical pursuits explored the heights, and made friendly barters with the aborigines on their native heath, commercially engaged in gathering bilberries or whortleberries, locally called whinberries, and in the north known as Blaeberries or Blueberries. What confusion reigns over the names of these fruits of the moorland!

The name Whortleberry is applied to the *genus*, also to the berries of *Vaccinium myrtillus*, which are globular and nearly black, and has its rosy waxen flowers solitary on peduncles. Its leaves are deciduous, ovate, seldom an inch long.

Vaccinium uliginosum or *Bog vaccinium* is more woody and branched; its leaves deciduous, entire and thin, are smaller. Its pale pink flowers are solitary on peduncles, and are smaller; its berries being similar in size and in colour.

Vaccinium vitis-idæa, Red whortleberry, and Cowberry, has evergreen leaves, like those of the box, its stems branched and procumbent; its elegant white flowers, streaked with hues more or less red in proportion to their exposure to the sun, several together in short, terminal, drooping racemes; its berries red.

The *Vaccinium oxycoccos*, or Cranberry, also has globular red berries: its stem creeping, more slender and wiry; its leaves small, evergreen, lanceolate, edges rolled back, and the under side very glaucous; its delicate rose-coloured drooping flowers with corolla turned back, resembling the flower of the potato.

All these latter four plants belong to the natural order *Ericaceæ* or the Heath family.

The Common Bearberry, *Arctostaphylos Uva-Ursi*, seems to range naturally with the *Vaccinia*, and belongs to the same order. Its fair pink blossoms hang in a cluster from the end of the stem; its berries are bright red, globular, smooth, and shining. The leaves are dark green above, lighter below. A decoction of its leaves, which, when dried, have an odour of green tea, is beneficial in disorders of the kidneys.

The Crowberry or *Empetrum nigrum*, with black globular berries, about the size of a pea, belongs to quite a different natural order—*Empetraceæ*. It is a glabrous plant, growing in thickly branched tufts; its flowers sessile and very minute: its leaves evergreen, very small, scarcely two lines in length, and very crowded; its leaves so minute that it is often mistaken for the Cross-leaved heath, *Erica tetralix*. It was found to-day.

The following were met with: the fine-leaved Heath, *Erica cinerea*, with smooth stems and leaves in whorls of three with clusters of minute leaves in thin axils, its flowers also in whorls; the cross-leaved Heath, *Erica tetralix*, or "Bell-heath," with leaves in whorls of four, waxen-looking pink flowers gathered into a dense head at the summit of the stem; and the Heather or Ling *(Calluna vulgaris)*, distinguished from the Heaths by its bell-shaped corolla being concealed by the longer equally coloured calyx leaves, below which are four bracts which resemble a calyx; its very minute densely packed leaves are triangular, overlapping each other. The prospects of one fair lady were brightened by gathering a white blossoming heath, prognosticating good luck. Would that the wind "that kisses all it meets," assisted by the busy bees and other insects, would disperse its pollen more profusely! Truly the white flowered heath is too rarely found.

Professor Tyndall's love for the purple heather has become well-known.

It is recorded that Sir Walter Scott said he should die of melancholy if he passed a year without seeing the purple heather in blossom at least once. The passion, however, for the "bonnie ling" is not confined to literary men.

The sunlit distant moorland is aglow with the bright golden Gorse, the plant before which Linnæus in ecstasy knelt, for its beauty thanking God. Gorse is called Furze in the South of England; in Lancashire and in the north-eastern and eastern counties it is known as the "whin."

> "The hills are heathy, save that swelling slope
> Which hath a gay and gorgeous covering on,
> All golden with the never bloomless furze."

"Never bloomless," how kindly accommodating to lovers who are told "When the Gorse is out of blossom, then is kissing out of fashion." We are encouraged to hope such a blighted era may never happen, when we consider that there are two distinct species of Furze, the Great or Winter Gorse with pale yellow flowers, blooming from October to May, and the Dwarf or Summer Gorse with smaller flowers of a deeper golden yellow which takes up the running from May until October. The young Gorse, excellent feed for sheep, is a harmless trefoil seedling, only in more advanced age developing its murderous prickly spines.

Seas of bracken, chrome and ochre-coloured after the long drought, suggesting the premature approach of the pastoral beauty of autumn, fill up

the loveable picture, elevating to grateful reverence of that creative Source of Nature, the Architect of the Universe, "Who bringeth forth grass for the cattle, and green herb for the service of men."

Truly an ideal summer day proved this our Ladies' Day. Who shall say what they have lost who tarried at home? This we know; they have lost the enjoyment of its beauties, its teachings, and its pleasures with him who

> "Wandered away and away
> With Nature, the dear old nurse,
> Who sang to him night and day
> The rhymes of the universe."

Woolhope Naturalists' Field Club.

THE SUPPOSED ROMAN BRIDGE IN THE GROUNDS OF THE NEW WEIR, KENCHESTER.

By H. C. Moore.

Read at The Ladies' Day Field Club Meeting, July 27th, 1893, at Water-break-its-neck, near New Radnor.

On the left bank of the Wye, in the grounds of the New Weir, Kenchester, a mass of ruinous stone masonry is to be seen, which from time immemorial, or so far as traditional history reaches, has been called "The remains of the old Roman bridge." Under that title the late Dick Jordan, his sons and his boatmen, have always carefully pointed out its situation to tourists rowing down the Wye from Hay to Hereford. Under these circumstances, I have a few times seen the masonry, and have always unhesitatingly accepted the information as likely to be true. It will readily be admitted that an oarsman, after having rowed twenty-three miles from Hay, and arrived within six miles of his goal at Hereford, would not be likely to be in the disposition to halt long and examine the surroundings. Moreover, the banks are steep, 15 to 18 feet high, overgrown with tangled branches of briars and formidable bushes, difficult of access in a flooded state of the river, and the ruins stand upon private grounds.* All these circumstances combined have rendered an exploration attended with at least sufficient inconvenience to cause it to be deferred to a more convenient season, which, to most, has never arrived. Having recently deliberately examined the ruins, I am astonished that so little could have been known about them, and I am prepared to assert that—

1. There never was a bridge across the river in this locality, neither of stone, nor of timber.

2. The site of the bridge (whether it were a permanent bridge, or a pontoon bridge of boats, or a ferry) was more than half a mile lower down the river, at the bottom of Huff Pool.

* Here surely a member of a Naturalists' Club may be pardoned for a short digression in a footnote. In August, 1891, I found at the base of the upper masonry abutment a plant of *Atropa Belladonna*. Hereby hangs a tale. Some twenty or thirty years ago, there came under the treatment of the late Dr. Bull, a patient from this neighbourhood, a fisherman, whose symptoms indicated poisoning from Belladonna. A sample of the berries of which he had partaken was seen. The question arose, where did he gather them? In vain for many years did Dr. Bull, the Rev. Augustin Ley, and other botanists endeavour to find the plant. No wonder, if it came from this steep bank, so difficult of access except in dry weather, or from a boat on the river.

1. On April 27th of this year, 1893, an exploration party, consisting of the Rev. J. O. Bevan, Mr. R. Clarke, Mr. W. Pilley, and myself, examined the whole locality under the favourable conditions of an unprecedentedly low state of the river and clearness of the water after two months' drought. We had a boat lent us by the tenant, the Rev. Lawrence Panting, the services of one of his men who had lived in the neighbourhood for the last fifty years, and a long iron-shod pole for the purpose of sounding the bed of the river. Photographs and measurements of the abutments were deliberately taken, and the bed of the river was sounded and carefully examined.

The abutments were found to be two in number, running out into the river parallel to each other, at right angles to the bank and to the direction of the stream. The interval between them was 18 feet, and the lower abutment projected into the river for a distance of 12 feet beyond the vertical face of the upper abutment. They were formed of excellent masonry with large stones, axe-dressed and roughly squared. The concrete which formed the filling in or backing of the upper abutment, being exposed, was found to have become very hard, denoted great antiquity, and contained numerous close textured tiles, generally with flanges, which after having been submitted to the authority of Mr. F. J. Haverfield, of Christ Church, Oxford, have been pronounced to be Roman. The vertical face of the upper abutment, looking towards the river is 12 feet wide. At about the height of 10 feet above lowest summer level it has an offset of six inches, the portion above the offset being also vertical. It is necessary to mention this fact, because in August, 1891, it was erroneously stated (the wish being father to the thought) that the spring of the first arch of the supposed bridge had been distinguished rising from this offset.

The diagram exhibits the vertical side, facing the river, of the most northerly or upper abutment.

The lower abutment is in a more ruinous condition than the upper, and its angles are disguised owing to their being covered with a layer of calcareous tufa (travertine) derived from the cornstones in the heights above. This travertine is exhibited in various stages of growth from its earliest development, covering mosses and other vegetation, to its conversion into extremely hard carbonate of lime. Upon the removal of portions of this travertine coating, the face of the lower abutment was calculated to be 18 feet in width.

A little above these masonry structures there is a curve of the river, causing this left bank, in the concavity of the bend, to have been for centuries the bank most exposed to the violence of the stream, which has more or less ruined the abutments. Upon this side of the river, extending to a distance of 12 yards below the abutments, we find large stones generally about 2 feet square (though one certainly attained a length of 3 feet) strewn all along the bed of the river; many of these stones have lewis-holes in them for the purpose of raising them. Whereas, on the less exposed opposite right bank, in the convexity of the bend, where any structure would have remained as a testimony for centuries after those on the left bank had been washed away, there is neither trace of abutments, nor of foundations of intermediate piers; not a single stone was found on this side of

the middle line of the river, here about 60 yards wide. This is as positive proof as can be adduced that a stone bridge never crossed the river here.

It is just as positively certain that no timber bridge crossed the river here. The Romans were in the habit of building bridges on piles shod with iron. Such piles have been discovered at Necker, near Heidelberg (see letter from Prof. Wilhelm Ihne in *Athenæum*, Nov. 16th, 1878. See page 64 of Caii Julii Cæsaris de Bell. Gall. Comment IV., V., A. G. Peskett. Pitt Press Series.) On the day of our exploration the water was perfectly clear, and only a foot or two in depth hereabouts. The bottom of the river was visible throughout, and upon examination was found to be a nearly horizontal bed of rock. If even the timber had perished, or been washed away, some trace of the foundation holes of one or more of the piers would have remained. Moreover, there is no trace whatever of any road of approach on the south or right side of the river, from Canon Bridge, in the parish of Madley.

For what purposes then could these massive masonry abutments have been built? Most probably as a landing place or quay. The interval of 18 feet between them affords ample space for a large boat. The only records extant on the navigation of the Wye are contained in the pamphlet published in 1873 by Mr. John Lloyd,* and although we cannot from these papers localize any corn mill, fulling mill, weir, pens for water cranes, or pens for water courses, in this particular locality, nevertheless it is possible that some buildings connected with the navigation of the river, or even one of the "fifty mills on Wye," may have occupied a position here. There are recorded, on page 44 of this pamphlet, as known to be in existence, 1665 to 1695, "Weares upon Wye, brot. down by the Act of ye 7th and 8th of William 3rd.

Monington
Bridg
Suggas
} All above Hereford."

And on page 14 amongst the list of the mills and wears, &c., &c., existing in 1665,

"2 Att Monington Wear (Monnington)
2 Att Brye (Bridge Solers)
3 Att Suges, Mr. Simenens (Sugwas),"

Mr. Simenene being an ancester of our present Mayor, Mr. F. R. Symonds. Middle-aged persons bear witness to barge traffic up the river so far as Hay, twenty-three miles up stream. Until shortly after the opening of the Railway to Hereford, a considerable river traffic was carried on between Hereford, Chepstow, and Bristol, by the Mayflower, John and Mary, Eliza, The Hereford Sloop, The Trader, and other barges. In a Ship Merchants' Account Book of 1826 to 1828, I find consignments, generally of timber and planks, from Canon Bridge in barges such as James, Charles, John and Mary, Eliza, and James Ward's large barge which traded to Chepstow and Bristol.

It may here be brought to the recollection of our members, in connection with the immediate vicinity of these two abutments, that the buried masonry basin of

* "Papers relating to the History and Navigation of the Rivers Wye and Lugg, by John Lloyd." Printed in 1873, at the *Hereford Times* Office.

The upper of the two masonry abutments on the left bank of the river Wye, in the grounds of The New Weir, Kenchester.

four or five steps leading to a permanent spring, discovered in August, 1891, three feet below the ground level (see *Transactions*, 1891, page 244 for plan and section), is situated about 50 yards below the abutments; that an excavation, made parallel with the river bank, cut obliquely across a road from 10 to 12 feet wide, between this basin and the abutments, that this road was buried about 18 inches below the present ground level; that there is sufficient space here for a small building, for instance a small warehouse, or a small villa; and that the ground rises quickly to a commanding elevation about 60 yards distant, from which small landslips, or detritus after heavy rains, may conceal other as yet undiscovered works of men, in connection with this recently unearthed handiwork.

2. Let us now turn to the consideration of the existence of a bridge of timber, or other way of communication, more than half-a-mile lower down the river, at the end of the reach which extends from the New Weir down to Huff Pool at the next bend of the river. A personal observation of the ground, and an inspection of the map, will show that this site is the direct prolongation of the old Roman Road in Madley parish called Stons Street. This road from Abergavenny (Gobannium) to Kenchester (Magna Castra), in the present day in use for five miles from Brampton Hill to three quarters of a mile distant from Huff Pool, extended down to the river at Huff Pool within the memory of living witnesses. James Lloyd, as a youth, less than half a century ago, often traversed it in awe of many a gipsy encampment, amongst which tribe he represents it to have been a favourite settlement. He resided at Canon Bridge, and accounts for its disuse by the fact of its having been ploughed up and annexed by Messrs. Jones and Lee, or Lea, of Canon Bridge, up to the present boundary between their respective properties and that of Sir Joseph Pulley, of Lower Eaton.

The accompanying plate, from a photograph taken by Mr. Robert Clarke, represents the boundary fence where the continuation of Stone Street terminated at the river bank.

On the same day of exploration, namely April 27th, we found at the distance of 20 yards above this boundary fence, where the water at lowest summer level is 12 feet deep, about fourteen piles in tolerably close arrangement, extending to a distance of 15 feet from the bank. Some of these piles were vertical, but generally in an oblique direction, of enormous scantling, two of them, notwithstanding their immersion for an unknown duration, at least 12 inches square; and a few yards further up the river are large timber baulks lying horizontally, like steps.

Could we only have discovered in this situation a row of intermediate piles extending across the river, we should have had proof of a bridge on timber piles. The result, however, of an examination of the river bed on another occasion, on May 12th, in company with Mr. Cockcroft, our librarian, proved negative; the only information obtained by fathoming with an iron-shod pole was that the bed of the river was mud, and that its general depth varied from 12 feet at the banks to 13 feet in the deepest part at lowest summer level.

The descendants of the skilful military engineers who overran Gaul, and who (as recorded in Liber iv., cap. xvii. of Cæsar's Commentaries on the Gallic War),

constructed in the short space of ten days, including falling, preparing, and transporting the timber, a timber bridge over the Rhine, probably at Bonn, where the river is 530 yards wide,* would have found it comparatively child's play to span the 60 or 70 yards of the Wye here. Calculating a width of from 8 to 10 yards from pier to pier, for each bay of Cæsar's bridge, five or six piers would have sufficed to cross the Wye, whereas about 60 piers must have been constructed to cross the Rhine at Bonn, the locality of Cæsar's bridge as fixed by Napoleon and others.

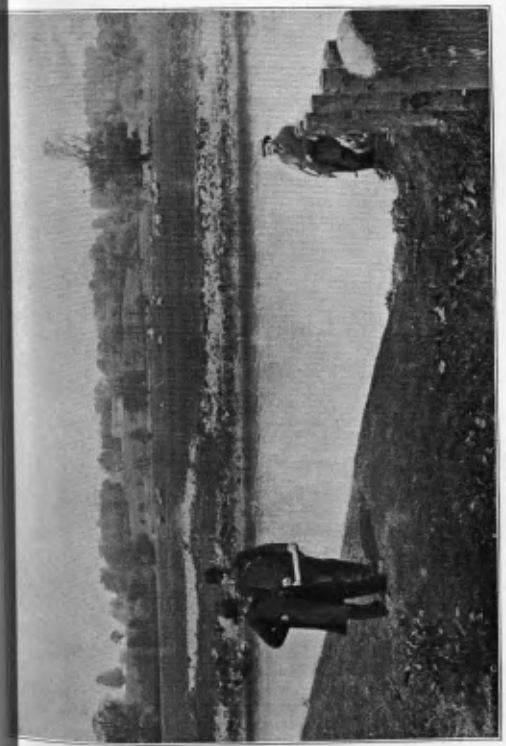
We have no records in our own country of ancient bridges reaching to a period so far distant as the Roman occupation—say to 400 A.D. The earliest record of a bridge over the Thames given by the Saxon chroniclers carries us back only to A.D. 1017 (Vine's Cæsar in Kent, 2nd edition, p. 229), when "Cnut the Dane, invading London with a fleet to dispossess Edmund Ironside, found himself unable to pass the bridge over the river at London, which the citizens had strongly fortified. He consequently cut a canal on the south side of the river, deep and broad enough to convey ships above the bridge."

We have adduced evidence bringing the Roman road to the Wye at Huff Pool. On April 27th, our party, having crossed the river in the boat, discovered its continuation on the opposite side of the river, leading directly over the "Wye Meadow" on Mr. Charles Hardwick's land, between his French barn and his residence, the Old Weir, to join the present existing Roman road, where it crosses the Hereford and Hay road, just opposite the entrance gate to the Old Weir. Keen eyes discovered in the Wye meadow two low parallel ridges, distant from each other about 12 or 15 feet. On the day succeeding our visit of exploration, Mr. Hardwick dug a trench transversely across these artificial ridges, with the result of discovering, at the depth of 12 inches below the surface level, a thickness of 12 inches of gravel, extending for a width of 15 feet. As a counter experiment, he dug a hole 10 yards distant. Not a single stone was found in the natural sub-soil loam. The existence of a buried road was so obvious as to preclude the necessity of further excavation.

To conclude; although we cannot go so far as to declare that these fourteen massive piles on the Canon Bridge side of the river at Huff Pool are the foundation piers of an ancient bridge over the Wye, yet the discovery of the buried road upon the opposite bank in the grounds of the Old Weir, in a direct prolongation of the old Roman road called Stone street, enables us to assert that there must have been some method of communication between the two opposite roads.

Nothing has ever been discovered to give a shadow of suspicion of a stone bridge having existed here—in fact, the foundation bed of the river, and its depth here, render it an unfavourable site for a stone bridge—therefore the access must have been either by a temporary pontoon bridge of boats, or what is more probable, over a fairly permanent timber bridge, which has been washed away by floods, here in the present day sometimes attaining a rise of 20 feet, and other vestiges of which have been removed by fishermen. James Lloyd's information comes again to our support. He remembers the fisherman, William Terry of Hoarwithy, who used to net for Mr. Jones of Canon Bridge, occupying all his spare time in sawing and removing timber obstructions at the bottom of Huff Pool.

*The average depth of the river between Coblenz and Andernach is 16 feet, and at Xanten 18 feet.



The right bank, or the south side, of the river Wye is represented in the foreground at the termination of the old Roman road called Stone Street. On the left bank, or north side of the river, is the large Wye Meadow, in which the buried road was discovered, leading in a direct straight line (between the barn on the right and Mr. Hardwick's residence, The Old Weir, on the left), to the camp of Kenchester (Magna Castra).

THE GENUS ACRONYCTA AND ITS ALLIES.

By T. A. Chapman, M.D.

The genus *Acronycta* contains species that are individually of considerable interest, and as a group, presents many points of attraction, both to the systematist and to the field naturalist. My own attention was drawn to the group many years ago. In rearing *Simyra venosa (Arsilonche albovenosa)*, I felt convinced that its relationship to *Acronycta rumicis* was much closer than was recognised; and the curious brotherhood of *psi* and *tridens* always had a fascination for me; then, some years ago, in rearing *A. alni* the variation of one specimen in the number of its moults, a subject I felt interested in, made me desirous of more closely studying the group. It is only recently that I have been able to do so, and in these notes I propose to record some of the results.

So far as I know, no details such as I have brought together of the earlier stages of the Acronyctidæ have been published in England, nor indeed, on the Continent; but this is merely a confession of my ignorance of Continental literature. The imagines have been abundantly dealt with, and the full-grown larvæ will no doubt be exhaustively treated in an early volume of Buckler's larvæ. I have therefore rather passed these stages by in recording my observations. As I gained knowledge and experience of the group I found that I had missed in those species first dealt with, several points worthy of note, and of all, I am not so industrious in taking full notes as not to leave much to be desired.

I may refer here to a paper in the *Transactions of the Entomological Society* for 1879, by Mr. A. G. Butler, which propounded such extraordinary ideas that I felt it was necessary that further research should confirm or refute them, and I may say at once that it proves to be a case in which one's natural suspicion is well founded, and not the result of mere prejudice and habit.

Although the genus *Acronycta*, as represented by our British species, naturally divides itself into three very distinct and well-marked groups, and though some species, hitherto placed in separate genera, such as *venosa* already referred to, seem closer to one of these groups than these groups are to each other, the genus, without precisely defining its limits at present, is very distinct from other families of the Noctuæ and from any group of Bombyces. Some of the outlying species that have at different times been referred to this group, present some difficulty in deciding whether they really belong to the Acronyctidæ or not, and with what other groups they have more or less affinity—such species are *orion*, *coryli*, *cæruleocephala*. But leaving these for the moment on one side, and confining our attention to the species more typical of the genus and group, we find certain points of affinity throughout all their stages that bind them together and distinguish them from other families.

The egg is low dome shaped, that is, it consists of a segment of a sphere, always less, usually much less, than a hemisphere, lying on its flat side, and ribbed from the summit to the circumference in a way that I have learned to

regard as characteristic of NOCTUÆ, though I am not able to distinguish it by description from that met with in other groups; the typical NOCTUA egg, though ribbed in this manner, is usually more or less spherical.

The most characteristic stage is the newly-hatched larva. It tends to have certain segments pale and others dark, but in all cases the eleventh segment is paler, smaller, and "weaker" than the rest; it is occasionally a little broader than the others, but it is always lower and flatter, and its tubercles and bristles are smaller and less developed. This relative development of the eleventh segment persists in many species throughout the life of the larvæ, even to the full-grown period; in *alni*, for instance, this segment has no clavate hairs.

I may note that I describe the head as segment one, as is, I think, now universal; but I mention the matter, as I find descriptions of *Acronycta* stating the *eleventh* segment to be large, tuberculated, etc., these count the segments, omitting the head, and refer to the large *twelfth* segment.

The pupa is less characteristic; it serves rather to divide the genus into the three characteristic groups I have referred to than to define the group as a whole. The pupa of the *rumicis* group is very characteristic and rather bombyciform in its aspect. The others are more of an ordinary NOCTUA pattern, but present features that separate them from other families. This is perhaps a somewhat rash statement to make, since I must confess my knowledge of NOCTUA pupæ is of a rather superficial character.

Of the imago I find my superficial knowledge of other groups compels me to speak with much diffidence. Still I think the dagger mark at the anal angle has some distinctive features. Below the median vein there follows another, usually, I think, called the first sub-median; but in the long space between these, extending from the base to the hind margin, there is sometimes another, or "intermediate" vein. This is very distinct in *Liparis monacha*, the arched black marks in which show the spaces on each side of this intermediate vein, between it and the median on the one hand and the sub-median on the other, to be of equal value with the other spaces between the veins.

In *Acronycta* this intermediate vein is represented by a trace only, towards the hind margin, and the spaces above and below it are reduced to less than two spaces, but are still rather more than one, the vein is marked by the line of the "dagger" (take *psi* as an example) and the fringe presents two black marks, one for each inter-space, placed closely together, and not regularly spread as in the rest of the wing. In what I take to be a typical NOCTUA, this intermediate vein is entirely wanting, but there are several groups in which it may be found, not so distinctly as in *Acronycta*, but in which, nevertheless, it might be described in almost the terms I have used in regard to that genus. The ORTHOSIDÆ and the genus *Xylina*, occur to me as such instances.

Acronycta certainly has some affinity to the BOMBYCES, probably most to *Liparis*, and the genus *Cymatophora* appears also to have relationship with other groups regarded as true BOMBYCES, and for these reasons the genera *Acronycta* and *Cymatophora* are placed in contiguous families; this is unfortunate, as I am convinced they are in no way related, not so much so, perhaps, as *Plusia* is to

Leucania. I hardly know in what points they agree, whilst the ova are very distinct, that of *Cymatophora* and *Thyatira* being more of a *geometrid* (or perhaps *Bombyx*) pattern than that of a NOCTUA. If the CYMATOPHORIDÆ were placed in the BOMBYCES, it would not materially increase the heterogeneous character of that division.

Acronycta, as represented in Britain, divides itself naturally into three sections, which really are distinct genera rather than sub-genera.

The first of these is the *Rumicis* group, consisting of

1. Auricoma.
2. Myricæ.
3. Menyanthidis.
4. Venosa.
5. Rumicis.

These are very closely related, and hardly admit of sub-division, although *venosa*, on the ground of the coloration of the imago, may be so separated for convenience.

The second group consists of—

6. Psi.
7. Tridens.
8. Strigosa.
9. Alni.
10. Megacephala.
11. Leporina.
12. Aceris.

This group is not so homogeneous as the first, and may be sub-divided, if fancy so dictates, into sub-genera, of which each species, except the two first, will represent one. Such sub-division might be desirable if one were dealing with the ACRONYCTIDÆ of the whole world. The best character on which to found the sub-divisions will be found in the relative positions of the pale and dark segments of the newly-hatched larvæ.

The third group contains only one species—

13. Ligustri,

and is so different from the others as to justify the doubts as to its being a true *Acronycta* that have been held; it agrees with them, however, in the form and sculpturing of the egg, and in the "weak" eleventh segment of the young larva, though this feature is less pronounced than in the other groups.

The three divisions into which the genus *Acronycta* thus naturally falls do not, so far as I can find, precisely agree with any sub-genera that have been proposed. *Semaphora*, Gn., for the *psi* group, is the nearest, but this genus did not include the whole group, and that Guenée did not fully understand the inter-relation of the species, having chiefly studied the imago, is clear from his placing *alni* and *ligustri* in the same group. I feel constrained, therefore, very unwillingly, to provide names for these groups; and since the pupa most distinctly classifies them, I take the character of the pupa on which to frame the designation.

The first, or *rumicis* group, which is the most typically *Acronycta*, I call *Viminia* (*Vimen*, a barrel hoop formed of a split willow branch), from the hoop-like raised margin of the segments of the pupa, which is present more or less in all, and very marked in some species (*vide* Plate I., fig. 1).

This group is characterised by the eggs being laid in groups, usually in a very regular manner, imbricated, that is, in regular rows overlapping each other,

an arrangement which their flatness permits, and which is precisely the same as in certain PTERIDÆ, but does not occur elsewhere, so far as I know, among the NOCTUÆ, the form of the egg rendering it indeed impossible, though the typical NOCTUA group of eggs is laid in the same order, but being spherical (more or less) are side by side instead of overlapping.

The young larva is of typical *Acronycta* form and colour, in all the five British species being very nearly alike, and very close to the newly-hatched larvæ of *psi* and *tridens*, having the 2., 3.4, 6.7, 10.11, and 13th segments pale, differing from the other groups in having three or more hairs on the anterior trapezoidal tubercles. The full-grown larva tends to be hairy by having many hairs on the tubercles, the rest of the larva being comparatively free; *auricoma* and *menyanthidis* are typical in this respect.

The pupa is (with the disposition of the eggs) the most distinctive character of the group. It is black or nearly so, of a rough, wrinkled, and warty surface; the free abdominal segments (segments 9 and 10) are of as wide, or even wider a diameter than those in front of them, the tapering to the tail being done in the remaining fixed segments 11-14, giving a peculiar squareness to the pupa. There is a double nodule between the eyes; the posterior margin of each segment, most marked in 9 and 10, has a raised band, just like those barrel hoops that are made of a branch split and with the bark left on, whose smooth surface contrasts with the roughness of the rest of the segment. In many pupæ (NOCTUÆ and others) there is a tendency for this margin of the segment to be free from pits or points, and in some a slight tendency to be raised above the general level, but nowhere else does it assume so distinct a barrel hoop form as in *rumicis* and *venosa*. The anal armature is a projection with somewhat quadrangular termination having the points or spines nearly or quite obsolete, but clothed with a brush of stiff brown bristles (Plate I., fig. 1, pupa of *rumicis*).

This pupa is enclosed in a cocoon of tough, whitish silk, fairly copious in amount, but of one simple layer, usually clothed in fragments of grass, twigs, leaves, etc., and often placed against a stump, stone, or post.

The second, or *psi* group, I propose to call by the name *Cuspidia* (*cuspis*, a spine), as the pupæ are distinguished by a peculiar arrangement of long terminal spines (*vide* Plate I., fig. 2). In this section the eggs are always laid separately and, so far as I know, in the wild state, are laid solitarily. They are not quite so flat as those of *Viminia*. Being laid solitarily, they assume their natural dome shape, whilst those of *Viminia* being laid overlapping each other, and consequently not on a flat surface, take whilst soft a form in which some of the convexity affects the lower surface and are therefore flatter above; essentially probably the eggs in both groups are equally dome shaped: indeed this is clearly apparent when an egg or two in *Viminia* is laid solitarily, as happens occasionally in all species, perhaps most frequently in *myricæ*.

The newly-hatched larvæ in *Cuspidia* always have the eleventh segment pale, but the tints of the other segments differ in different species; in *psi* and *tridens* they are the same as in *Viminia*. In nearly all species the *anterior* trapezoidal tubercles have only one bristle, but two occur in one or two species. The

full-grown larva is in each species a law to itself, but where the larva is hairy, as in *leporina* and *aceris*, the hairs arise chiefly from the general surface, and the tubercles, as bases for bundles of hairs, are not easily distinguished, whilst in the non-hairy species, such as *alni*, each tubercle has one bristle.

The pupa, however, is again the most distinctive stage of the group; it is indeed hard to believe that there can be any relationship between, say, *rumicis* and *psi* (Plate I., figs. 1 and 2); the latter is of the ordinary NOCTUA, smooth, brown, brittle-looking, semi-transparent, chitinous material; it tapers regularly from the thickest part of the thorax to the terminal segments, which are somewhat rounded to finish with, and the sculpturing, instead of being raised points, consists of the ordinary minute pits (Plate I., fig. 2, pupa of *tridens*). The anal armature consists of a system of spines, of which there are a dorsal and a ventral series. I presume strictly, all are dorsal as being dorsal to the cloacal aperture, but in relation to each other, these groups may be most simply so described. The dorsal set consists of two spines, one on either side, but not far from the middle line; only in *aceris* do these tend to be multiplied, apparently by being split up rather than by others being developed. The ventral set is more variable, and consists of three or more spines on either side. These pupæ are not contained in a silken cocoon, but in cavities formed by the larvæ in rotten wood, bark, etc. Some, as *psi* and *tridens*, use rather more silk, and will spin up in *débris* or even go down into earth, if no other resource is available, whilst *aceris*, though loving some dead loose bark or such material, spins an elaborate cocoon almost anywhere; in this respect, and in the anal armature, perhaps, presenting a slight approach towards (or from) the *Viminia* group, and the further gap may, for aught I know, be bridged over by some exotic species.

The third group I propose to name *Bisulcia* (*bis* twice, *sulcus* a furrow) from the double depression that crosses the back of each segment of the pupa (Plate I., fig. 3, pupa of *ligustri*). Having only one species in the group it is difficult to say what characters are generic and what specific. The egg is laid solitarily, and is indeed very like that of *psi*; the young larva is pale throughout, with only one bristle on each tubercle. The full-grown larva does not at all suggest *Acronycta*, being green and semi-transparent, and tapering regularly to each extremity.

The pupa is thick and squat, and has two transverse depressions on the dorsum of each segment; the anal armature consists of short points. The cocoon is of a hard, tough, but somewhat brittle silk, nearly black in colour, and with always some indication of an opening at one end, and sometimes an almost distinct line of division forming a valve for the emergence of the moth.

The perfect insect in *Bisulcia* has a tufted abdomen, and is more polished in wing surface, and the wings are shorter and rounder, so that altogether the moth has a different facies from the other species; but between the other two groups there is no very decided difference. *Viminia* is more robust, and has a rougher aspect than *Cuspidia*, but so indefinite is the distinction that, judging from the imago alone, there would be some temptation to class *megacephala* with *Viminia*, and *menyanthidis* with *Cuspidia*.

The other pupa in Plate I., that of *orion* (fig. 4), differs considerably from any

of the true *Acronyctas*, but not more so than the several sub-genera do from each other. It will be best to deal with it when treating of that species.

Acronycta (*Viminia*) *auricoma*.—This species, so far as my experience goes, is the least common of all our British species; at least I have so far failed to secure living British examples, and have had to be satisfied with the study of specimens derived from continental *ova*. It appears to be somewhat localised in a few spots in the south of England, where it occurs occasionally, tolerably freely at sugar, and though I have heard of no considerable captures of recent years, I have heard nothing to shew that it is dying out. The information I have obtained from several correspondents goes to show that it is double-brooded, probably invariably so, and its being confined to the extreme south is most likely due to this circumstance, the temperature further north being insufficient to secure the double brood.

Several of our *Acronyctas* appear to be usually double-brooded on the continent, or at least in many of the warmer districts; but in England it is their normal habit to be single-brooded, and only *auricoma* appear to insist on being double-brooded. It is therefore somewhat curious that last year I obtained continental eggs of the spring laying, that is, the summer brood that ought to have emerged at the end of July and August, but not one did so; all remained over till this year—proved, in fact, to be simply single-brooded.

It may be convenient to put together my observations on the other species in this matter. *Rumicis* and *tridens* are the only species that I have observed make fairly successful attempts to be double-brooded, but I fancy, in a state of nature, they are usually unsuccessful; that is, that the specimens that emerge in the autumn do not do so early enough to give their progeny time to certainly feed up before winter. The first brood of *tridens* that I reared in 1886 divided itself into two portions, one of which came out at the beginning of August, the other remained over till the following year. This experience has not occurred to me since, nor have I ever had an autumnal emergence of *psi*. *Rumicis* very commonly affords an autumnal specimen or two, and it not unfrequently puts in an appearance at sugar in August, in the south of England.

Sundry species occasionally remain two or more years in the pupa state. I never had any of the *Viminia* group do so successfully. *Psi* and *tridens* have presented two or three pupæ that remained alive till the following year, but failed to emerge. *Alni*, *strigosa*, and *aceris* have never shown any tendency of this sort; but with *megacephala* it is quite frequent, half of a brood sometimes going over to the second year, and emerging as satisfactorily as in the first year, and some take a third winter in the pupa state. *Leporina* also goes over a second year easily and successfully, but in a smaller proportion of cases, and rarely takes a third year. *Ligustri* remains over sometimes, but has so far in my hands failed to emerge.

The egg of *auricoma* is laid in the imbricated manner characteristic of *Viminia*, but, like *myricæ*, in smaller groups than in the others, and with more frequent single specimens. It is 1.1 mm. in diameter, and about two-sevenths of this in height, the ribs are fifty-seven to sixty in number, and are waved or

crenulated as in the other species; pale creamy when first laid, it passes into a rich reddish chocolate brown, with numerous white or creamy spots, which are more regular and distinct in outline and distribution than the pale markings are in the other species of *Viminia*. In several instances my drawings of the eggs of *Acronycta* have not been taken at the best point in the development of the markings, which, after reaching their best and most perfect stage, rapidly became confused and obscure again as the young larva within matures.

In this clearness and distinctness of the rounded white spots this egg comes nearer, in general aspect, to that of *alni* than do any of the other species of *Viminia*, but the spots are smaller and more numerous than in *alni*, the outer or marginal set forming a tolerably complete ring of small spots; the remainder are small enough, but hardly regularly enough disposed to be described as forming two inner rings, besides a few central spots; the central spots are much larger than the others.

The larva when newly hatched is pale, but very shortly the tubercles become black, and are so closely set together as to make the larva appear quite black; it is indeed only as it feeds, so as to separate the tubercles a little, that its proper coloration is clearly seen. It is then apparent that segments 3.4, 6.7, 10.11, and 13 are paler than the others. The form of the tubercles is that due to their being closely packed together, the posterior trapezoidal being wedge-shaped, and, so to speak, pushed in between the anterior trapezoidal and the superior spiracular. As the larva grows from 1½ mm. long to about 3 mm., the tubercles float apart, and the whole larva looks paler; it is now of a chocolate brown, with black tubercles and lighter markings. The pale segments have what seems to be a white mark below the trapezoidal tubercles, and on these segments there is very distinctly a paler area around each tubercle; this is also visible on the dark segments, but very obscurely. The head is black. The anterior trapezoidals are very large, and so assume a very dorsal position, thrusting the posterior trapezoidals into an almost lateral position; they (the anterior trapezoidals) have five to seven hairs each, the other tubercles each one hair; the posterior spiracular and marginal tubercles are very small; the tubercles of segments 5 and 12 are very large, as are the segments themselves, whilst 11, and to a slight degree 10 also, is small, with small dorsal tubercles with only five hairs, very decidedly shorter than those on the other segments, which in length rather exceed that of the larva itself (when full-fed in this skin), *i.e.*, about 3 mm. The dorsal plates on 2 and 14 have each eight hairs.

The cocoon is of rather whiter silk than in most of the other species of *Viminia*, and leaves, twigs, etc., are drawn together to cover it. It presents no distinct structure to facilitate the emergence of the moth.

Details of the pupa are figured in Pl. I., 5.

The characteristic hooped margin of segments is least marked in *auricoma* of any member of the *Viminia* group. This portion of the segment is distinctly marked off by its smoothness from the rest of the segment, and looks raised; but as a matter of fact it hardly rises above the level of the rest of the surface. It also differs in having the nodules between the eyes closer together than in the

other species, and occasionally the nodules are united together (the ordinary form in *Simyra nervosa*). The anal armature, and indeed the whole pupa, is so close to the other species that an absolute description would apply almost equally to any of them. As compared with *rumicis* the mesothorax is not so overhanging, the incisions of the free segments are black. The bristles of the anal armature are shorter, stiffer, darker, and look more regularly placed than in *rumicis*, the upper corners of the square extremity are more rounded than in *rumicis*, and each have two minute points; the fine hairs are smaller than in *rumicis*, and being black easily elude notice, at least on segments 12 and 13.

Acronycta (*Viminia*) *myricæ*.—My acquaintance with this species is not of that intimate character that results from frequently meeting with it in its natural home. I have only once captured the larva in Great Britain, and not unfrequently the same or a closely allied form in Switzerland. I have, however, several times reared the larva from the egg.

I have not learned the precise limits of its range in Great Britain. Its headquarters appear to be at Rannoch, and that portion of Scotland to the north east of Ranaoch. Whether it occurs in the north-west of Scotland I do not know; it does not occur in the south, and as regards the west and south-west my solitary capture was made in Argyleshire, where it must be excessively rare, probably as occasional immigrant, or I should have seen more of it.

It appears to emerge in its northern habitat as early as *rumicis* and its congeners do in the south, that is to say, in the first half of June, or later in some seasons.

The egg is laid in the imbricated manner characteristic of *Viminia*, but in smaller batches, and more often solitarily than in the other species. It differs also by varying in size more frequently than any of the others do. Two adjacent eggs, for example, measured in diameter 1 mm. and 1.33 mm., the average being about 1.15, and the height 0.5 m.m.; the ribs are about 66 in number. The colour is somewhat richer than, say, *rumicis* has, the yellow soon becoming of a pale salmon pink, and passing on to a purplish brown, with paler reddish brown spots; these pale areas are smaller and more irregular than in *auricoma*, but preserve more the form of separate roundish spots than they do in *rumicis*, where they run together and form bands and streaks.

The ribs unite together somewhat regularly as they approach the vertex; there are no transverse striæ, but the ribs are waved or crenulated much as in the other species of the genus.

The newly hatched larva is almost impossible to distinguish by description from that of the other species of *Viminia*; after it has fed a few days each species differs somewhat in the aspect of the pale markings of the pale segments, and can be distinguished when compared together. These differences are fully shown in the drawings of these larvæ. The length is 2 mm., with hairs as long, the hairs are black and vary in thickness, looking nodulated when magnified. The predominance of the anterior trapezoidal tubercles is as fully pronounced as in any other species of the section, presenting themselves as two great dorsal bosses on each of the 5th to 12th segments, and each carrying six hairs, the other tubercles

each carrying one, except the posterior trapezoidal, which has a second short hair. They tend to be angular, as if fitted to each other (as is really the case), as in the other species. The 2nd segment has a plate carrying long hairs, the dorsal tubercle of the 3rd has three hairs, and of the 4th four. The dark segments are rufous in colour, the 11th is the palest of the pale segments, the tubercles are only just less pronounced than in the others. The darkest segments are 5, 8, 9, and 12.

The pupa is black, very like that of *rumicis*, but less pronounced in its markings and processes. The knobs between the antennæ are slight elevations, closer together than in *rumicis*, less so than in *auricoma*. The "hoops" of the abdominal segments are broad and flat, and would hardly be described as hoops, except for the homology with the other species, and the warts of the dorsum are less large than in *rumicis*, and fade away towards the margin sooner. The membrane of the incisions is nearly black. The apical portion of the pupa is larger, more round and bluut than in *rumicis*, the brown bristles are darker, sparser, and shorter, and the hollow in the ventral aspect is deeper; the apex might almost be described as hemispherical, but that the ventral portion of the hemisphere is wanting, owing to this hollow—it is rough, and has several indistinct points along its dorsal margin.

The hairs are exceedingly minute, almost microscopic, especially those at the antennal base; there are also a few hairs on the prothorax.

In Plate II., the details of the pupæ of *Viminia* are shown (*auricoma* is in Plate I.). The differences between the several species are well represented, but are, if anything, somewhat exaggerated. The two anterior nodules are large and near together in *menyanthidis*, smaller and further apart in *rumicis* and *venosa*. The difference in sculpturing shown *(a)* is rather due to a slightly different aspect of each pupa having been taken; all have a tendency to the decided marking on the prothorax shown in *rumicis*, and *rumicis* rarely has it in so pronounced a degree. The "hoops" *(b)* are most marked in *rumicis* and *venosa*, least in *myricæ* and *auricoma*. As regards the anal armature *(c)* the differences are not really quite as marked as shown; all have the stiff brush of brown bristles, and all have certain nearly obsolete spines or points, which in *venosa* and *rumicis* are so placed as to form the angles of a somewhat quadrangular end; in *myricæ*, and still more in *menyanthidis*, the end is larger, more rounded, and the spines or points are less marked and terminal, but they are not so decidedly different from *rumicis* and *venosa* as the drawings suggest. In *menyanthidis*, the bristles are less pronounced and easily lost, but they are usually rather more abundant than shown in the figure. Indeed the degree to which these bristles persist makes much more difference between the species in appearance than the actual pupa, apart from the bristles, really presente; they are, however, more abundant, larger, and more persistent in *rumicis* and *venosa* than in the others. All these pupæ have two small hairs at the base of each antenna; these are also to be found in the other *Acronyctas*, and indeed in many NOCTUA (and other?) pupæ, but are often so fine as to be easily overlooked.

Acronycta (*Viminia*) *menyanthidis*.—This species is one of my oldest and most familiar acquaintances. In the West of Scotland I used to meet with the

larva freely in all moorland districts; I have also found it in the North of Scotland, in Wales (north), and in the West of Ireland. It occurs, too, in the North-east of Scotland and on the moors of Lancashire and Yorkshire, but I do not think it is found in the Scotch Lowlands or at all in the South of England. Like all the species of *Viminia*, it is by no means particular as to its food: it certainly has a preference for *Calluna* and *Myrica*, but will eat various grasses and rushes, sallow, bramble, etc., and after, if indeed after, *rumicis*, it is the most omnivorous of the group. *Rumicis* prefers, perhaps, bramble and sallow to anything else. *Myricæ* prefers ling, but will eat various low plants, such as ragwort, plantain, etc., and is partial to wild-rose. *Auricoma* affects bramble and raspberry, whilst *venosa* is more restricted to reed, *Poa aquatica*, and other marsh grasses. Several Continental species of this group (*Viminia*), and its outliers, *Clidia geographica*, *Simyra nervosa*, etc., feed on species of *Euphorbia*, but this habit does not occur in any of our British species.

The eggs are laid in the typical manner in batches of 20 to 100, closely imbricated, each egg being overlaid by three others. They are flat with about 50 ribs, slightly waved or crenulated; the secondary or transverse ribs, so marked in most NOCTUÆ eggs, are in *Acronycta* nearly evanescent, and are represented by the principal ribs being waved or impressed by alternating hollows on either side. (Plate VII., figs. 6 and 6a.)

The effect of the eggs being so massed together, and by their superposition bringing the exposed portions of the eggs into nearly the same plane, is to give the whole group a remarkable silky lustre, this is equally marked in a group of *rumicis* eggs, and perhaps most of all in those of *venosa*.

The diameter is 1.1 mm.; at first yellowish, they soon become red, and at full colour are perhaps brown rather than red, and get nearly black as the young larva approaches hatching. At their best, they are reddish-brown with numerous paler spots; these spots are very small, and in some specimens very indistinct; towards the centre, 5 to 8 larger spots are arranged somewhat in a circle, those outside this are very small and irregularly disposed. The centre is free from spots and rather darker, and, being where the head of the larva is placed, becomes quite black when the larva is matured.

When just hatched the tubercles are pale, but soon become black, the larva then looking almost entirely black. As it grows, it shows the same pale segments, and much the same colouring as the other species. The pale segments, however, present, not pale colourless, but opaque white, areas round the posterior trapezoidal tubercles. The hairs are black, about twice the diameter of the larva in length, and when magnified look dotted or ringed. When full grown in this skin, it is 2½ mm. long; the largeness of the 5th segment, and the smallness of 2 and 11, together with a habit of holding the head prone, already give a *rumicis* outline to the larva. The white of the pale segments, 3.4, 6.7, 10.11, and, to some extent, segment 2, is so opaque and solid looking as to give the larva a more robust appearance than the other *Viminia* larvæ at this stage. Indications of white circles round the tubercles may be made out on the dark segments; segments 7 and 11 have the dorsal area of the same fuscous-brown as the dark segments. Below

the sub-spiracular tubercles all the segments are of a tolerably uniform tint, somewhat paler than that of the dark segments; the 13th segment has some pale marking around the dorsal tubercles, and is not distinctly of either the pale or dark series. (Plate V., figs. 3 and 4).

The anterior trapezoidal tubercles have 3 hairs on the 3rd segment, 4 on the 4th and 5 on the others, three of the five being longer than the rest: they are largest on 3 and 4, shortest on 2 and 11, the other tubercles have each 1 hair.

All make a pad of silk on which to moult; this is indeed invariable throughout the whole genus; one or two of this species made something almost approaching a tent; they never appear to eat their cast skins.

The pupa (Plate II., fig. 2) is the largest and stoutest of this group, 19 mm. long by 6 mm. in width, its outline is nearer to *myricæ* than to *rumicis*. The frontal knobs are lower, rounder and closer together than in the other species. The hoops of the hooped segments form a distinctly raised band, less pronounced than in *rumicis*, but decidedly more so than in *myricæ* or *auricoma*. The anal extremity is larger and rounder than in any of the others; an indication of the points, that are so evident in, say, *rumicis*, may be detected, but they are somewhat uncertain. The bristles are fewer and shorter than in the others, and more easily lost, so that an impression that they are fewer and shorter than in truth they are, is readily formed. Sometimes they look as if they were dwindled spines, suggesting that such may be the origin of these bristles. This appearance is due to their being shorter and rather thicker than on the other species, but on a closer examination it does not appear to be really the fact. In Plate II., fig. 2 c., the 11th segment is shown without a spiracle, this is of course not the case: the artist's intention, no doubt, is, that this segment is a mere sketch without pretensions to accuracy, just as *rumicis* below (fig. 4 c.) is a mere outline except as to the anal armature itself.

Acronycta (Viminia) venosa.—It must be some thirty years since I first reared this species, and was impressed with its close resemblance, especially as a pupa, to *rumicis* and *menyanthidis*, with which species I was very familiar, and whose differences from *psi* and *leporina*, the other species of *Acronycta* I knew most of, were so much greater than separated them from *venosa*. It was therefore with much pleasure that I received a batch of fertile ova from Mr. W. H. B. Fletcher, after having in vain tried to secure ova from moths reared in captivity. I may have something further to say about the pairing of *Acronyctas* in confinement, a subject on which, however, I am still nearly as much in the dark as my experience of *venosa* would appear to indicate; for with this species I have entirely failed in three several years; yet Sepp relates that he obtained two larvæ. These happened to emerge together, a male and female, and, pairing, provided him with a batch of eggs. The batch of eggs I had was in fact two batches laid by the same moth, and consisted of several hundred eggs. Having laid one batch, the moth, finding, I presume, no tempting place to lay another, disposed them as a second layer over the first. This was, of course, an accident that would not happen in a state of freedom, and was fatal to the hatching of the under layer. Nearly the whole of each layer consisted of eggs laid in one imbricated set,

each egg overlapping its neighbour about one-fourth of its diameter. Each egg is overlaid by three others, or, where a little irregularity occurs, by four others; the regularity of the arrangement was very exact; in *rumicis* the eggs overlap a little further, and are not unfrequently a little less regular in the orderly arrangement of the rows of overlapping eggs.

In *venosa* the silky lustre of the group of eggs is more striking than in any other species, but is approached by *rumicis*. When first laid, the eggs are of a sulphur yellow, but soon become reddish brown, with paler markings, much in the pattern of *rumicis*, as regards size and arrangement, but less definite and distinct and without the dark apical mark. The ribs are fewer than in *rumicis*, about 41 to 45, being thus a little larger and bolder; the crenulations or secondary ridges are somewhat more evident, and terminate towards the summit or micropyle in rather more decided mammillæ. The diameter is from 0·95 to 1·1 mm.; the height must be about ·4 mm., but I got no satisfactory measurement, owing to the attachment of the eggs to each other. (Plate VII., fig. 3.)

The larva, when newly hatched, is whitish, but soon gets darker, and much resembles the other species of *Viminia*. 3.4, 6.7, 10.11, and 13 are pale segments. 2 is also rather pale, head black (as in others). The tubercles are distinctly larger and darker in the dark segments, paler and rather smaller in 10, and especially so in 11. The anterior trapezoidals stand up prominently, so that, seen laterally, they form a serrated dorsal ridge, especially marked in 3.4, 5.6, and 12, and notably deficient in 11; each has 3 hairs, except 4 on 9th and 5 on 12th segments; the other tubercles have each 1 hair. The hairs are long, about 1 mm. (larva 2 mm.), and several, especially in 13, longer. The larva is rather paler than the other *Viminia*, the tubercles being deep brown rather than black. In *rumicis*, which comes nearest to *venosa*, the tubercles are also not quite black as in the others, but are even rather paler than in *venosa*. As the larva grows, the distinction between the pale and dark segments becomes more marked than at first. The scutellum of the 2nd segment has 4 hairs on either lateral half; this is the same as in the other *Viminia* of which I have a note. As compared with *rumicis*, the larva is paler, tubercles smaller and blacker, but the form of the tubercles, disposition of hairs, and relative size of the 11th segment seem identical. In the full-grown (in 1st skin) larva, the alternation of pale and dark segments is perhaps more marked than in the other species of *Viminia*. (Plate V., fig. 6.)

They still like to feed gregariously, but a solitary larva does not appear altogether unhappy, as is the case with distinctly gregarious larvæ, such as young *Moma orion* or *Endromis versicolor*.

In the last skin, the larva attains a length of from 34 to 40 and 45 mm., a hairy larva, marked longitudinally with black, gray, orange, and yellow. It has now no *rumicis* form, but is fairly cylindrical, tapering a little at each end, the head is set on squarely, and it does not protrude the jaws, nor does it draw itself up into any humped attitudes, nor curl itself round. There is a good deal of variety in the brilliancy and darkness of colouring of different larvæ.

The lateral or subspiracular line is yellow, but at the centre of each segment it is red; here it includes the large subepiracular tubercle, and, stretching up

behind the spiracle, includes the small post-spiracular tubercle. The spiracle itself in front of this, is conspicuously white, in a darker patch belonging to the zone above. This lateral area is identical in form and in relative colour with the lateral line in *rumicis*. Immediately on moulting into this skin, the colours of this band in *venosa* are much more brilliant, and not far from those of *rumicis*. This is notable, as it is the rule for colours to be pale and less pronounced immediately after a moult. Indeed, I have, in describing the younger stages of these larvæ, erred, in noting how, after each moult, or on hatching, the blackness of the tubercles packed together makes the larva appear black, although, as it grows, and they separate, the paler colour of the skin asserts itself. *Immediately* on hatching or moulting, however, the larvæ really look pale, as the tubercles are then a pale ashy grey, and it takes some time, often very short, for them to assume their inky blackness.

When ready to spin up, this larva voids some damp frass, very unlike the dry material of a feeding larva, and shrinks very much in bulk, diminishing in length from 45 to 33 mm., whilst the colours lose all definition and brightness. *Rumicis* loses little or nothing in bulk before spinning up. It suggests itself to me, that the food of *venosa*, being bulky in proportion to its nutritiousness, the larva is, for its accommodation, more expanded than in the other *Viminia*, though *auricoma* has a good deal of the same habit of shrinking and voiding moist frass before spinning. This is, indeed, I believe, really a very universal habit, though varying much in degree, the large silkworms, *yama-mai*, *cecropia*, etc., voiding some actual fluid when preparing to spin.

In its habits, the larva is not unlike the other *Viminia*. The young larvæ take each a line of cells in the leaf of the grass or reed, and eat the surface between the septa on either side, and, as they are at first somewhat gregarious, they have a processionary aspect, attacking adjacent series of cells, and this habit lasts into the 3rd skin, when they are more independent and devastate the leaf more thoroughly. Some gregarious larvæ pine and refuse to eat when solitary; of all the larvæ I have experimented with, this is most marked in *Endromis versicolor* when young. But I think there is a decided amount of the same habit in *Viminia*, at least in *venosa*, *auricoma*, and *menyanthidis*, when small, and would be in *rumicis*, were he not so hardy as to stand much ill-usage with impunity. Isolated *rumicis* in their 1st skin seem disconsolate, and they all wander about till they find their brethren. They coil up when disturbed, and when larger, have a curious way of apparently desiring to drop when coiled up, but really retaining a hold by the anal prolegs. *Venosa* does not coil up so readily and completely as the others.

The pupa is very like that of *rumicis*. The mesothorax does not project backwards, as in *rumicis*, and the following segments are relatively smaller, the thoracic and fixed abdominal segments are more slender, making the whole pupa look more delicate and slender than *rumicis* or any other *Viminia*. The marginal hoops of the six abdominal segments are nearly as pronounced as in *rumicis*, the rough points cover the rest of the segment, and are nearly as large as in *rumicis*. The segmental incisions, *i.e.*, the softer chitinous parts of the free segments, are

black, and finely granulated, as in the other species. The frontal knobs are the same as in *rumicis*. The anal armature is very similar, tha pen-nib-lika termination is a little longer and more slender, it has the same four points, and a faint indication of a central dorsal one, the bristles are more strictly terminal, not covering quite so wide an area, and are perhaps a little longer, stiffer, and darker in colour. Tha minute hairs, at the bass of the antennæ, etc., appear to be identical.

Among the points, in which this species is clearly very closely allied to *rumicis*, aone is perhaps more remarkable than the lateral line of the full-grown larva, tha outline of which, and relative colouring, are identical in the two species.

In *rumicis* (a loud vulgar fellow), the lateral line might be described, as two broad white dashes, anteriorly and posteriorly, on each segment, connected by a brilliant red patch. With the same outline, the red is, in *venosa*, much toned down, and passes without great contrast into the paler yellow portions, and so forms a tolerably regular band. In a genus like *Acronycta*, where the larvæ, even of closely allied species, are so different from each other, in form, colour, and markings, a close identity like this appears to imply a near relationship. The eggs are also very similar, those of *venosa* are perhaps less specialised than those of the other species of *Viminia*; not having the bold pale markings of *auricoma*, or the distinct special dot and pale circle of *rumicis*, they, nevertheless, more nearly resemble those of *rumicis*, than do any of the other species of *Viminia*, and, in groups, the two species have much the same tone and silky lustre. The pupæ are very similar, *venosa* looks more hulky in tha abdominal segments, or, more correctly, is more slender thoracically, generally enough so, to enabla an opinion to he formed, as to which species is under examination; the general surface gives also an impression of less roughness, because it is uaually more fully extended, as though better fed up, and the smoother portions of the segments are more in evidence, but as to the datails of sculpture, the frontal nodules, anal armature, etc., there is rather an identity than a rasemblance between the two species, and a number of pupæ of both species mixad together, would be as difficult to separate as would those of *psi* and *tridens*, except that the intersegmental membrane is black in *venosa*, and brown in *rumicis*.

Acronycta (*Viminia*) *rumicis*.—I have, to some extent, taken this species as the type of the sub-genus *Viminia*, and used it for the purpose of comparing the others with, rathar becanse it is the most abundant and easily obtained, and therefore the most convenient for the purpose, than because I have any decided opinion that it is a more ancient and primitive species than the others. The humps on the 5th and 12th segments of the full-grown larva of *rumicis* give it a peculiar outline, which is further pronounced by the attitude it assumes by laying its head prone and slightly raising the 5th segmeat off the surface on which it rests. I have called thia the *rumicis* form or outline. This form is assumed in the earlier larval stages by all the other species of *Viminia*, but lost again by the full-grown larva. Curiously there is least of it in *venosa*, which in all other respects, egg, newly-hatched larva, and markings of full-grown larva and pupa is closer to *rumicis* than they. It is also perhaps remarkahle that the outline of the

larvæ of *psi*, *tridens*, and *strigosa* should be so strongly that of *rumicis*, though belonging to a widely differeat section of the genus, thair nawly-hatched larvæ (*psi* aad *tridens* at least), have also the same pale and dark segments as *Viminia*, so that it would not perhaps be safe to suppose that the *rumicis* outliae has been assumed by them independently; but I am, nevertheless, inclined to regard the coincidence as due rather to a parallel variation in allied spscies, than to a sommon descent from an ancestor of *rumicis* form.

The egg (Plate VII., figs. 1 and 2), whsn first laid, is white or faintly greenish in tint, and soon becomes yellowish, it then gets streaks of red in a network, as if it were going to take the aspect of *alni* or *auricoma*; the streaks, howsver, become more numerous and suffused, there is a central red or brown dot on the apex surronnded with a pals zone, and the rest of the egg is finely dotted with yellow or orange dots on a reddish-brown base. This colouring is assumed in two days in warm weather, in cool weathar not under a week is occupied in the progress of the change to full colour. When massed together, the eggs appear to have a black dot at the apex of each. They are laid in a regularly imbricated fashion, and have in mass the silky lustra already referred to. They are almost exactly 1 mm. in diameter and 0.32 mm. in height. They have about 54 ribs, of the same character as in the other species. In some lights the crenulations of the ribs have more of the appearance of rows of beads, but this is not due to any essential difference from the other species, which would probably present a similar aspect when favourably viewed.

The newly-hatched larva (Plate V., fig. 7) is pale, hut very quickly the tubercles blacken, and when somewhat fed, or indeed at first, with sufficiently close observation, the segments present the typical pale and dark coloration characteristic of *Viminia* with the weak 11th segment of *Acronycta*. The pale segments have each tubercle surrounded by a white zone, the rest of the segment being pale rufous, the dark segments are brown, and the pale zones ronnd the tubercles, in these, are rufous.

The anterior trapezoidals are large, with an angular hollow edge to fit the posterior trapezoidals; they have three strong hairs, and two, or even three, weaker ones: tha hairs, as well as the tubercles, are nearly hlack. On the 11th segment, the tubercles are very small and the hairs short, but tha anterior trapezoidals possess fiva hairs. The other tubercles hava one hair each, on some posterior trapezoidals is a faint point as of a second hair.

The scutellum of the 2nd segment has three hairs on each half, and the second tubercla (supra spiracular?) has two hairs. On the 3rd and 4th, the anterior trapezoidals have each three hairs. Unlike *venosa*, the larva, as it grows, showe the alternation of light and dark segments less distinctly.

The number of moults in *Acronycta* is five, but a number of the species do, upon occasion, reach the last skin in four moults, omitting the fifth skin; and where, as in *rumicis*, that skin has a special distinctive marking or coloration, or arrangement of the hairs, these larvæ never exhibit that particular phase. In *rumicis* thia is by no means uncommon, most broods presenting soma examples of it. I have also noted it in *menyanthidis*, *auricoma*, *leporina*, and *aceris*, and have

further discussion of them would hardly be profitable, though, as illustrating the superficial nature of the resemblances that form tha inspiration of his paper, I may be excused for quoting a characteristic paragraph:—"*A. alni* appears to be referable to the *Noctuites*, the caterpillar much resembling, both in colour and in its clavate hairs, the larva of *Tinolius*, the latter, however, ia a semi-looper and therefore *not* nearly related to it." (The italics are mine). One would suppose not much nearer than *Pieris brassicæ* is to *Eubolia cervinata*, though the young larvæ of both these have their hairs tipped with moisture. Ona is, indeed, astouishad that so accomplished a systematist as Mr. Butler, should found such startling conclusions on mere superficial resemblances of full-grown larvæ, whilst his carafal examination of the neuration in *Acronycta* and certain other genera, instead of confirming his conclnsions, clearly shows them to be untenable. Hs finds a uaiform type of neuration in *Acronycta*, and some little diffarences, little, but of importance, for the neuration differs only in small particulars, amongst a large number of more or less allied families, between *Acronycta* aud each of the several groups amongst which he proposes to distribute them.

To return to our *Viminia* larvæ. As I have stated under sach speciss, the larvæ, when nawly hatched are pals, but in a short time, oftan only a few minutes, become black, the tubercles being set so closely together as to show nothing but the black tubercles, and it is necessary they should grow a little before their real features can be fully, or at least at all easily seen. It results that the figures are drawn at different ages of the several larvæ and at different degrees of enlargement. Throughout the whole genus, tha 11th segment is pale (and "weak") and in *Viminia* 3. 4, 6. 7, 10 aad 13 are also pale, the other segments being darker. There is a tendency in all of them to develop a white ring round each tubercle, most marked on the pale segments, and in the Plate is best seen in fig. 4, *menyanthidis*, and 7, *rumicis*. In *menyanthidis*, this proceeds to the fullest development, giving to the pale segments a porcelain-like density and solidity, the pale portions of the other species always having a somewhat delicate transparent character. The sebinate character of the anterior trapezoidal tubercles, each hair starting from a pyramidal base and the whole tubercle forming a slight dorsal boss, is not brought out in any of the figures, it is just hinted at in fig. 2, *auricoma*. This character is most marked in *rumicis* and *venosa*, least so in *menyanthidis*.

It remains the case, however, that, notwithstanding the great peculiarities which distinguish these ynung larvæ from all others, the five species present only slight characters, chiefly in the development and intensity of the pale rings round the tubercles, to distinguish them from each nther, en very much alike are they. I should not like to pronounce on the identity of any of them presented tn me at random, thaugh I can dstect certain slight differences when I have them side by side fnr comparison.

They all agree in having several hairs on the anterior trapezoidal tubercles and only one on each nf the others. On the trapezoidals (anterior) they all tend to have fewer hairs ou the 3rd and 4th segments (if dorsal tubercles here are really anterior trapezoidals) and more on 5th, 9th, and 12th. On ths remaining

segments 6. 7. 8. 10 and 11, *venosa* has three hairs on the anterior trapezoidal tubercles, *rumicis* has three strong hairs and two faint ones, *menyanthidis* has five, *myricæ* six, and *auricoma* sevan. So that here we have a decided means of distinguishing them, but by no means so aimple in application as tbe plain statement of the numbers suggests, a correct enumeration being indeed very difficult unless the larva is chloroformed, or, in effect, in some other way killed.

Figures 8 and 9 are the larvæ of *Bisulcia ligustri* in their first akins. Thia larva is a true *Acronycta*, tha 11th segment being pale, and "weak," the paleness is here no especial feature, as none of the segments are dark, but the "weakness" and form are distinctive, it is smaller than the others, chiefly by being lower dorsally, and weaker by the much smaller tubercles. It also presents the tendency to a lateral projection, well shown in fig. 8, which is always most prononnced in the larva when newly hatched, and is therefore best seen in the figures of larvæ nf *Viminia* that are taken from the youngest larvæ, viz., fig. 1, *auricoma*, fig. 6, *venosa*. In this larva each tubercle, anterior trapezoidal as well as the rest, has only one hair.

Fig. 10, *aceris*, had space permitted, ought to have been in Plate VI. with the other *Cuspidia* larvæ. This figure is from a larva almost newly hatched; it ehows well the characteristic *Acronycta* form of the 11th segment as regards having a lateral expansion. The pale segments here are fi. 10 and 11.

Plate VII. Eggs of *Viminia*.—The eggs of *Viminia* have a close resamblance to each other; this is brought out in the plate perhaps rather too strongly, owing to the circumstance already alluded to that in warm weather, and to some exteat at all times, the eggs possess their most typical and perfect colouring for only a short time, and the artist has not in all isstances seized this moment. There is therefore somethiag to desire in nearly all these figures. It is, however, to be borne in mind, that these eggs are perhaps as difficult subjects for pen and pencil as it is possible to desirs, and that the success, though qualified, is not meagre, but the chiaf cause for regret is in not seizing the momeat when the egg is at its best to make the drawing. This is most notable in ths case nf *auricoma*, fig 4, which has a greater definiteness nf marking than the other species, approaching in this respect the egg of *alni*, to which it bas considerable resemblance. *Rumicis* also has as its most definite point a distiuctly paler area rouud the dark summit, giving a characteristic dotted aspect to the egg. Curiously this character has been well eaized in the drawing of *venosa*, where it is less prominent. In the case of *venosa* the crenulations of the ribs have been drawn more distinctly than in the others, which they are not in reality, except that the ribs being fewer they are on a slightly larger scale and therefore more evident, but they do *not*, as shown, form a distiuct system of transverse ribs. The groups showing imbricated method nf laying is very correctly displayed in 3*a*, *venosa*. In 6*a* and 4*b* the order is well shown, but it is comparatively rarely that an egg is nut of its place as shown in nne cass in each nf these. This only occurs when the moth has been disturbed in laying and begins afrash, and thare will often be 40 to 50 and, with *rumicis* and *venosa*, 100 or mnre eggs laid with perfect regularity.

The characters of the eggs may be most easily compared if shown in a tabular form :—

	Diameter, mm.	Height mm.	Number of ribs.	Colour, etc.
myricæ	1.1 to 1.33	.5	66	Pale areas comparatively indefinite.
auricoma ...	1.1	.32	57 to 60	Pale areas large and few.
rumicis	1.0	.32	54	Pale areas very numerous, small, and forming a pale circle round a dark summit.
menyanthidis	1.1	.35	50	Pale areas more definite than *myricæ*, intermediate in size between *auricoma* and *rumicis*.
venosa.....	.95-1.1	.4	41-45	Very like *rumicis*, but dark summit less definite and whole egg paler.

The greater height of *myricæ* is due to its being a somewhat larger egg than the others and being more often laid singly. Such a specimen was selected for measurement and showed a greater height than could be found in them in an imbricated mass. The heights are given as actually recorded, but my impression is strong that the differences between the several species in this respect is trifling or evanescent.

It is curious that the number of ribs should vary as it does, and especially that the difference should be so great in the most allied species, *menyanthidis* and *myricæ* having respectively 66 and 50, and *rumicis* and *venosa* 54 and 44. This is quite parallel to what obtains between *psi* and *tridens*, and probably has some relation to the circumstance that, though these pairs occupy the same areas and emerge at the same times (or nearly so), hybridisation as to none of them has been recorded.

Acronycta (Cuspidia) tridens.—We begin here that section of the genus in which the eggs are laid solitarily, the moth in the wild state probably taking a flight after the deposition of each egg. The egg (Plate VIII., fig. 2) of *tridens* is nearly colourless, almost glassy when first laid, but acquiring a certain whitish opalescence as the young larva within is developed. Its greater size, and, to a slight degree, the ribbing, render it only slightly less favourable for the observation of the embryonic development than those of *Botys hyalinalis*, for the opportunity of observing which species I am indebted to Mr. Jeffrey, of Ashford. The egg being solitary takes the very regular form of a portion of a sphere, less than a hemisphere, or roughly, that of a bun. The diameter is ·83 mm., and height ·38 mm. The ribs are 38 in number; in all the *Acronyctas* this number varies, and the numbers I give are either the average or the actual number of a particular specimen counted. The egg of *tridens* rarely, if ever, exceeds 44 ribs, that of *psi* as rarely has less than 45. In colour, or rather want of colour, secondary ribbing, form, etc., they seem to be identical. When about to hatch, the young larva is very conspicuous inside, the head forming a central black spot.

The newly hatched larva (Plate VI., fig. 2) is paler than it shortly becomes, but the head is already black, and the pale and dark segments are clearly pronounced. Each tubercle is a large flat plate, somewhat angulated, so as to fit against and amongst the others; this feature is common to a number of *Acronyctas*. The trapezoidals are thus somewhat pear-shaped, the anterior with the narrow end backwards, the posterior with the narrow end forward, between the anterior trapezoidals and the supra-spiracular. The dorsal tubercles of 3 and 4, being apparently fused trapezoidals, have each two hairs, all the other tubercles have each one long black hair. The plate of the 2nd segment has four hairs on either side. The trapezoidal and supra-spiracular tubercles of 11 are very small, and not so markedly angulated. The trapezoidals of 12 are large, rounded, and the posterior set immediately behind the anterior, again a common arrangement in *Acronycta* and many other larvæ. The tubercles are fuscous rather than black, the head black. Below the sub-spiracular there is a small ventral or "marginal" tubercle in 5, 6, 11, and 12. The colour of the segments, that is the skin of the larva, is reddish brown on the 5th, 8th, 9th, and 12th, pale or whitish on the others. In *psi*, which is also somewhat larger, the 13th segment belongs to the coloured series.

The pupa (Plate III., 2, 2*a*, 2*b*, 2*d*) is of a usual NOCTUÆ type, *i.e.*, of a polished brown corneous texture, more semitransparent than usual, though not so much so as *strigosa*, still less as compared say with *Hadena chenopodii* or *Cucullia:* the abdominal segments tapering, 5th and 6th being as usual free; length 19 mm., width 5 mm., no hairs or bristles, though the double hairs at the antennal bases exist in little more than microscopic form. The sculpturing is in the form of very minute pits, which are most numerous dorsally, and do not exist on the leg and wing cases or thorax, which are finely wrinkled, but not so as to interfere with the shining polished character. The transparency permits, especially on the abdominal segments, certain markings due to the interior structure to be seen, and including a darker dorsal line (dorsal vessel?) a paler lateral one, with darker and lighter (fat masses?) marbling between, the ventral aspect being paler. The prothoracic spiracle is a very slender slit, almost obsolete, indeed I am inclined to say that no aperture exists, those of the 2nd to 7th abdominal segments each being marked, being raised on a slight conical projection followed by a depression. The 8th abdominal spiracle is visible but obsolete. The anal armature consists of a wrinkled projection of the dorsal half of the extremity, armed dorsally by two central spines, and ventrally by three similar spines on either side. All this group have a similar armature, but vary, especially in the number of ventral spines on either side and in the curvature of the hooks, which they often form or terminate in. In *tridens* there is a very slight curvature, and the hold taken of the silk of the cocoon is slight. In *tridens* their number is very usually three, but a considerable portion of pupæ have four, or, not unfrequently, four on one side only. When this occurs, the extra spine is often very slender and close to the outer side of the outer one, as if split off it. It is curious that the name *tridens*, given no doubt on account of the trident or psi (Ψ) mark of the imago, should be so applicable to this typical point in the pupal structure. The

curvature of the ventral set is inwards, of the dorsal pair downwards (ventrally) more decidedly than the others (see Plate III., 2*a*, 2*b*, 2*d*). Certain flatteninga of the dorsal surfaces of the first four abdominal segments, which are more evident in some other species, are easily observed in this species when carefully looked for.

To form its cocoon this species appears to prefer to get behind a piece of loose bark or into a chink of rotten wood, where it hollows out a suitable cavity, which it completes into a cocoon with some white silk and the removed chips, very slightly, if at all, lining the excavated hollow. It will, however, very readily accept an already prepared tubular hollow, or will perform all the work of excavating one for itself in rotten wood or in the pith of a piece of elder twig, and in this case closes the opening with the top of the cocoon. In default of a more suitable nidus it will go down into sawdust or even earth, forming an ordinary cocoon of silk and the surrounding material.

I have already referred to the fact that on one occasion half of a certain brood emerged in August as an autumnal brood, in time enough for a second brood to have occurred, but that on no other occasion among hundreds of moths has an autumnal specimen shown itself. This shows that it is very unsafe in the matter of habits of this sort to regard as invariable in a species, any habit, which we may have found to be so, in even a very large experience.

This consideration prevents my saying that *tridens* never has four-moult larvæ, so frequent in some species, but I have never datected one.

Tridens occurs here at precisely the same seasons, and in precisely the same places as *psi*. Wherein they differ in habit, why there is room for the two species, why the one does not displace the other, are matters an which I have still everything to learn. *Tridens* like *psi*, will eat almost anything arboreal, but I think it has a closer relation to rosaceous plants than *psi*, especially fruit trees, and is perhaps commonest here in pear orchards ; whilst *psi* is at least equally at home on forest trees, and may be met with on oak, birch, etc., on which I never happen to have taken *tridens*. I have a suspicion that the fine pink tinge that has characterised some of my broods, and which occurs in several *Acronyctas* as a variety, is here related to cherry as a food, but I have instituted no special experiments to test the point.

Acronycta (Cuspidia) psi.—*Psi* is in many reepects so like *tridens* that having fully described those aspecta of that species to which I have paid most attention, *psi* may be most conveniently treated hy noting the points of distiaction between them, rather than by going into a fully detailed account of each stage. *Psi* is the only *Acronycta* of which it has happened to me to meet with the egg as laid naturally by the moth in the wild etate. This egg was found on July 4th, 1888, laid on the upper surface of an oak leaf, the diameter was .97 mm., and the height about .33 mm. ; it had 51 ribs, of a pale straw tint or almost colnurless. An egg laid in captivity on a glass slide measured 1.03 mm. in diameter and had 50 ribs, other epecimens had 54 ribs. It is thus seen that the egg is distinctly larger than that of *tridens*, and has a larger number of ribs ; in colour (or want of colour) and other charactere they are very much the same ; in the figures (Plate VIII., fig. 1, *psi* ; 2, *tridens*), the difference in colouring represents the different method

taken hy the artist, at different times, to show the glasey transparency of the eggs, and does nnt correspond tn any actual difference of tint in the eggs themselves. These two eggs exhihit perhaps more distinctly than any others, what is very obvious in all *Acronycta* eggs, and is common to all eggs of Lepidoptera so far as I have observed them, *viz.*, that the egg contents shrink away from the shell n a very early stage of development, leaving a space containing only a clear fiuid between, and the flatness of these eggs leaves this space very evident as a margin round the contents, and in the species with coloured egg contents, this has the form of a colourless ring round the coloured internal egg proper. In most species the young larva is very plainly visihle through the shell before hatching. In *psi* and *tridens* it is perhaps most evident, owiog to the transparency and thinness of the egg shell, and the transparency of the larva itself. It lies coiled round the egg, making one complete circle with the head in the centre, and the arrangement of dark and pale segments in *psi* and *tridens* is such that the black head in the centre is surrounded hy a margin divided into six nearly equal parts which are alternately dark and light tinted.

The hatching may occur in from five to twelve days after laying, according to the temperature prevailing. It is perhaps repeating unnecessarily, as the sculpturing is almost identical in all the epecies, to point nut that the transverse ribs are only represented by a waved outline of the summits of the primary ribs and hollows on their sides, the hollows and projections of the sides of the ribs corresponding to each other on opposite sides of each furrow, and therefure alternating in adjacent furrows, and that tha micropylar area is marked by a small circle of slightly raised radiating lines, surrounded hy a hardly raised irregular margin in which the ribs terminate ; the ribs arise from this to the number of about twenty, and increase in number towards the margin by dividing dichotomously in eome instances, in others by arising *de novo*, in the hollow between two other ribs.

The newly hatched larva (Plate VI., fig. 1) ie 2 mm. in length, very distinctly larger thau that of *tridens*, thie is unmistakably seen hy drawing them under the camera when the head of the larva of *psi* is decidedly larger than that of *tridens*, in the proportion of 8 to 7 in diameter. The only other point of difference that I can be sure of is that the 13th segment in *psi* belongs rather to the dark series, in *tridens* certainly to the pale. I think I may also say that the tubercles of *psi* are rather larger and more markedly angulated than those of *tridens*, and the lateral plates of the pro-legs are nearly colourless in *tridens*, distinctly dark in *psi*.

When fully grown in thie skin, it has a trace nf a broad yellow dorsal line nn the pale segments, *viz.*, 3.4, 6.7, 10.11, the 12th segment is already large and dark, with its four tubercles set four-square ; the 13th segment seems intermediate in tint between the dark and light series. The hairs (thie applies also to *tridens*) are one to each tnbercle, those of the anterior trapezoidals being very long, those on 11 very short, nn 5-10 nearly twice the diameter of the larva in length, the othere longer ; the posterior trapezoidal hairs on 12 have the appearance nf belooging to the anterior trapezoidal set, being equally long and merging with them.

Its habits of pupating seem to be identical with those of *tridens* already

noticed. The pupa (Plate III., figs. 1, 1*a*, 1*b*) is not to be distinguished with certainty from that of *tridens*. *Psi* usually has four spines on each side forming the ventral portion of the anal armature, whilst *tridens* usually has hut three, but just as *tridens* has not unfrequently four, so *psi* has at times only three. *Tridens* is also usually smaller and more delicate and transparent in appearance, and I cannot with certainty say of any individual pupa which it is, hut of a score of pupæ said to be all one species, I should take a census of the numbers having 3 and 4 spines to the lateral anal armature, and if 3 predominated, I should say they were *tridens*, if 4, then they were *psi*.

On one or two occasions I have fancied this larva missed the 5th moult, but being on occasions when the moults were not being carefully recorded, am in doubt, nor have I reared an autumnal specimen.

The young larvæ of *Cuspidia* have each their own method of eating and resting. *Psi* and *tridens* affect somewhat impartially either side of the leaf, leaving the small ribs and the cuticle of the opposite surface, and when at rest are curled round in a circle.

Notes on Plate VIII.—The ova here delineated are those of the sections ***Cuspidia*** and ***Bisulcia***, together with those of *Moma orion*, *Demas coryli*, and *Diloba cæruleocephala*, three species associated by many systematists with the *Acronyctas;* in my opinion correctly so in the case of *M. orion*, doubtfully in that of *D. cæruleocephala* and erroneously in that of *D. coryli*. I am very well satisfied with the success of the artist in these delineations. As pictures of the eggs they are everything that can be desired, and convey to the mind a most correct idea of the actual objects. As a matter of scientific accuracy they may be criticised on two points:—1st. The glassy transparency of *psi*, *tridens* and *strigosa* is of precisely the same character, and that of *ligustri* is nearly the same, and it is therefore unfortunate that, the drawings being made at different times, the method of representing this has involved different, instead of identical tints, in each instance. 2nd. In several cases the ribs are represented as all proceeding to the summit of the egg, instead of diminishing largely in number either by coalescing or by certain ribs stopping short as shown in the lateral view of *M. orion* (fig. 10 *a*).

Fig. 3.—*Leporina* is most accurate in this respect, and is indeed a wonderfully successful representation of one of the most beautiful of these beautiful objects. The marginal clear zone is shown in all the *Cuspidia* eggs, and is widest of all, as shown in *megacephala*, the largest but also the flattest of the group. The eggs of *aceris* and *alni* most resemble those of the *Viminia* group, *auricoma* being, at its best colouring, not unlike them; *psi* and *tridens* which in the larva state most approach *Viminia*, both in the arrangement of dark and light segments in the young larva and in the *rumicis* attitude of the older larva, and in these respects are to some extent intermediate between *Viminia* and *Cuspidia*, depart from the types of both groups in being colourless. It may be that they are the more ancient forms and that the colouring of the others has been acquired later.

It may be useful to append a note of the sizes of these eggs and the number of their ribs, both items being subject to variation within small limits.

	Number of ribs.	Diameter, mm.	Height, mm.
tridens	38	0·80	
strigosa	41	0·74	
leporina	41	1·10	
alni	53	1·00	
psi	54	0,97	
megacephala	66	1·23	
aceris	75	1·10	
ligustri	60	0·90	
orion	30	0·70	0.40
cæruleocephala	13	0·93	0·61
coryli	25	0·76	0·47

The *Acronyctas* are so flat that the measurement of their height is difficult. In most it is about half the diameter, less than this in *megacephala* and perhaps in *leporina*.

Acronycta (Cuspidia) strigosa.—I have had infertile eggs, larvæ, pupæ and imagines of this species for several years, but had completely failed to get fertile eggs until this year, when Mr. Farren, of Cambridge, sent me a moth which laid over two dozen eggs.

In 1890, for example, I had a number of pupæ and obtained nine moths. Among these moths, sleeved over a growing thorn bush, nine pairings were observed to take place, but in no instance with a satisfactory result. I believe others have been more successful, and am therefore unable to say wherein my procedure was faulty. *Alni* sometimes pairs in the same useless manner and did so in every instance in 1890, whether I or the season was to blame in either or both instances I cannot say. In previous years the same arrangements had been very successful with *alni*. The egg is the smallest of the *Acronyctas*, being only ·74 mm. in diameter and is transparent and colourless; the structure is that of the other species of the genus, the ribs about 41 in number. The inner egg shrinks away from the outer, leaving a clear margin, but, the inner egg remaining colourless, this is not so self-evident as in the coloured species. In eggs laid on glass the development of the larva is easily observed. When ready to hatch, the larva presents very little colour except the brown jaw tips, a faint indian ink in the head, and indications of brown round the margin where the dark segments lie, can just be made out; the position of the larva in the egg-shell being identical with that of *psi*, *tridens*, and all the other *Acronyctas* so far as I have observed, *viz.*, with the head under the vertex of the egg-shell and the body coiled round, with the back against the circumference. All the eggs hatched (on three consecutive days) between 9 and 11.30 a.m. I think this is a favourite hour for *Acronycta* eggs to hatch, but it can hardly be so pronounced in other species as here, or I should, I think, have made some observations on the subject in some instance or other (Egg, Plate VIII., fig. 7).

The young larva, when hatched, sate up the dome of the egg-shell, unless disturbed, leaving the base fixed to its attachment. Like most of the others, this larva also likes to eat its moulted skin, and invariably does so after each moult,

yet I have rarely seen this actually being done, the evidence usually being the disappearance of the cast skin, except a few fragments. I do not know on which side of the leaf the egg is laid. In the wild state, it is certainly laid solitarily, in Cuspidian fashion.

The young larvæ eat the whole of the upper dome of egg-shell. They are very flimsy and transparent, with hairs nearly half their own length (length of larva about 1·6 mm.); the dark segments have some brownish tinting dorsally. The dark segments are 4.5, 8.9 and 12, the pale 2·3, 6.7, 10.11, 13 and 14, and hairs pale, finely serrated or spicated as are those of *tridens* and others. Hairs in II about two-fifth length of others and proportionally fine and tubercles less marked *Psi* and *tridens* are really very delicate little larvæ at this stage, and *strigosa* only differs in degree, but is much more delicate in appearance. Head tinted with indigo, looks dark to the naked eye. Larvæ rest underneath the leaf, but will take the upper surface when the leaf is upside down, they sit curled in horse-shoe shape and eat holes into the leaf, but not through the upper cuticle, the holes being placed irregularly round the larva. When full-grown, in this (1st) skin, the whole larva retains a pellucid transparency, to a degree much beyond any other *Acronycta*. The 3rd segment is somewhat opaque with a yellowish shade, the dark segments 2, 4.5, 8.9 and 12, have the appearance as if the dark portion were really a plate laid on dorsally; this aspect is assisted by the circumstance that the dark portion is dorsal only and is rounded at the angles, so that a pale wedge intrudes between the dark portions of the adjoining dark segments 4.5 and 8.9. The head is now densely black and shining with 12-16 black hairs. The 2nd segment has a black plate with three black hairs on each side, two along the anterior margin and one towards the posterior angle; on each side, below this, is a plate with two hairs, and lower, laterally, another with a large black hair and a shorter behind. Dorsally, and behind the plate, are, one on either side, a reddish-brown patch, or one might say, the rest of the segment is dorsally reddish-brown, divided by a colourless dorsal line; 3rd segment colourless, dorsal tubercle with two hairs; 4th segment dorsal tubercles with two hairs. The dorsum around the tubercles, which are black, is rich red-brown, stopping short before the lateral tubercle which is in exact line with the supra-spiracular of 5th. The 5th segment is the same, except that four trapezoidals, each black with one hair, are all included in the coloured area. 8 and 9 have the same large red lozenges including trapezoidal tubercles black. On 3, 6.7, 10.11 the tubercles are just tinted with dark, getting blackish to the edges. On 12 they are again black and a lighter shading of the dark area includes the supra-spiracular tubercles. 13 follows the rule of the pale segments with reversed trapezoidals (as usual); 14 has a pale plate, just tinted with fuscous, somewhat pyramidal in form, and carrying 8 hairs. The hairs are all black, the longest about one and a half the diameter of the larva. The 11th segment requires fuller notice. The tubercles are very small and the hairs about half the length of the others; at first view there are no posterior trapezoidal tubercles. On the other segments the large tubercles are angular and fit together, and even in the full-grown (in first skin) larva, are still in this obvious relation to each other, though floated somewhat apart. Here the anterior trapezoidals are minute and

rounded, and no posterior trapezoidals are anywhere to be seen. There is, however, between segments 11 and 12 what appears to be a narrow subsegment, rounded and cushioned like an ordinary segment; this carries two minute tubercles with fine hairs, and its posterior margin is coloured continuously with the 12th segment, making it look like an appendage thereto, but it is really a part of 11, the tubercles being its posterior trapezoidals. The minute tubercles of 11 are raised on protuberances, of which one carries both anterior, and one both posterior trapezoidals. The post and sub-spiracular tubercles and the marginal tubercles are smaller than the others. There are small plates at the bases of the anal prolegs, and there is a curious black point in the incision between segments 3 and 4 in the centre of the dorsum. Comparing with *tridens*, the point on the 3rd segment cannot be found in that species, but the anatomy of this 11th is the same; the 4th segment looks paler than the 5th, the pale segments are more opaque, their whitsness not glassy as in *strigosa*, the tubercles of the pale segments are black or nearly so, and the dark of the dark segments includes the supra-spiracular tubercle and is square from segment to segment.

Six-sevenths of the brood were 4-moulters only; and so large a proportion as 15 per cent. varied to 5 moults. The great jump from 4th to 5th skin as measured by the size of the head and the large proportion of exceptions, would suggest that *strigosa* has not acquired the habit of being a 4-moulter for so long or so completely as *alni* has. When ready to pupate, the larva will bore into rotten wood, or go into a stem of reed or elder, or will, like *psi* and *tridens*, form a cocoon on or under the surface in sawdust or loose rubbish. In rotten wood, which seems to please it best, it prefers, like *alni*, to go in horizontally in a perpendicular face, and then bore upwards; but it differs altogether from *alni*, in that when it has closed the opening, to appearance in much the same way, the diaphragm so made is the actual top (or outlet) of the cocoon proper, there being no inner structure. The space excavated measures 14 mm. by 5 mm., and is lined with a little silk, and here and there by a few chips removed apparently in giving a proper shape to the cavity. The thin silk operculum coated with chips, which form the outlet of the cocoons, often shows no indication of the exit of the moth. The sides of the opening made, which is an irregular slit, falling together again.

The pupa (Plate III., fig. 3) is 13 mm. in length, wings 8, abdomen 5, width little over 3 mm. Pale greenish-brown, with a darker dorsal line, the leg and wing cases so transparent that the incisions of the segments within are very distinct, and the tracheal vessels running down the antennæ, legs, etc., are obvious. The whole pupa looks extremely delicate and fragile. The outlines of the fat masses are visible through the abdominal walls. The spiracles are dark raised rings, and are the only solid looking parts of the pupa, there are two bristles in front between the eyes, the pair at the bases of the antennæ are also distinct; the sculpturing is extremely fine, and only distinct along the anterior margins of the abdominal segments as very minute close pitting. The anal armature consists of two dorsal and six ventral spines. These are long compared with the size of the pupa. The ventral set are regularly disposed at equal distances, the outer ones set at an angle of 45°; all are hooked downwards. The amount of corrugated base is very small,

hut from the spreading of ths spines they get well entangled with the silk of the cocoon ; at the base of the spines there is a sloping area of longitudinal wrinkles, beneath there is a transverse ridge at the hase of the spines hounding some fine radiating ridges. The hooks at end of the spines form more than a semi-circle.

Acronycta (Cuspidia) alni.—Alni seems to come nearer to *psi*, *tridens*, and *strigosa* than the remaining spscies we have still to examine, though it is distinguished from all the rest of the genus hy the curious neck which marks off the anal armature of the pnpa ; this seems correlated with its manner of pupating, which is very like that of *leporina*. In *alni* the elaboration for providing abundant entanglement in the silk, of the end of the cocoon, is found in this curious groove, ths spines remaining of the same simple type as in *tridens;* whilst in *leporina* it is achieved hy an abundant multiplication of ths spines and their curving into very efficient hooks.

The egg is laid at the end of June or beginning of July, always solitarily, I conjecture on the upper side of the leaf, though in captivity it lays them on either side. I recently had an opportunity of observing *psi* deposit her eggs when in freedom. The moth came from some little distance, laid two eggs a quarter of an inch apart on the under side of an hawthorn leaf, and then flsw off out of sight. I have already recorded finding an egg of *psi* on the *upper* side of an oak leaf. *Psi* as a young larva affects either side of the leaf, hut as *alni* lives on the *upper* side, the eggs are probably laid there.

Whsn first laid the egg (Plate VIII., fig. 6) is nearly as colonrless as that of *psi*, but soon assumes soms coloration, and in about three days, reaches its proper tint. For twenty-four hours before hatching it becomes much darker, with the black head of tbs larva occupying the summit.

In form the egg is of typical *Acronycta* shape ; the diameter is just over one millimetre, and the height is about 2·5 the diameter. The ribs are about 53 in number. They increase in number from the apex hy division, and intercalation takes place at all distances from the top, hut rarely further than half-way down, the ribs are distinctly waved, witb corresponding shallow foveolæ in the furrows. The micropylar area has a very regular rosette of fine willow-leaf-shaped cells, io the centre of a small area nnt encroached on hy the ribs. The inner egg leaves s distinct colourless margin ronnd the limit of the outer shell, hut this is less obvious at first glance than in aome other species. The inner egg is of a rich chocolate brown, marked with creamy white, nearly circular, patches, somewhat irregular in size and disposition, but tending to be arranged in two circles round a central one, making the egg a vsry beautiful and strikiug object.

My earliest experience of *alni* was to have five eggs which produced five moths, but, dealing with larger numbers, I find the larvæ, when first hatched, are so far restless that a certain nnmber perish from leaving their food and not finding it again.

The newly hatched larva (Plate VI., fig. 3, *3a*, fed about two days) has a large black head, the 3rd, 4th, 11th, and 13th segments pale, the others dark. Its length is 2 mm. The incisions of the segments are very marked owing to the largs size and projection of the tubercles, the tubercles of 5, 6, 7, 8, 9, and of 12

and 13 are especially large, appearing almost as if fused together, the platss being fuscous in colour and the lines between them rufous ; on the 10th segment ths tubercles are not quits so large and the spaces between them towards the posterior margin are white, showing a tendency of this segment to belong to the pale series. The 11th segment has the characteristic *Acronycta* form, projecting slightly laterally, depressed dorsally, and with the tubercles aod hairs much smaller than on any other segments. Each tubercle carries one hair, of rathsr greater length than the diameter of the larva (when newly hatchsd). The second segment has a black dorsal plate—Head, when viewed from the front, markedly heart-shaped. *Alni* presents, perhaps more than any other species, the large development of the tubercles and their angulated margins, as if their forms resulted from their heing closely packed together. They ars really large flat plates with a central hair. So large are the plates that a suspicion arises as to whether they are not really areas surrounding the tubercles proper, represented hy the hases of hairs, but reasons in favour of such a supposition sesm otherwise wanting. The disposition of ths tubercles is that normal in the other species.

All ths other British *Acronyctas* bave normally 5 moults, *strigosa* and *leporina* may perhaps be regarded as exceptions, *alni* has only 4. But, whilst several of them, probably all, do upon occasion have only 4 moults, so *alni* does sometimes have 5 ; and, when it does so, the larva in the extra, penultimate skin, differs from any of those already described, and shows a transition between the juvenile and adult plumage, showing that formerly the adult plumage was attained hy a gradual development, and that the abrupt transition occurs hy the suppression of the now lost intermediate stages. One form of extra skin is like the present 4th, with certain adult characters superadded, of this form I have seen a good many. Another form has only been observed in ons specimen, and is more like the adult than ths juvenile form, but with soms juvenile characteristics.

Of the former of these two forms, I have noted that ont of abont 250 larvæ, half had spun up and only some 15 wers not in last skin ; of these 15, 4 wers extra moulters, and of the remaining 11, 3 were certainly not extra moulters, and several were likely ts die of atrophy, how many of the others became extra moulters I have not recordad. It would thus appear, and I have observsd a similar circumstance in other species, that a larva, belated hy want of food or other circumstances, may die of atrophy, or may display extra vigour, have an extra moult, and finally be a larger specimen than if the usual normal course had been pursued.

Roughly, the larva in extra 5th skin resembles that in 4th skin, hut is larger, and differs in colonring. It has a dark shade across between segments 13 and 14, and this, with other dark tintiag laterally, gives an appearance of 10, 11, 12, and especially 13 and 14, having the yetlow lozenges of the adult or a strong indication of them, the colour being yellower than the creamy white of 4th skin. The 10th and 12th are sometimes very dark in this connection, and the front margin of the 2nd segment is yellow. The spathulate hairs are spread laterally instead of being erect as in the previous skins ; thess hairs are really spathulate as in ths other skin, though smaller, much more so than is occasionally to be seen in an unusually fine larva in 4th skin.

The length of these hairs will give some idea of the relative development in this respect, and will also show that the extra-moulter produces a larger adult larva than normal.

Lengths of spathulate hairs:—

A large fine 4th skin.	Extra fine 4th.	Extra moult 5th.	Adult (5th).	Adult (6th), extra moulter.
On 2nd segment ... 3½ mm.	3½ mm.	3½ mm.	6 mm.	7 mm.
On 8th ,, 1½ ,,	2 ,,	3 ,,	3½ ,,	4 ,,
On 12th ,, 2½ ,,	2½ ,,	3 ,,	4 ,,	4½ ,,

It is to be noted that these larvæ produced moths of both sexes, and further, that the variation is not hereditary. The memorandum, as to the ratio they presented to the normal form given above, was for 1888. Ova were obtained in 1889 from these, but in 1889 not one example of this variation in moulting presented itself, either from the ova laid by the five-moulters or from the ordinary types. A note on this form will be found in the *Ent. Mo. Mag.*, vol. xxiii., p. 226, and on the result of the broods of 1889, in the *Entomologist's Record*, vol. i., p. 271.

The other var. of larva, of which only one specimen occurred, appeared in 1889, and presented in its extra (5th) skin a form much more nearly resembling the usual adult form, at least in so far that it was on the whole dark, and had the 13 dorsal yellow marks. The head, instead of being black, had the dorsal half brown, as is usual in the 4th skin. The yellow patches are very pale as to their ground colour, but look dark, owing to the plates of the tubercles being a pale greenish or olive-brown. Thus that of the 2nd segment is brown, almost like the head; segments 3 and 4 have each a double tubercle on either side (as in the other skins, but noticeable here owing to the colour differences); 5, 6, 7, 8, and 9 are very much alike, in addition to the olive tubercles they have a dark central line (transverse) or shade, on the 10th the anterior tubercles are dark, but the posterior nearly of the yellow of the ground colour; the 11th, 13th, and 14th are uniformly pale (these pale portions are on the pale area of 4th skin), the 12th has the tubercles very dark, thus resembling the 2nd.

The paleness of the pale segments is increased by the space on the 10th and 11th, between the lozenges, being nearly as pale as the lozenges themselves, and by an isthmus passing from the 11th to the 12th. There are also, on the forward segments, traces of a yellowish dorsal line, and also of a sub-dorsal line at the margin of the lozenges. The dark portion of the larva has not the velvety metallic sheen of the ordinary full-grown larva, and it is broadly marked by the pale lateral band (on level of sub-spiracular tubercles) that the larva has temporarily just after moulting into the last skin. This line fades slowly upwards, it tends to invade 3 and 4 in the incisions of those segments, narrows rather on 8, 9, and 10; on 11 it throws a curious branch upwards and forwards, and is continuous with the lozenge on 13 (suggestive of juvenile *tridens*). The circum-spiracular tubercles are black (with short hairs), and surrounded with narrow pale rings (like various other species) on 7, 8, 9, and 10. The marginal tubercle has two hairs. The sub-spiracular tends to be olive coloured, as do the others on the pale segments. There is a faint pre-spiracular tubercle. The 11th segment is

markedly lower than the others, whilst the 12th is distinctly humped. The hairs are rather more clubbed than is usual in 4th skin, less than in the last; length of clubbed hairs on 8th segment 2¾ mm. This larva died when in its last skin, owing to ill-usage.

For pupation, the larva seeks a piece of rotten wood or soft spongy bark; it will readily accept a piece of elder pith, or probably anything in which it can easily make a burrow, and it will adopt a hole already partially made. It is not particular as to the direction in which it burrows, but seems to prefer to enter horizontally and then turn upwards, reaching in the pupa resting head downwards. The depth of the burrow varies from 1½ to 2½ inches, generally about 1¾ inches (45 mm.). This is made very rapidly, often in three or four hours, usually eight to ten, no doubt varying with the nature of the material; the width is 7 to 8 mm. The larva throws out all the excavated material, then when the tube is completed, he stretches out his head and picks up some of the chips or any other material within reach, and, with this and some silk, makes a tolerably firm diaphragm across the opening. Then, retiring to the bottom of the excavation, he there makes the cocoon proper. In shaping this out, some further chips are sometimes placed loosely in the space between the outer diaphragm and the top of the cocoon proper. The top of the cocoon is made firmly of silk and chips, and lined closely and smoothly with silk, the walls have but little silk, but, at the base, some strong silk is loosely disposed round the sides, and it is in this that the pupa takes such a firm and abundant entanglement with the anal spines and groove. The space between the outer defence and the cocoon proper varies from half an inch to an inch, according to the depth of the burrow.

The pupa (Plate III., figs. 4, 4*a*, 4*b*, 4*c*), in texture, form, and general outline, is of the *psi* type, and indeed very like *psi*, a little darker in colour, and the free segments tapering rather more regularly. The length is 17 to 22 mm., divided between wings portion 10 mm., free segments 8 mm.; width 5 mm.; colour rich deep brown with indications of a black dorsal line, and the incisions (dorsally of course) of segments 4, 5, 6 and 7 a little raised into a sharp line of nearly black colour. The back covered by well separated minute pits. Wing cases faintly corrugated and showing veins. Two hairs at the bases of the antennæ, very small but distinct. Also two fine brown bristles between the eyes, difficult to find, but quite obvious when found. Claws of 3rd pair of feet just visible. The spiracles present a fine raised border, but are not decidedly prominent as in *psi*, *leporina*, etc. The anal armature is more elaborate and specialised than in any other species. There is this difficulty in observing it properly, that it is constructed for seizing strongly the loose silk of the bottom of the cocoon, and this is always done so effectually, that it is only with great care and pains that the silk can be unravelled, without damage to the pupal spines. The spines are arranged on the *tridens* formula, *i.e.*, with 2 dorsal and 6 (3 on each side) ventral spines. They are curved so as to be hooks rather than spines, the dorsal curved downwards and the ventral upwards. The latter are, however, not so terminal as in *tridens*, but are spread round a semicircle, so that the outer ones are lateral rather than terminal. The, roughly speaking, round boss, on which the spines are

situated, is separated at its base from the rest of the pupa by a shallow groove ventrally, but dorsally by a deep channel or incision, on cut into it that the basal portion of the boss has a thin round margin over it, with a smooth surface, passing down to the dorsal spines, which is somewhat shield-shaped. The pupal margin of the incision presents a series of longitudinal ribs or buttresses, four on either side, with indications of a minute one in the intervals between them.

When the moth emerges, it leaves very little trace of an opening in the outer diaphragm, but there is always a little wool rubbed off the mouth to be observed in the opening. If the pupæ are kept too dry, the moth is unable to force the outer diaphragm, either because this becomes too hard and dry, or because the moth has no spare fluid to soften it, the moth then perishes in the outer chamber.

The larva appears to eat almost anything arboreal, is perhaps even more omnivorous than *psi*; but I have little doubt it is correctly named, in so far that in the wild state it is founder of alder than anything. It is very widely distributed and supposed to have its headquarters in the New Forest; I fancy it is as abundant here as anywhere. My friend, Dr. Wood, finds a larva or two most years, and I have twice taken it here on birch. On only one occasion have I searched for it, and then Dr. Wood and myself (really looking ostensibly for *Cerura bicuspis*, which we did *not* get) each took two larvæ off alder.

Alni feeds up the most rapidly of any species I have bred. In each skin it occupies four days in feeding, one or two days in moulting, with a few extra days in the last skin. One month is all the time spent as a larva when the season is reasonably warm.

Acronycta (*Cuspidia*) *megacephala*.—This species is most nearly allied to *alni* in one very important respect, viz., the distribution of the dark and pale segments of the newly-hatched larva. It also resembles it in the less important matter of living as a larva on the middle of the upper surface of a leaf. It presents an approach to *leporina* and *aceris* in the tubercles and their hairs becoming less marked as the larva gets older, in the surface hairs being very obvious, though very minute, and in the increased number of spines carried by the pupa. The resemblance of the perfect insect to *rumicis* or *auricoma*, has, I think, been attained independently, as an instance, of allied species finding it possible and profitable to assume a similar facies; or to express it differently, in tracing both back to a common ancestor, we should somewhere come across a form unlike the existing ones, and more like, perhaps, *tridens*.

The egg is the largest of any, being 1·23 mm. in diameter; it is also a good deal flatter than any others. It is laid solitarily, but as the moth, when laying, is rather inclined to buzz about than fly far, eggs are probably laid on neighbouring leaves (on the upper surface?) more often than with other species; when first laid it is of a pale greenish colour, uniform throughout, and when the dark dots first appear, the inner egg has not begun to shrink from the margin. When fully matured in colour, the colourless margin, due to the shrinking of the inner egg, is wider than in any other species and has the appearance of a frill round the egg proper, this great width is due to the flatness of the egg—it is nearly an eighth of the diameter of the egg in width, or, the inner egg is only three-quarters of the

diameter of the shell. I have observed more distinctly in this species, that a moth in laying smears a cement on the surface on which she lays the egg, often extending the width of the egg itself beyond the surface that the egg covers. The inner egg presents a series of brown spots (Plate VIII., fig. h), a series of very narrow marginal ones and two inner rows, the spots are not round, but angular, usually pentagonal, clearly indicating that if only a little more developed they would coalesce and reduce the pale area to rounded spots as in *alni* or *aceris*. The brown spots differ in different specimens, the extremes being merely indicated dots that might easily escape detection, and on the other hand they are so large as to occupy nearly as large an area as do the pale spots in *aceris* or *alni*. The specimen figured is about an average, but those with nearly evanescent spots are the least frequent. The ribs are 66 in number, and do not differ in structure or arrangement from the other species.

The newly-hatched larva presents the same pale segments as *alni*, *e.g.*, 3.4 and 11; but the tendency of 10 to be pale in *alni* is not observed in *megacephala*.

The head is black, the general colour rufous, except 3.4 and 11, which are very pale, 3 and 4 are also very small and narrow in the newly-hatched larva, 11 is low and flat, but projects laterally. The tubercles are large raised bosses, paler than the rest of the segment, but without very defined margins. Each tubercle with one hair, dark basally and paler towards the tip, 1 mm. in length, the larva itself being 2 mm. The blackness of the hairs is very conspicuous on the pale 3rd and 4th segments, on the 11th they are shorter and paler than elsewhere, the size of the sub-spiracular tubercles is what gives this segment the appearance of width, or at least the width of the segment forms a boss on which the sub-spiracular hair (and tubercle?) stands. The 2nd segment has a central flat hairless scutellum with three tubercles on either side, two in front and one behind. Seen laterally the larva is pale whitish or fuscous with a brown back from 5—10 and on 12 and 13, the dorsal tubercles showing as paler bosses out of the brown area; on 12 and 2 the hairs exceed 1 mm. in length. When full-fed in this (1st) skin (Plate VI., figs., 5, 5a), the tubercles are distinctly separate and but little angled, on 12 they have the usual cruciform arrangement, but are small, circular and wide apart. The white on 3 and 4 has dwindled to a dorsal lozenge just including the inner tubercles, there is an indication of a similar pale patch towards the anterior margins of 6, 7, 8, 9, and 10. 11 has the white porcellanous look of the hinder segments of young *alni*, and the posterior trapezoidals are rather on a sub-segment, with marked lateral bosses.

In the matter of spinning, *megacephala* closely resembles *psi* and *tridens*. Its proper procedure is probably to get behind a piece of rotten wood or bark, but it will excavate a hole into rotten wood or pith of elder, etc., as well as *tridens* or *alni*, and is more loth than either of them to go into earth, rubbish, or sawdust, and will wander about disconsolately for days before submitting to do so. The cocoon it makes is much like that of *tridens*, but with rather more silk and of a more robust character; but it makes only the cocoon, no outer defence, like *alni* or *leporina*.

The pupa (Plate III., fig. 5, 5b, 5c) in colour, texture, general aspect and outline

closely resembles *psi* and *tridens*, length 20—22 mm., width 5½—6 mm., therefore larger and more robust than they. The wing portion ie eylindrical, tbe free abdominal tapering. Down the back is a rather darksr shade. Two fine brown hairs exist at the base of each antennæ, but though larger than in *tridens*, would certainly not be seen unless epecially looked for. The angularity of the frss segments at the incisions is more decided than in *tridens*.

Ths fixsd abdominal segments 5, 6, 7, and 8 besides being pitted minutely have more markedly in some specimens than others, certain depressions, that look at first as though ths pupa, when newly moulted, had heen marked by lying agaiast something. There are, however, when fully developed, two of these on each side of each segment, the 4 filliag np the space from side to side between the wing covers. Ths pitting and these depressions are most marked on 5, and tend to be disposed in two transverse series on each segment, the whole arrangemeat bearing some resemblance to ths special sculpturing on the pupa of *ligustri*. In *megacephala*, however, it is never very marked, and in many specimens ouly to be traced by comparisou with a more decided instance. In the last larval skin I noted a very curious dspression immediately behind ths supra-spiracular tubercle; this is even more marked in the pupa, especially in 7, 8, 9 and 10. At least there is a deep pit on these segments at a situation that very closely, if not absolutely, corresponds with that in the larva, it is evident enough in 11 and 12, and in 6 and 7 is a deeper portion of the hollows referred to above.

The anal armature consists of a boss on the dorsal half of the otherwise rounded end of the pupa; this boss is black, closely wrinkled longitudinally and armed with about 18 spines or hooks. Of these two are dorsal, the remainder are disposed as a fan or fringe round the vertical margin, four along the extreme end and six or seven on either side, closely huached togsther. These spines have an elegant curvature and terminate in a hook forming nearly three-fourths nf a circle, the dorsal ones curl downwards, the terminal ones upwards, and the lateral ones in several directions. It is impossible to resist believing that the dorsal spines correspond with the dorsal nes of *tridens*, the four cantral with the four central of that species, and the lateral take the position of the lateral spine, the nnly difference from *tridens* hsing this multiplication nf the outer ventral spine. As in *alni*, these spines secure a very firm hold of the silk of the cocoon, which is wonnd round and amongst thsu most firmly.

I have no record showing that *megacephala* misses a moult, hut I did get into a confusion the first year I hred tbe species, as to the number of moults, which probably arose from some four monlters occurring; those which I specially obeerved the secnnd year all moulted five times. *Megacephala* is the most accomplished of all the species in passing mors than nne winter as a pupa, tbough it is run rather closely by *leporina*. More than half a brood usually goes over to the second year, and this year (1891) I bed three pupæ left of larvæ of 1887, of which two emsrged quite eatisfactorily, ordinary full-sized specimens, and ths third is alive and well, and proposes to face a fifth winter as a pupa. This specimen ultimately emerged successfully.

In this distrist it affects aspen as its proper food, but occurs on other species

of poplar. I have seen it, but very rarely on sallow; it does not range far north, at least on the west coast, but I do not know its exact limits.

Notes on Plate III.—The pupæ here illustrated are the most typical *Cuspidiæ*. They all have the two dorsal hooks, and of the three ventral hooks on either sids, all have the two inner; *alni*, *strigosa* and *tridens* bave also ths nuter in typical form; *psi* has this outer one simply, or more usually duplicated into two on either side. In *megacephala* it is represented by a lateral group of 6 or 7 hooks. Taking *tridens* for comparison, then *psi* is extremely similar, *strigosa*, though of the same pattern, has the hooks very long and delicate, proportionally (to the smaller pupa) about twice as long. *Alni* has the hooks much the same, hut more spread and more hooked, and has in addition the remarkable special groove, with its fluted margin and remarkable smooth escutcheon on ths boss below. In *Glea* there is a suggestion that such a etructure might arise, but I am not acquainted with any other pupa with this groove fully developed. The drawings, which are well reproduced in the plate, convey a very accurate impression of these strnctures, and are indeed most excellent aad successful. Only in *megacephala* is the success at all modified.

Notes on Plate VI.—These figures show ths larvæ of *Acronycta*, Section *Cuspidia*, with the exception of *Cuspidia strigosa* (on Plate IX.) and *C. aceris* (on Plate V.), that of *Moma orion* being also includsd. The young larvæ of *Cuspidia* have a more delicate appearance than those of *Viminia*, due to the tubercles having, not several, hut one hair on each tubsrcle (the anterior trapezoidals of *aceris* and *leporina* have two). They all strongly present the *Acronycta* feature of a "weak" 11th segment, this being always pale, always with smaller tubercles and finer, shorter hairs, lower dorsally, though often a littls widsr, and with the tendency to a sub-division into an anterior and posterior sub-segment more marked than in any other segment. The "pale" and "dark" segments are in *C. psi*, *tridens* and *strigosa* the same as in *Viminia*, *viz.*, 3,4. 6,7. 10.11 pale; in *psi*, 13 is dark; in *tridens* and *strigosa*, pale. In *strigosa*, the dark portion of the dark segments is more decidedly a mere dorsal lnzenge, but this is to some extent tha case in the other two, not so much so in the remaining species.

In *alni*, 6 and 7 have become dark segments and 10 partially so; *megacephala* is nearly the same, excspt that 10 is dark, and 3 and 4 are somewhat doubtful. In *aceris* and *leporina*, 10 remains pale, as also does 6; 3 is pale in *leporina*, dark in *aceris*.

With regard to *M. orion*, it will be sufficient here to note that, very diffsrent as it is from the nthers, the "weakness" of segment 11 is very evident, showing that its supposed affiuity with *Acronycta* is confirmed by this curious and special character.

The arrangement of pale and dark segments may be made more intelligihls if arranged in thie tabular form. Except in *ligustri*, the head is always black, and the 2nd segment is pale, except for the predominance of the dorsal plate and some dark markings.

Arrangement of pale and dark segments in larvæ (First skin, or, newly hatched) of Acronycta.

SEGMENTS:

SPECIES.	HEAD.	2	3	4	5	6	7	8	9	10	11	12	13	14
Bisulcia ligustri	—	—	—	—	—	—	—	—	—	—	—	—	—	—
All *Viminia*	×	=	—	—	×	—	—	×	×	—	—	×		
Cuspidia strigosa	×	=	—	—	×	—	—	×	×	—	—	×	—	—
C. tridens	×	=	—	—	×	—	—	×	×	—	—	×	—	—
C. psi	×	=	—	—	×	—	—	×	×	—	—	×	×	=
C. alni	×	×	—	—	×	×	×	×	×	=	—	×	=	=
C. megacephala	×	×	=	=	×	×	×	×	×	×	—	×	×	×
C. leporina	×	=	=	=	×	—	×	×	×	—	—	×	×	=
C. aceris	×	=	×	×	×	—	×	×	×	—	—	×	×	×

× dark ; = doubtful or intermediate ; — pale.

Acronycta (Cuspidia) leporina.—This species and *aceris* differ from the other *Cuspidia* in having very hairy larvæ (in last skin). The nature and disposition of the hairs, however, is such as presents no similarity to the hairiness of the larvæ of *Viminia*. In *Viminia*, the hairs resemble those of *Arctia* in being developed in rosettes on the tubercles. In *leporina*, and to a great extent in *aceris*, the tubercles actually disappear, and the hairs that are developed are scattered over the general surface, and are, in fact, a full development of the hair points that cover the general surface in *megacephala* and *strigosa* (and others). *Aceris* does, however, in one or two points, make an approach to *Viminia*, probably, however, as a matter of parallel variation, rather than by continuity of relationship. As to *leporina*, there is only one point at all suggesting affinities to *Viminia*, closer than those of the other Cuspidians, and that is that the newly hatched larva has two hairs on the anterior trapezoidal tubercles. On this point I must call attention to the circumstance that under several species I have written as though *aceris* only presented this peculiarity, this is a lapsus requiring correction. It differs, however, entirely, in the arrangement of light and dark segments, and, since *psi*, *tridens* and *strigosa*, which each have only one hair to a tubercle, resemble *Viminia* in the alternation of light and dark segments, and are therefore nearer to them than *leporina*, I incline to regard this duplication of anterior trapezoidal bristles as not indicating close relationship.

The egg of *leporina* (Plate VIII., fig. 3) differs from those of all the other *Acronyctas*, to what at first sight appears a very important degree, as regards its coloration. There is the outer frings of clear egg shell, but the inner egg is homogenous in colour ; all the others, beginning with *psi* etc., which remain clear, passing through *megacephala*, where the brown colouration only reaches the length of separate dots, to *alni*, *aceris*, etc., where the dark colour is more abundant, have some pale areas tending to be arranged in concentric circles of spots. In *leporina*

the pale area entirely disappears. The development of the colouring is a very regular and beautiful process, the egg, pale straw colour at first, as the inner egg shrinks away from the shell, develops a chocolate dot at the vertex surrounded by a small reddish circular patch, which is gradually invaded by the chocolate colour, which is still, however, rather bright or reddish ; then round the margin of the inner egg appear 5 to 8 reddish spots, the inner chocolate area extends angularly towards these spots leaving for a brief interval between them a circle of pale blotches. Then the dark colour absorbs the whole inner egg, which becomes of an uniform tint, except that the ribbing of the shell, more markedly than in any other species, gives in different lights some very pleasing effects of a silky or pearly lustre.

The egg exceeds one millimetre in diameter, is only about ·35 mm. in height, very variable in the number of ribs, two specimens having respectively 41 and 63, the lesser numbers are the more common ; towards the top they are waved into arched lines enclosing distinct hollows, the white reflections from the bottom of which, give the peculiar silky tone above noted. The ribs increase by branching or separate origin, but towards the margin are straight and simple. When first laid, the egg is colourless. The micropyle presents the same rosette of radiating willow-leaf cells as in the other species.

The newly-hatched larva (Plate VI., fig. 5) is 2 mm. long, white, with the dark segments marked by the dorsum being dark brown, these are 4.5, 7.8.9 and 12, and partially 13 and 14. The head is black, and there is a distinct black plate on the 2nd segment. The anterior trapezoidals have each two hairs with indication of a third, the other tubercles each have one hair ; the hairs are long (1 mm.), black, and longest on the front segments. Both hairs and tubercles are much smaller on 11. The tubercles have very decidedly the wedge-shaped outlines due to mutual pressure, and cover nearly the whole dorsum of the young larva. On the dark segments and on the 3rd, the tubercles are black, the supra-spiracular and posterior trapezoidal on 6 are tinted dark, the tubercles of 10 and 11 are nearly colourless as well as the anterior trapezoidals of 6. The tubercles and hairs of 10 are smaller and weaker than the others, though less so than on 11. The 12th segment is high but narrower than 11, and has the crucial arrangement of trapezoidals, whilst on 13 they are reversed.

As the larva grows, there becomes evident a transverse groove between the trapezoidals (like *alni*), or perhaps two transverse level ridges to each segment (carrying respectively the anterior and posterior trapezoidals), ending in a point at the outer end, the posterior being the wider, would better describe the aspect—this is especially obvious on 11. The scutellum of the 2nd carries four hairs along the anterior margin, and four along the posterior, but the two inner of these are smaller, it carries a central marking as if for subdivision. There are only two hairs on the anterior trapezoidals of 3 and 4, that is, these tubercles do not show the usual indication of being double, except by the hairs being in front of each other on 3, and side by side on 4, whilst on the others they have a diagonal disposition (the outer in front).

When full-grown in this (1st) skin, the contrast between 6, 10, 11 and 7.8.9 is

very great; the former are smooth, white, glazed, giving a porcellaneous aspect, the hairs are smaller (most on 11), and the tubercles are either white and indistinguishable or much smaller than the large black plates of the dark segments. The 11th segment has the typical lateral projection and dorsal depression, and the division into two sub-segments is more marked than on the other segments. The 3rd segment has become slightly rufous.

The larva invariably selects the underside of the leaf, and, in feeding, leaves the veins and upper cuticle. It sits with a slight bend at the 6th segment, but with no approach to the curl of *alni* or *megacephala*.

The young larvæ are usually to be found in the wild state, several together on adjacent leaves or branches, showing that the eggs, though laid separately, are generally laid in little groups.

There are two distinct forms of the full-grown larva, the southern alder or green form with white hairs, and the yellow northern or birch form. The former is tolerably uniform in the larval surface, being green and nearly free from marking. Length 34 mm.; outline thickest at 7.8 and 9, tapering either way with an arched or rounded margin, especially when sulking, something like *Notodonta dodonæa* or *N. carmelita*, but more truncate at the tail. Colour pale apple-green with no markings, spiracles white with a fine black line, head and legs a trifle paler, labrum and palpi nearly white, darker beneath. The surface is uniformly clothed with long, perfectly white hairs, which stand erect for about 2 mm. of their length, and then bend down parallel to the larval surface for a length of about 5 mm., thus forming a continuous coat or surface at a distance of 2 mm. from the larva. Very inconspicuous, but easily seen when looked for, are certain black hairs, 2 to 3 to each anterior trapezoidal, 1 to each posterior trapezoidal, 1½ to 2 mm. long, a little longer and more numerous on 13 and 14, where they tangle with the flowing white hairs. Sometimes this form has some black markings in head. The yellow form has a yellow larval skin with distinct chocolate bands down back and side, indistinct as to outline, but pronounced as to tint; it is also olive-brown beneath, the head has much black, and the black tufts on the back are very strong, rising above the level of the yellow hairs, especially are they strong on 5.7.8.9 and 12.

I have had the white form with a good deal of chocolate marking of the skin, and the yellow form tolerably free from it; whilst the degree of development of the black tufts of the conjoined anterior trapezoidals varies very much.

I have not mentioned yet, as I desire to do so with especial emphasis, the peculiar manner in which the long hairs, after being bent down parallel to the larval surface, are arranged. This is exactly as if they had been brushed smoothly, but the remarkable part of the arrangement is that they are always brushed *forwards on the right side*, and *backwards on the left side*. So that we have here an instance of bilateral asymmetry, which is certainly extremely rare throughout all insects. In the white form the brushing is generally most smooth and perfect, in the yellow one there is sometimes a little roughness.

When ready to spin, and some hours before it moves off in search of a site for its cocoon, a change of tint occurs, the skin becomes a dirty olive and the

hairs nearly black, except their extreme tips, which change colour but little. The appearance is as if the larva had been well smoked. The larva will sometimes eat a whole leaf whilst the change is taking place. I have had *strigosa* eating several days after the similar change that occurs in that species had begun, but this year *strigosa* began to excavate within a couple of hours of the first change of tint being noticed, in every instance in which the observation was made.

Leporina makes its cocoon by boring a hole into rotten wood, though it will adopt any suitable tube, bramble or elder pith, etc., just like *alni* or *strigosa*. I once found the larva in the wild state making its burrow, this was into the dead bark of an alder, a most ancient tree, with hard cork-like bark nearly two inches thick. A typical cocoon is made by entering a vertical face of rotten wood, the whole excavation being made by the larva, sometimes occupying as much time as 20 hours, and always about half as long again as *alni*, varying of course according to the material. The whole excavation may be in one line, but usually when half an inch deep the burrow turns downwards. The total depth is 1·3 inches (35 mm.), and 0·4 inches (10 mm.) in diameter; the exterior opening of the burrow is closed by a diaphragm of dark felt, consisting of the cast hairs of the larva with a minimum of silk; 10 mm. below this, another diaphragm made of wood chippings and strong silk occurs, this is a strong structure, and is in fact the top of the cocoon proper, the burrow is often slightly narrowed at this point, the material to form the diaphragm being obtained by a rounding out of the cocoon cavity, and some superfluous chips always occupy the base of the cocoon and occasionally other portions, a trace of silk lines the cavity, and is more abundant at the base, where the chrysalis entangles its anal spines therein. No larval hairs are to be found on the cast skin, or anywhere in the cavity, except in the felt diaphragm closing its mouth. In emerging, the moth makes an inappreciable opening in this, which closes up elastically. In the inner cover there is sometimes a small circular lid, at others a triradial slit.

The pupa (Plate IV., fig. 1), length 20—22 mm., wings 11, abdomen 9, width 5mm. to 5th segment, then wider, 6 mm. to 9th segment, then tapering to apex. Projection of spiracles marked. Colour blackish-brown, with darker dorsal line, and paler beneath; wings and legs transparent, dark green nervures distinct as raised ribs on the wing cases. The two hairs at antennal base very minute, wings meet at end of proboscis, separate again, just showing tips of hinder legs. The anal armature is a boss somewhat flattened from above downwards, forming a thin semicircular margin, round the edge of which the ventral hooks are tolerably regularly distributed as a corona, eight in number on each side, the two terminal ones being more important and finely curved in a lyre shape, and the two nearest the base being one above the other. The lower surface of the boss is flattened, the upper rather domed, carrying the two dorsal hooks, projecting upwards, slightly backwards, and also with a double lyre-shaped curve. The boss is dorsally finely wrinkled and pitted, margined above by a transverse depression, above which again is a small rounded wrinkled boss; a special raised line or wrinkle passes down from the transverse groove, between the bases of the dorsal hooks. The pitting of the general pupal surface is only marked along the anterior dorsal

margins of the abdominal segments, and the intersegmental membrane is, as in the other species, finely shagreened.

This species remains several years in pupa more frequently than any other, except *megacephala*, a third of a brood will often stay over the second year, and I have had several that emerged satisfactorily after a third winter.

The protection which the full-grown larvæ of *Acronycta* have from their enemies, owing to their special form and colouring, is a matter that, in its details, has very largely eluded me; I have, in fact, seen very few *Cuspidia* in the wild state. *Psi* and *tridens* are usually conspicuous, but may be otherwise in many circumstances; *strigosa* no doubt closely assimilates to a hawthorn leaf with a bit of brown dead leaf or twig. But, except in the case of *leporina*, I have made no observations that are either new or very definite. But in this case, so odd is the mimicry, and so unlikely to be thought of, except by having actually observed it in the field, that it is very likely that some other species have unsuspected means of protection or concealment. My observations were made and repeated a good many times on the green, white-haired form occuring on alder; this larva sits somewhat curled round, near the middle of the under-side of a leaf. Looking down from above it is absolutely hidden, looking up from beneath it ought to be very evident, but this is far from being the case. I have several times missed a larva till I have looked three or four times, and have also fancied I saw a larva when none was there. In looking up from below through the foliage of an alder tree, most of the lower leaves are in the shade of the upper ones, but here and there a gleam of light falls through on to a portion of a leaf, and gives it quite a different tone and appearance, as seen from beneath. A larva of *leporina* seated beneath an unilluminated leaf, precisely resembles one of these patches.

Mr. Poulton thinks the larva gets protection by resembling a cocoon, though I fancy a bird would attack the cocoon as readily as the larva; an ichneumon might be deceived, or at least if deceived, would leave the cocoon alone, and there is a chalcidious parasite that plays great havoc amongst *leporina*.

This may, therefore, for all I know, be the actual means of protection of the yellow larva, that is more frequent on birch and in the north, though I rather fancy that, curled up under a birch leaf, and occupying nearly its whole surface, it more nearly resembles a dead yellow leaf or two with some spinning attaching them to the living leaf, such as *Asphalia flavicornis*, for instance, and other larvæ often leave in great numbers on some birch trees, and the black tufts that sometimes persist in this form, resemble bits of frass and other dark chips that are entangled in such vacated lodgings. It would not perhaps be altogether improper to call such empty domiciles, cocoons, though they are not usually included in the term. I have never myself been mistaken, so far as I know, by passing over *leporina* on birch, certainly I have never taken anything else for *leporina*, though I have not unfrequently found the full-grown larva at rest on birch. My difficulty in accepting Mr. Poulton's hypothesis is, that the protection on alder is certainly by a very different resemblance, whilst on birch, I can call to mind no cocoon that it is at all like; indeed the only one at the right season is that of *Ennomos tiliaria*, to which *leporina* larva bears no resemblance. An *Orgyia antiqua*

cocoon might occur, but is not common on birch, nor has it the right tint. In any case *leporina* presents a marked instance of a dimorphous larva, such form being suited to different circumstances and almost certainly for purposes of concealment.

The dimorphism of the adult larva wants further investigation as to its geographical distribution, and I shall be glad to hear, from as many localities as possible, as to which form is found, and under what circumstances. As far as my present information goes, I regard the white as the southern, the yellow as a northern form, but I also associate the white with alder, the yellow with birch. This may result from the circumstance that here I usually capture the white form on alder, rarely on birch. In Scotland I used always to take the yellow form freely on birch, rarely on alder. I do not know that alder is more common in the south and birch in the north, as an actual botanical fact, both being fairly common everywhere, but certainly they have that relationship in the habitats of *leporina* in which I have hunted. As a basis to elicit further information I may say, that somewhere about Cheshire or Lancashire the white form gives place to the yellow. Does the white extend further north on the east coast? What form occurs in Wales and Ireland? Especially information would be interesting from any locality where both forms occur with equal frequency. The moths from the two forms cross readily, and, in one brood at least, the resulting larvæ were the most richly coloured I have seen, and preserved the black tufts more freely into the last skin than any others I have met with.

Acronycta (Cuspidia) aceris.—This species is usually associated with *leporina*, on account of both having hairy larvæ, but the egg colouring, the different distribution of pale segments in the newly hatched larva, and the method of pupating, make it most probable that this aspect of the full-grown larva is a resemblance, not due to a close relationship, but is a case of similar structure independently developed in allied species. The arrangement of the hairs also differs very markedly in the two species. In both, the hairs of the general surface are well developed, but in *aceris*, the tufted distribution is largely due to a special development of the hairs of the tubercles, only slightly paralleled in *leporina* and not occurring in any other British species.

The egg (Plate VIII., fig. 4) is large, 1.1 mm. in diameter, rather flat, ribs numerous—usually 70 to 75—but sometimes as few as 50. When first laid it looks very like that of *psi* or *tridens*, but is a little more opaque. As the inner egg shrinks and leaves a colourless margin, it assumes a rich chocolate colour with pale straw-coloured spots, which are rather large and somewhat irregular in distribution and shape, being frequently almost angular rather than circular, and often run together into streaks and blotches, but suggesting a never-attained type of a central spot, and three rings surrounding it, of which the inner is imperfect and encroaches on the central spot and the outer is marginal, the intermediate one consisting of the largest spots frequently joined together into portions of a circle. The number of spots in each circle would be perhaps 6, 12 and 15 respectively where each row is most regularly developed. The micropylar spot is small, and surrounding it, the ribs join together in a wider area than usual of

confused and irregular ridges, not settling down into regular ribs till half way to the margin.

The newly-hatched larva (Plate V., fig. 10) is fully 2 mm. long, the head is black early, but the rest of ths larva pale, ths dark segmants haing marked by the dorsom being reddish-rufous; as it hegins to feed, however, it becomss much darker. There is a hlack plate on segment 2. Segments 5, 7, 8.9, 12 and 13 (and partially 4) have ths dark dorsal areas (dark segments). The tubercles on these segments are whita when the larva is just hatched. When the colour matures after some hours, the gensral toue is fuscous, 3 is paler, there is a large white ares on 6, and 10 and 11 are white, the tubercles are black even on thess pale segments, larger on the dark ones, angularly flattsned against sach other, but on 11 much smaller, circular, and separated from each other. On 12 they are cruciform and trapszoidal reversed (as usual) on 13. Ths tubercles each carry one long hair, about twice the diameter of the larva in length, the anterior trapezoidals each hava two; four on those of 3 aud 4, and three on thoss of 12. The skin is fioely dotted all over except on whitest portions; on 3 and 4 the trapezoidals are fused. The division of the segmants into two sub-segments carrying each the anterior and posterior trapezoidals are very evident in this species. Ths head carries long hairs. The larva sits curled into a note of interrogation (?) form; it sits heneath the leaf and eats the lower parenchyma between the veins.

In pupating *aceris* differs from the other *Cuspidix* in not hurrowing into rotten wood or otherwise excavating a cavity or burrow. It likes to get behind a loose chip of wood or bark, or into a mixture of wood chips and dead leaves and will spin up among dead leaves, in moss, etc. A cocoon formed among wood chips has first a wide outer area of loose spinning, then a distinct cocoon of rather loose texture, about 1½ in. hy ⅔ broad, consistiog of a vary pale hrowaish (nearly white) silk, with tha hairs of the larva and numerous wood chips interwoven. Inside this, and on one side cnntinuous with it, is the inner cocoon, of tough white silk, danse and firm, with wood chips included in its thickness; the toughness is equal to, if not greater than that of *menyanthidis* or *rumicis*. This inner cocoon is 1¼ in. x ⅓ in. Internally it is lined with white silk, but is rough and irregular rather than smooth, as the interiors of cocoons usually are. I hava also had cocoons made in moss, which were almost exactly of *Viminia* type, hut these were sent me and had, I fancy, been deprived of the nuter envelope and were only the innar true cocoons.

The pupa (Plate IV., fig. 2) is 22—25 mm. long, 13 for wings, aad 9 for free ahdomen, width 7 mm., fairly equal to 9th segment, then tapering to extremity, but with decided angular ribhing at spiracular lines. The coloar aod texture is the brown chitinous of the *Cuspidix*. The rich hrown has darker lines at the margins of segmants, especially of 4, 5, 6 and 7, also a dark dorsal lios wideaed in places, as if it were the black lina which, in the larva, encircles the lozenges. This is unmistakeabla on 11 and 12. The 9th aad 10th segments often have projections representing the prolegs; in some pupss these ars so distinct as to suggest a continuance of the larval structura. No hairs are found except those at the base of ths antennæ, and of these, *only one* is certainly mada out. The

proboscis and intermediate legsfall short of the length of the wing cases, and ths extremities of the hind legs come into view. Tha boss carrying ths anal armature forms a less projection than in other species, and would, but from analogy with them, be regarded rather as meraly the roundsd end of the pupa slightly produced. It is, however, ahundantly and finely wrinkled and has a full armamant of spines. These consist, as in the other *Cuspidix*, of a dorsal and ventral series. The dorsal set are here subject to a multiplication (or rather division), that hitherto we have seen affecting only tha veutral series; on either side there is ona strong spine, the largest of all and three weaker ones of about ⅓rds its length. The ventral set consists of 9 or 10 on either side, very crowded togsther, somewhat longer than the shorter dorsal hooks. The dorsal hooks bend downwards, but the ventral ones presont in all directions. The hollows on the dorsum of the ahdominal segments, which apparently exist in all the speciee of the *Cuspidix*, and which I hava more fully described in some of them, are here especially evident in the 5th segmeot. The cast larva skin is nearly free from hairs, which are left entangled in the outer cocoon. The pupa varies, howevar, a good deal. Iu not a few there are on soma segments markings that appear to be a persistence of the diamonds on the larval dorsum, and the persistence of larval prclegs though commoner in this than perhaps in any others, is really exceptional. The dorsal hooks are at times singls and may havs one, two, or more slighter companions, the ventral set may be as few as five. The boss is at times more marked than as above described. The hooks are very curved and so entangle themselves in the silk of the cocoon as to be often hrokeo rather than be set free for examination, although the pupa does not take so firm a hold of the cocoon as one wonld axpect from so abundant a supply of hooks.

It is not unusual for this species to pass a second year in the pupa state.

Acronycta (Bisulcia) ligustri.—This species differs from the groups *Viminia* aud *Cuspidia* more than they do from each other. If it is to be kapt within the genus *Acronycta*, then most certainly such species as *Clidia geographica* and *Simyra nervosa* must be placed in the section *Viminia*, and not in separate genera.

Ligustri differs from the others in tha form and sculpturing of the pupa, and also in the form, habit, and gensral facies nf the full-grown larva, even making full allowance for the immense variety that *Acronycta* allows amongst its adult larvæ. It agrees with *Acronycta*, however, in its two most essential characters—viz., ths flat dome-shaped egg (less than a hemiaphere) very lika that of *psi*, aud in ths young larva having a "weak" eleveath segmeat, and having, indeed, an undoubted *Acronycta* form and aspect, althongh it has no dark segments—except ths black head, and this ersn is pale on emergence from the egg.

The egg (Plate VIII., fig. 8) is of a pale pearly green, almost colourless, very translucent, 1.1 to 1.2 mm. in diameter, quite as flat as any of the others, about one-third its diameter in height. The ribs are 60 in aumber; the micropylar area is rather larger thau nsual, and the ribe do not increase in number outwards by intercalation or division so much as is usual in other species. The figure is faulty in not showing a large micropylar area, and in showiug little or no branching of ribs. In one instance, two ribs joined together outwards, and so dimiuished tha number

of ribs towards the margin. This is very unusual, and I have not met with it in any other *Acronycta* egg. The summits of the ribs are narrow and waved, but it would be hardly correct to say there are any transverse secondary ribs. The inner egg shrinks from the shell as in the other species, but no coloration takes place. The egg is laid singly, probably beneath the leaf.

The newly hatched larva (Plate V., figs. 8 and 9) is whitish or colourless except the head, which soon becomes black, and the jaws brown. The tubercles are slightly outlined in a darker shade, and the hairs are fuscous towards their bases. The length of the larva is about 2 mm., of the hairs 0.3 mm. There is one hair on each tubercle. The tubercles are arranged on the usual pattern, the trapezoidals and supra-spiracular are largest and of oval form; the post and sub-spiracular smaller, each abundantly distinct from its neighbours, with no trace of the angulation and apparent crowding so characteristic of many *Viminiæ* and *Cuspidiæ*. The slenderness of the larva makes the legs and pro-legs appear very long, and the pro-legs show well the double-winged form characteristic of typical *Macro-Heterocera*. The eleventh segment is lower than the others and rather broader, the tubercles and hairs are less pronounced, but not so markedly as in the other sections.

I do not know, from personal observation, where the cocoon is made naturally, never having met with one; but my friend, the Rev. G. M. A. Hewett, finds that they make them under moss on the trunks of the ash trees, when such a situation is available. In captivity, some individuals ascend, and like to spin under some overhanging ledge, but the majority appear to prefer to go downwards and spin among dead leaves and surface rubbish, generally against the side of cage, however, and, probably, they usually spin against the stem of the tree. The cocoon consists of very dark, nearly black, silk, and is of considerable strength, in one dense layer, without any admixture of chips or extraneous matter, but adhering, if possible, to some leaf or other object all round. This habit makes it of varying and irregular form, and so gives rise to a little doubt whether the fact, that the point of exit is usually a valvular slit, is a true and constant result of instinct, or is due to this point being so often where two objects, between which the cocoon is made, meet at an angle. The fact, however, is undoubted, that, unlike *Viminia* with a weak place in the cocoon, or *Cuspidia* with a specially-arranged, but not specially weak point of exit, *Bisulcia ligustri* has frequently a valvular slit in the cocoon, often nearly as completely elaborated as in *Hylophila* or *Sarothripa*.

The pupa (Plate I., fig. 3, and Plate IV., fig. 4) is even more distinct from those of *Viminia* and *Cuspidia*, than they are from each other. Having only one species to deal with, it is difficult to take any of the points of difference as being generic rather than specific, but, as a provisional expedient, it is perhaps simplest to regard them all as being so. It is of the Noctua type as regards general appearance and texture, short and thick, the general outline similar to a *Tæniocampa*, 15 mm. long, of which the 9th to the 14th abdominal segments are only 5 mm.; the width is 5 mm., the widest part being about the 4th abdominal segment. The colour is brown, tending dorsally to black, especially along the posterior margins of the 4th, 5th and 6th abdominal segments. The head, legs, and wing cases are very

smooth and polished, but the remainder of the pupa, especially dorsally, is sculptured in a very definite manner, of which only the dimmest suggestion is to be found in any of the *Cuspidiæ*. A special pattern affects the dorsum of each segment, *viz.*, two furrows or channels crossing from side to side, leaving a median and two marginal ridges. On the prothorax these furrows meet laterally; the anterior is interrupted in the middle line by a very slight ridge, but the second is so interrupted as to present only two ends and two pits between the divided ends. On the mesothorax, the pattern is so modified by the expansion of the median ridge and central interruption, as hardly to come within the definition of the pattern which is fairly applicable to the other segments.

The furrows form a horse shoe shaped depression, with the convexity forwards, and the posterior ends dilated, leaving in its centre a raised surface, shaped like a heraldic escutcheon or shield. On the metathorax, the furrows coalesce and the dividing ridge is represented by only a faint elevation in the dilated ends of the furrow.

On the first abdominal segment, the median ridge is divided on each side of the middle line. On the following segments, the pattern is more typical, the median ridge widens at its extremities, and flattens out to join the marginal ridges, and in the flat portion the spiracles are situated. The marginal ridges of adjoining segments are separated by a sharp but narrow incision, so that the pupa appears to have alternately double and single ridges transversely. All these ridges, from the posterior thoracic margin to the median ridge of the 7th abdominal segment, are very sharp and well-defined. There are no minute pits as is so usual with Noctuæ. The prothoracic spiracle is distinct, the six abdominal spiracles are oval and have a shallow depression behind them. The pupa tapers to a point behind, which has, however, a very definite though minute armature, consisting of eight short points hooked downwards (towards the venter), disposed almost in the pattern of the hooks of *tridens*, two being dorsal, and the other six in a line anterior to this, the central ones being the largest. There are two, if not three, very minute bristles at the base of the anteoæ.

I have never taken the larva on anything but ash, which is no doubt its proper food in this district (Hereford), and its form and colouring are so adapted to its residence on the leaves of the ash, that I should imagine its other foodplants are makeshifts, resorted to, if one may so express it, because their botanical affinities persuaded the parent moth when ovipositing, that if they were not ash they were something very like it, and the larvæ found it possible to accept the position.

I have never had a pupa of this species successfully pass a second winter in that stage.

Moma orion.—This is the only British species outside the genus *Acronycta* that appears to me to belong to the same family. I presume it was originally classed with *Acronycta* on the ground of characters of the imago, I sustain its claim to that position because the newly hatched larva presents an eleventh segment that has essentially the same characters as that segment has in true Acronyctas. The young larva has, nevertheless, a considerably different facies,

and the egg is nearly spherical, instead of being of the flat form characteristic of those of *Acronycta*. Nevertheless, the egg has the same remarkably fragile delicacy that many Acronycta eggs have.

The egg (Plate VIII., fig. 10–10a) is flat on the lower surface on which it rests and so is not quite a sphere, but is nearly three-quarters as high as it is wide. Its diameter is 0·7 mm., the ribs number thirty at the margin, and the transverse or secondary ribs are very marked, from the netting at top, the ribs increase outwards by division and intercalation in the usual way, but, instead of doing so in irregular positions, nearly all the increase takes place at about one-third of the way from the summit, though rarely quite as regularly as shown at fig. 10a. The whole egg is extremely delicate and transparent, acquiring a pale straw tint, but no deeper coloration or markings, nor does any change occur as the contained larva becomes ready to hatch, except a slight increase of opacity and the tips of the larval jaws can be seen, but the young larva is itself so transparent that very close observation is necessary to see anything more of it.

The eggs are laid beneath the leaf in batches of fifty or more, regularly disposed in close order like many species of *Arctia* and Noctuæ.

The newly hatched larva is a very delicate whitish scrap, whose first duty is to eat up as much as his neighbours permit of his egg-shell, and who is already prepared to drop by a thread if alarmed. In Pl. VI., figs. 6-6a, the facies in which he differs from a young *Acronycta* is, perhaps, a little exaggerated, and he certainly has not so much colour as there shown, though a greenish tint soon arises when some food has been eaten. They linger rather leisurely over their eggshells, apparently waiting for the last member of the batch to hatch. I have not found them (as *Spilosoma* does) eating any infertile eggs. At length they commence to feed, which they do by ranging themselves exactly side by side, and marching forward exactly in line, in the manner of *Pygæra bucephala*—only even more exactly and accurately. They only eat the parenchyma of the leaf, leaving the upper surface and even the smallest ribs. The larva is practically colourless, and only 1¼ mm. in length. It looks rough and irregular from the large size of the tubercles and has a large head, but the want of colour makes details very difficult to observe, and it is generally cylindrical. Segments 4 to 10 have a small circular anterior trapezoidal tubercle and a large curved posterior trapezoidal, which arches round the anterior trapezoidal apparently in order, as it does, to occupy all the dorsum except that taken by the small anterior trapezoidal. Then there is a large supra-spiracular, and an equally large sub-spiracular tubercle, and between these two minute (pre- and post-spiracular) tubercles. There is also, in these segments, a remarkable feature suggestive of alliance with *Liparidæ, viz.*,—a minute dot in the central line, between the posterior horns of the posterior trapezoidals. The other segments do not possess this.

The hairs are long, delicate, and colourless, the longest on the posterior trapezoidal, a very short one on the pre-spiracular, each tubercle has only one hair, except the supra-spiracular which has three. It may be noted that the prolegs are complete circles of about 14 hooks, the true legs have the battledore palpus well-developed, and there is a chin-gland which, when everted, is of very

much the size and outline of a thoracic leg but with a fine pellucid apex somewhat prolonged. Except the brown tipped four-serrate jaws and black eye spots the head is nearly colourless, and carries about five hairs on either side. The tubercles on 2, 3 and 4 are somewhat different (as usual) from those on the other segments. On 11, the tubercles are very small, and the hairs about half the length of those on the 10th and other segments.

Below the sub-spiracular I only detect one ventral tubercle, but suspect there must be another.

The most remarkable feature of the larva as it grows is the disappearance of the 2nd segment. This is reduced dorsally to an exceedingly narrow black collar, with two white transverse lines, but is hard to see from the thick fringe of hair passing forwards over the head from segment 3. Laterally, it possesses two tubercles of ordinary type, of a pale cinereous colour. Immediately behind these is the 1st spiracle, black and very large. The other spiracles are black, surrounded by paler areas.

At all stages the head is large, and this gives a somewhat unusual appearance at the moults. The dislocation of the head, which takes place when laid up, has a specially unhealthy and repulsive aspect, the large head giving an appearance as if the larva had just moulted, rather than of being about to do so. The progressive atrophy of the 2nd segment adds to the unhealthy look by placing the new head under a very bald membrane, out of place in a hairy larva.

In the fourth skin, certain larvæ become rather larger than others, and moult directly into the last skin, others take an intermediate moult. What I have to say on this point is, perhaps, more interesting than if I had succeeded in making more definite observations. I secured larvæ in 1887 from the New Forest, and had several broods from these in 1888. Not being prepared for this variation in moulting, the result was that I concluded I had made some error in counting the moults, and had got muddled. In 1889, however, I found that this variation occurred, about half the larvæ adopting each method. I fancied, therefore, that following *Orgyia antiqua* possibly they were male and female. This proved, however, not to be the case; those that moulted an extra time grew much larger than the others, and when they emerged were larger and finer moths, the wing expanse averaging 39 to 42 mm., against 36-37 in the 4-moulters; but both sexes occurred equally in both sets. In 1890, I intended to make further observations, but most remarkably all the larvæ in the brood I especially watched moulted the full number of times (5). In 1891, I failed to do anything, as but few eggs were laid, and many of these were infertile. I concluded that from in-breeding or domestication they were dying out. This year (1892), however, the broods were large and healthy, but, unfortunately, I had not leisure to observe them properly at the right time. A certain portion of pupæ usually remain over a second year, and I had this spring, pupæ of two years; however this may have affected the matter, it is somewhat curious that with an fresh blood introduced, the race should regain vitality and fertility.

To pupate, the larva likes to get under a dead leaf or other similar object, and makes a cocoon of loose matters on the surface of the ground; I succeed in

making them spin up in sawdust, but they always do so close to the surface, and often aggregate their cocoons together. The cocoon is moderately firm, made with a pale reddish brown silk, and always has a very flimsy portion opposite the head; it is smooth, but not polished inside; the flimsy portion, seen from within, has hardly any silk, and the cocoon materials are held together by the larval hairs, which are interwoven with the cocoon throughout, and here hold the materials together, some of them being held by the silk round its margin. When the moth emerges, these hairs project more or less from the opening.

The pupa (Plate I., figs. 4, 4a; Plate IV., figs. 3a, 3b, 3c) is of the brown, corneous, brittle-looking texture, common among NOCTUÆ, but is firm and robust, length 15mm. (wing portion 10mm., abdomen 5 mm.), and breadth 5 mm. The wing portion fairly cylindrical, but slightly swelling towards the 8th segment, the 3rd also full, and the anterior tibiæ rather prominent; the abdominal segments taper regularly, but not so much as usual, the termination being broadly truncate instead of sharp. The brown colour becomes nearly black dorsally; the surface is highly polished, the wing and leg covers rather less so, being transversely striate, as is also somewhat the thoracic dorsum. The 2nd segment has a central ridge dividing two polished almost specular surfaces. The features of the pupa is the sculpturing of the anterior borders of the segments most marked on the free borders of 9, 10, 11, contrasting with the glassy polish of the rest of the surface. It consists of a sharp raised margin, with a groove behind it, the groove being formed by a series of pits, to the number of 16 or 18, across the dorsum from spiracle to spiracle, the sharp ridge being depressed opposite each pit. Ventrally, these pits merge into a row of the ordinary small pits common on pupæ, this row being the posterior margin of a set that extend up to the bottom of the incision. The anterior margin of the incision (where movable) is the ordinary membrane, but shagreened with much finer points than usual, the margin of the segment (in front) attached to this has a fine groove, the extreme margin against the membrane being raised into a high rounded ridge. The anal armature consists of six short, thick, recurved hooks, set round the dorsal semicircular margin of the wide truncate extremity, the anterior margin being rounded off and falling into the ventral surface of the pupa. The two marginal hooks are rather close together, the two dorsal hooks are about 1 mm. from these and from each other. This gives a measure of the comparatively large scale of the terminal arrangements, the hooks themselves, though very thick, being, however, very short. There are two very minute antenno-basal hairs, hardly to be detected except by knowing where to look for them; the want of this knowledge may be the reason that no others are seen.

The pupa often stays over a second winter, sometimes more than half the brood doing so, but it never goes over a third one.

The specimens that emerged from the wild larvæ, and those reared the first year from these, contained a proportion of Esper's type form with extra rows of black spots, but though I raised a brood with both parents of this form, I have not seen one since.

I have never met with the species myself, but I gather that it is quite a

Southern species and rarely abundant anywhere, certainly most common in the New Forest.

Demas coryli and *Diloba cæruleocephala*.—We now come to two species, *Demas coryli* and *Diloba cæruleocephala*, that are certainly not very much related to each other, and though they have some indications of affinity with *Acronycta*, are not near enough to be placed in the same family. *Coryli* I should certainly restore to its old place in the *Liparidæ*, to which it is far closer than to the *Acronyctas*, whilst *cæruleocephala* seems to require a family to itself, and is possibly as near to *Acronycta* as to any other family, but is nevertheless rather a BOMBYX than a NOCTUA. But neither of these seems to be nearer to *Acronycta* than is *Arctia*, or *Liparis*, or *Orthosia*, or *Xylina*, which appear to be perhaps the families nearest to *Acronycta*, in different directions.

Before discussing this matter further it may be well to give some description of each of these.

Demas coryli.—The eggs are laid singly (Plate VIII., figs. 9, 9a). In the figure they have a close resemblance to those of *Moma orion*, and in size and sculpturing the likeness is rather close, but the detailed character of the sculpturing is very different, and the colour and texture are also very different. The form is much the same, nearly three-quarters of a sphere, rather flattened on the top and below. The diameter is ·76 mm., the ribs are about twenty-five in number, diminishing in number towards the top, and the secondary ribs are very distinct, alternating in adjacent furrows. Each rib consists of, or perhaps is surmounted by, a very definite small raised ridge, unlike anything seen in *Acronyctas*. The colour is pale greenish when laid, and then becomes yellowish with a circle of small red dots just above the widest part; the egg looks solid and strong when compared with the glassy delicacy of nearly all *Acronyctas*, *orion* especially.

The newly hatched larva (Plate IX., fig. 2) is cylindrical, the 12th segment perhaps a little pronounced, otherwise no sign of any segment being "weaker" either in form or colour than any other; the head is black, and there is a black plate on segment 2. The colour is rufous, with paler lines and black points and hairs, producing a general fuscous effect. The anterior trapezoidal possesses three or four hairs, the posterior one, the lateral many. The hairs are long, about twice the diameter of the larva dorsally, those of the large lateral tubercles three or four times, and those on 13 and 14 are as long as the larva, *viz.*, 2 mm. As the larva feeds up, various reddish markings appear along the subdorsal region. The hairs are ringed darker and paler, like porcupine quills. The abundance of hairs and their length, the character of the tubercles, the anterior trapezoidal being more important than the posterior, the colouring, all point to *Liparis* rather than *Acronycta* as the nearest affinity.

In the further skins it acquires a more *Liparid* general appearance from the anterior and posterior bunches, rather perhaps than brushes, of hair, but it does not acquire any dorsal brushes or glands, nor do the organs in the second skin* acquire further development; but even so far they are very characteristic.

*A peculiar central dot on segments 3 and 4, and on 5 to 11 or 12, a depression, with a corneous point immediately behind the anterior trapezoidal in the position of a peculiar organ in various *Liparids* (*e.g.*, *monacha*).

Its fashion of living between spun leaves is by no means that of an *Acronycta*, even if it be not characteristic of *Liparis*. This habit is, however, very characteristic of the young larva of *Leucoma salicis*.

The pupa (Plate IX., fig. 3) is nearly black, with paler membrane at the incisions of 9 and 10. It is broad and full at 6.7 and 8, narrow at 4 and 5, and tapers readily; 12, 13 and 14 finely tapered. The anal armature is a fairly tapering process, longitudinally ribbed, ending in an irregularly ribbed or pitted bulb, slightly flattened above, and terminated by a hunch of hooks, all arising together and lying in the same horizontal plane, and consisting of four larger ones, two spreading to either side, and three or four very small ones on each side crowded at the base of the others.

Diloba cæruleocephala.—The egg (Plate VIII., figs. 11, 11a, 11b) is a dome of rather less than a hemisphere, 1·00 mm. in diameter, with 14 or 15 ribs, the top is rather flattened over an area of about 0·30 mm. in diameter, making a very large micropylar area. The ribs are rather high, but not sharp, and the secondary ribs are numerous and pass continuously over the primary ones. The primary ribs pass smoothly into the micropylar area without any irregularity or any meeting or division, whilst the secondary ribs form a network of small cells.

In the NOCTUA (and *Acronycta*) egg the cells around the micropylar area seem as they pass outwards so to arrange themselves that their radiating dissepiments form the primary ribs, and the others the secondary ones. Here the cells seem to arrange themselves into the secondary ribs, but the 14 or 15 primary ribs seem to be flutings underlying altogether these cells, and consequently the ribs into which they arrange themselves. They are laid in groups of fifty or more, nearly touching each other, but not overlapping, or always in very orderly arrangement, and are coated with abundant scales of the moth. The winter is passed in this state.

The newly-hatched larva (Plate IX., fig. 4), 2.50 mm. in length, is of a grey sooty colour, nearly cylindrical, head large and black, the 11th segment presents no difference from the others. The tubercles each carry one long hair, dark at the base, pale at the tip and of a length nearly twice that of the larva. The skin between the tubercles is covered with fine rough points, almost hairs. The 2nd segment has a black dorsal plate carrying six strong hairs and two tubercles in front of spiracle; on 3 and 4 the conjoined trapezoidal tubercles have each two hairs, placed one in front of the other (not side by side). There are three circumspiracular tubercles, of which the post-spiracular is small on 3rd and following segments, a marginal tubercle to the 7th, but not after. The central tubercles of 13 are conjoined, and the anal plate has eight hairs. When full-grown in this skin, the larva is greenish-grey, with yellow dorsal and lateral lines, and is in fact already a miniature of the full-grown larva.

The second skin differs from the first, in the yellow bands being free from the minute black points or bristles, which give a smoky look to the white (green?) portions. The head has sundry pale markings. The plate of the 2nd segment is divided into two portions, each with four hairs. The 3rd segment is decidedly the largest, then the 4th. The yellow band broadens on 3, so as to include the dorsal tubercles, and is nearly evanescent on 4.

In the third skin the larva is at first deep blue-black and yellow, but as it grows, the blue becomes a pale violet blue, and the yellow, clearer and purer. The marginal tubercles now present a complete series, and there is a pre-spiracular tubercle just to be detected. Each lateral plate on 2nd segment has now broken up into four tubercles, of which the two posterior are still conjoined. The yellow forms a broad transverse dorsal stripe on the 3rd, including the dorsal tubercles, and forming a hump. The 12th is also raised; in these and other respects the larva is almost identical with the full-grown larva.

The cocoon is 22 mm. by 8 mm., fairly cylindrical, and tapering at each end, but varying a good deal in size and outline, according to its position. In captivity, it is formed in an angle of the top or bottom of the cage, or more frequently on the stem of the foodplant, especially at a fork. In such a situation it pulls a leaf or two together in which to spin, but instead of curling them round the cocoon, it chops them up into fragments which it incorporates with the silk of the cocoon. It will also accept a surface of sawdust and cover the cocoon densely with this. The material is a white silk, afterwards becoming rather darker, apt in a cocoon formed without much extraneous material to be rather brittle. On several occasions I have found the cocoon on the trunk of an apple tree, and except that it was more rounded and prominent, and, of course, softer, it much resembled a *Cerura* cocoon, the lichen of the surface of the bark being most cleverly worked into the cocoon *Cerura*-fashion, so as to make the cocoon quite like its surroundings. In some specimens there is almost a valvular arrangement by which a strong edge of silk easily separates from the surface in which the cocoon is made, but I fancy this is accidental, as in most cases the cocoon is ruptured for emergence.

The moth emerges from 5 to 7 p.m. (*Acronyctas* 11 to 3), and by 8 p.m. is usually paired; the date is about the first week in October. They pair readily in confinement, and the female sits very quietly till this occurs, remaining on the same spot even for several days, only moving in the evening enough to find a spot where she can conveniently raise her wings a little, but practically on the same spot where she expanded her wings. This is not at all usual in any other species I know, the female usually taking a short preliminary flight, obviously with the view of finding a more protected spot, and is especially unlike *Acronycta*, where the female certainly often sits still and "calls," but very often also is so active that the male must have some difficulty in finding her.

The pupa of *Diloba cæruleocephala* (Plate IV., fig. 5) is 18 mm. in length, brown, sometimes darker, almost purple, or black, and with a bloom like *Cosmia trapezina* or *Halias prasinana*, cylindrical, tapering from the 6th abdominal segment, which is rounded, but for an anal armature (seen dorsally), of a bat's-wing or fish-tail outline. This ends in two points on either side, one in front of the other. There is a minor point in the ventral aspect of the anterior one. There are also four spines on either side, one quite on the dorsal aspect and three lying in a line between the ridges leading to the points. The general surface of the pupa is finely wrinkled, but dorsally it is rough, with numerous raised points.

There is a slight ridge along the dorsal hind margin of the 4th, 5th, 6th and 7th segments. The incisions of the free segments are darker than the rest of the

pupa and very finely shagreened. There are two very minute hairs at the base of the antennæ, two in front between the eyes, and a rather longer one above the 1st spiracle. Each segment appears to have a pair of dorsal hairs, of which that noted as near 1st spiracle is the first; they are more dorsal afterwards, and extend to the 12th segment.

Affinities of Acronyota.—In *Diloba cæruleocephala* we have a species that is very difficult to locate, but I can see but very little affinity to *Acronycta* in any of its stages. The egg has a similar form, but the sculpturing is very different, the larva has no *Acronyct* characters, the pupa has some remote resemblance in anal armature to *Bisulcia*, and is certainly not very like any other species I am acquainted with, but is more *Bombycid* than *Noctuid*. The imago has a very different facies, and has quite a diffsrent probosois; the cocoon, and in some degree the moth, are more suggestive of *Cerura* than of Noctua. I do not know on what characters it is placed among the Noctuæ or near the *Acronyctas*.

The only ground for placing certain species amongst the Noctuæ would appear to be the sculpturing nf ths egg, which is unquestionably of the pattera nowhere common except amongst the Noctuæ, such species are *D. cæruleocephala*, *D. coryli*, *Panthea cœnobita*, *Diphthera ludifica*, *Petasia cassinea*, and *P. nubeculosa*. The *Nycteolidæ* have, however, never been placed amongst the Noctuæ, yet have a very *Noctuid* egg, and one that in flatness even exceede that of *Acronycta*. *Coryli*, *cœnobita* and *ludifica* are certainly very close to, if not in, the *Liparidæ*, in which group we already have a very great variation in the characters of the ova:—*Orgyia antiqua* and *Dasychira pudibunda* with a hard smooth egg, not unlike a *Notodont*, except the flattening or hollow at the micropyle; ***Leucoma salicis*** with eggs glued together in a spumous material; *Liparis monacha* with quite a delicate egg, smooth, but with traces of sculpturing not very remote from the *Noctuid* character of *ludifica*.

When we look for the nearer relatives of the *Acronyctas*, the best guides we caa take are probably to search for species presentiag any of the peculiar characters of *Acronycta*, *e.g.*, ths peculiar flattened egg of *Noctua* sculpturing, and with from 40 to 80 ribs, and tending to markings in circles of pale blotches on a chocolate ground; the young larva with pale and dark segments, the 11th always being pale and "weak," and the imago of a special facies, and with the approximating veins at the anal angle nf the anterior wings.

Tbe eggs of *Nycteolidæ* and of *D. cæruleocephala* resemble *Acronycta* in furm, but the sculpturing suggests that this is merely an accidental resemblance. Again the larva of *Rivula sericealis* has "weak" 11th and 5th segments when newly hatched, but I do not think this species has any nther character suggesting alliance with *Acronycta*.

When we come to the *Liparidæ* we find a considerable resemblance in the adult larvæ. We find also in *Liparidæ* newly hatched larvæ with "weak" segments. I have not met with une with the 11th segment weak. On Plate IX., fig. 8 represents the newly hatched larva of *O. pudibunda*, in which the "weak" segments are 3. 4. 9. I think thie probably is a real relationship, the tendency to weak segments having taken somewhat different directions in the two groups.

The *Noctuid* eggs of some *Liparids*, and the *Liparid* features of the larva of *M. orion*, being other points of connection.

Xylina and certain *Orthosids* have a somewhat flattened egg of very similar sculpturing to *Acronycta*, though quite different in coloration. The neuration is also similar, and the larvæ of both (unusual amongst Noctuæ) are arboreal feeders. These charactere appear to imply some, though distant affinity.

In *Arctia* we have again traces of affinity to *Acronycta*. The most remarkable is perhaps the anal armature of the pupa. In *caja*, for example, we have an arrangement of spines very like that of *Cuspidia*, whilst the texture strongly suggests that of *Viminia*. The ova, though very different in form and sculpturing, tead to he of the same delicate glassy textnre. It ie therefore probable that the Arctioid character of the larva of *Viminia* is not a mere accidental resemblance, but the result of actual affinity. The red lateral line of *menyanthidis* (and others) is very like that of some *Arctias* (half-grown *caja*, for instances), though this form of markiog ie ao doubt found in widely separated and unrelated species (*e.g.*, half-grown *Saturnia carpini.*)

The *Bryophilidæ* are always associated with the *Acronyctæ*, being placed by Guenée with them and the *Cymatophoridæ* in his tribe *Bombyciformes*. I cannot resist the belief that they are much further from the *Acronyctas* than this arrangement implies. The egg of a *Bryophila* (Plate IX., fig. 6. 6a) is rouaded, and is sculptured and coloured like those of the tribe *Genuinæ*. The young larva (Plate IX., fig. 7) is not a looper, but has all ths prolegs long and well developed; it is remarkable for having, besides the ordinary tubercles, each marked by one hair, a number nf dots several times as numerous as the tubercles and looking just like them, but without hairs, and disappearing as the larva grows. None of the segments are stronger or weaker than the others.

I should like to be able to discuss the value of the character of ths venation of ths anal angle of the upper wing that I have mentioned as apparently characteristic of the *Acronyctas*, hut to du so would require a knowledge of the venation of other families that I cannot pretend to. In *Bryophila* the space here is much wider than in *Acronycta*, and by markings is evidently two spaces, but there is no "intermediate" veiu. *Cæruleocephala* makes the nearest approach to *Acronycta* of any of these dnubtful species as regards this veiu, but seems to be nearer *Notodonta* (say *dictæa*) in which a very similar acrangement occurs.

In *Xylina* the arrangement is very similar to *Acronycta*. In *Tæniocampa* and most Noctuæ the vein is very faintly indicated if it can be said to exist, yet the space is less reduced than in *Acronycta*. In *orion* the markings show this narrow space to be double, but the veln is more faintly indicated than in *Acronycta* and would at first view be regarded as absent. In *ludifica* the space and vein are nearly as fully developed as in *monacha*, but in *coryli* it appears to be absent.

Additional Notes.—I have since writing the accennt of the several species, made a few further nbservations on some of them, of which the most important may nnw be stated.

Cuspidia tridens.—I have stated that the ova have alwaye much fewer ribs than has *psi*. This was true for several continuous broods of one race, and for nnt

a few unrelated broods from solated captured moths, but last year I captured a moth in August, which seemed to be a very late emergence, and was a very dark specimen; her eggs and those of her descendants this year, had 49 to 52 ribs, practically the same as *psi*. The moths are large and dark, identical I am told with the form found in the East of England, and certainly very rare here. Those I had previously dealt with were smaller, paler, and presented always (when bred) a proportion with rosy tinting that seems to be regarded as rare and interesting by many lepidopterists. I think we have here, then, evidence of two distinct races of *tridens*, with some possibility that the dates of emergence in this district are somewhat different. I have not seen the specimens, but Messrs. Farren and Jones (Cambridge) report having raised two broods of *tridens* with very different facies, and each following the form of the parent moth. I have some grounds for believing that even trifling differences in these species are strongly hereditary. Thus in *psi* there is also no doubt a tendency to have slightly different forms hereditarily continued, of which the most marked I have yet met with was my var. *bidens*. I think these species would well repay the trouble of breeding different races, and some interesting results would probably be obtained. Just as *psi*, *tridens* and *cuspis* (living examples of which I have not yet obtained) seem to have only just established themselves as distinct species, so each of them seems again endeavouring to split up into distinct races.

Viminia rumicis and V. venosa.—With regard to the close relationship of *rumicis* and *venosa*, Mr. Farren informs me that so common a species as *rumicis* is not found in the habitats of *venosa*, though one would suppose that stragglers would certainly from time to time occur. Indeed, Mr. Tutt informs me that a well-known Fen collector did take a specimen of *rumicis* last summer, and brought it to him as something very rare and unusual.

Cuspidia alni.—I bred a large number this year in order to get for figuring the form (in extra 5th skin) intermediate between the early and adult plumage, but not one occurred. "He that will not when he may," etc. In former broods as many as 5 per cent. have occurred. These were from long domesticated and somewhat inbred ancestry. Those this year were direct from wild specimens. I think it is very probable that the domestication had produced a tendency to their variation in the direction of reversion.

I had entirely omitted from my former notes a circumstance of some importance and interest, *viz.*, the strong odour that the adult larva of *alni* emits when irritated. It can also do so slightly in the previous skin. The odour is suggestive of an escape of ordinary illuminating coal gas. A friend of chemical and engineering experience to whom I submitted some examples says the odour is that of carburetted hydrogen. The scent is emitted most strongly when the larva is ready to search for a place to pupate in. It is so strong that I have several times wondered whether there was not an escape of gas in the room in which the larvæ were. It is perhaps proper to suggest that this odour is protective, and in this sense associated with the brilliant "warning" colour and conspicuous station (on the middle of the upper surface of a leaf) of the larva.

In reference to a record that the function of the spathulate hairs is to eject

the chips made by the larva in excavating its pupating cavity, there is no doubt that an odd grain thereof may sometimes be so ejected, but this is rare and purely accidental. I have observed scores of larvæ engaged in this operation, and they all use the thoracic legs and the head bent down as a sort of scoop to drag out the débris, which they do at intervals, after having made a certain quantity. Rarely also a portion will be brought out held by the jaws. In forming the outer operculum of the burrow the larva will use anything it can get hold of, but it distinctly prefers to break off a little fresh material from the surface about the opening to using any of the excavated chips. It no doubt thus secures a less conspicuous result.

This year for the first time four specimens of *alni* emerged the same year as autumnal specimens, or efforts towards a second brood; they were four amongst the earliest larvæ to pupate.

Cuspidia leporina.—Various correspondents have kindly given me their observations on the two forms of this larva, which go to show that both forms are found in all parts of Great Britain, and that their connection with birch and alder and with a northern and southern habitat is only true in a general sense, and has everywhere many exceptions. I secured a brood of Lancashire and presumably yellow parentage this year, and fed some on birch and some on alder. Unfortunately I did not treat them so well as I ought to have done and the numbers dwindled, but the result points strongly to the conclusion that these forms are hereditary and are not directly affected by the actual foodplant. Out of eight fed on birch one was white, and seven yellow; of ten fed on alder one was white, and nine yellow. Mr. Poulton called my attention to an observation that young larvæ of *leporina* possessed clubbed hairs like those of *alni*. I therefore paid special attention to this point, and find that, strictly speaking, this is not the case. Each tubercle preserves throughout the larval existence one simple hair; in the posterior trapezoidals this hair remains evident enough when looked for, and unaccompanied by any others; this is the one that becomes clubbed in *alni*. On the anterior trapezoidals this primary hair or bristle also persists in a simple form, but is accompanied by the tufts of black hair often persisting in the last skin, but usually most abundant in the penultimate ons. Each hair of these black tufts is expanded and spathulate just like the characteristic hairs of *alni*. They are, however, quite a different set of hairs. The anterior trapezoidals of *alni* have no secondary hairs, and the primary ones (in last skin) are nearly obsolete.

DESCRIPTION OF PLATES.

PLATE I.

Enlarged about 3½ diameters.
- Fig. 1.—Pupa of *Viminia rumicis*.
- Fig. 2.—Pupa of *Cuspidia tridens*.
- Fig. 3.—Pupa of *Bisulcia ligustri*.
- Fig. 4.—Pupa of *Moma* (*Diphthera*) *orion*.

Fig. 4a.—Pupa of *M. orion*, 9th segment, enlarged about 15 diameters.

Fig. 5a.—Pupa of *V. auricoma*, natural size.

Enlarged about 8 diameters.
- Fig. 5b.—Pupa of *V. auricoma*; dorsal view of anterior extremity.
- Fig. 5c.—Pupa of *V. auricoma*; 9th segment, lateral view.
- Fig. 5d.—Terminal segment and anal armature.

PLATE II.

Natural Size.— Fig. 1.—Pupa of *Viminia myricæ*.

Enlarged about 8 diameters.
- Fig. 1a.—Pupa of *V. myricæ*; dorsal view of anterior extremity.
- Fig. 1b.—Pupa of *V. myricæ*; 9th segment, lateral view.
- Fig. 1c.—Pupa of *V. myricæ*; lateral view of posterior extremity.

Natural Size.—Fig. 2.—Pupa of *Viminia menyanthidis*.

Enlarged about 8 diameters.
- Fig. 2a.—Pupa of *V. menyanthidis*; dorsal view of anterior extremity.
- Fig. 2b.—Pupa of *V. menyanthidis*; 9th segment, lateral view.
- Fig. 2c.—Pupa of *V. menyanthidis*; lateral view of posterior extremity.

Natural Size.—Fig. 3.—Pupa of *Viminia venosa*.

Enlarged about 8 diameters.
- Fig. 3a.—Pupa of *V. venosa*; dorsal view of anterior extremity.
- Fig. 3b.—Pupa of *V. venosa*; 9th segment, lateral view.
- Fig. 3c.—Pupa of *V. venosa*; lateral view of posterior extremity.

Enlarged about 8 diameters.
- Fig. 4a.—Pupa of *V. rumicis*; dorsal view of anterior extremity.
- Fig. 4b.—Pupa of *V. rumicis*; 9th segment, lateral view.
- Fig. 4c.—Pupa of *V. rumicis*; lateral view of posterior extremity.

PLATE III.

Fig.

Natural Size.—1.—Pupa of *Acronycta* (*Cuspidia*) *psi*.

Enlarged 8 diameters.
- 1a. ,, ,, ,, ,, dorsal view of anal armature.
- 1b. ,, ,, ,, ,, ventral ,, ,,

Natural Size.—2.—Pupa of *Acronycta* (*Cuspidia*) *tridens*.

Enlarged 8 diameters.
- 2a. ,, ,, ,, ,, dorsal view of anal armature.
- 2b. ,, ,, ,, ,, ventral ,, ,,
- 2d. ,, ,, ,, ,, terminal ,, ,,

Natural Size.—3. ,, ,, ,, *strigosa*.

Enlarged 9 diameters.
- 3a. ,, ,, ,, ,, dorsal ,, ,,
- 3b. ,, ,, ,, ,, ventral ,, ,,
- 3c. ,, ,, ,, ,, lateral ,, ,,

Natural Size.—4. ,, ,, ,, *alni*.

Enlarged 9 diameters.
- 4a. ,, ,, ,, ,, dorsal ,, ,,
- 4b. ,, ,, ,, ,, ventral ,, ,,
- 4c. ,, ,, ,, ,, lateral ,, ,,

Natural Size.—5. ,, ,, ,, *megacephala*.

Enlarged 6 diameters.
- 5b. ,, ,, ,, ,, ventral ,, ,,
- 5c. ,, ,, ,, ,, lateral ,, ,,

PLATE IV.

Fig. 1a.—Pupa of *Acronycta* (*Cuspidia*) *leporina*, nat. size.
Fig. 1b. ,, ,, ,, ,, lateral view of anal armature, × 9 dm.
Fig. 1c. ,, ,, ,, ,, end ,, ,, ,,
Fig. 1d. ,, ,, ,, ,, dorsal ,, ,, ,,
Fig. 2a.—Pupa of *Acronycta* (*Cuspidia*) *aceris*, nat. size.
Fig. 2b. ,, ,, ,, ,, dorsal view of anal armature, × 8 dm.
Fig. 2c. ,, ,, ,, ,, ventral ,, ,, ,,
Fig. 2d.—Pupa of *Acronycta* (*Cuspidia*) *aceris*, lateral view of anal armature, × 8 dm.
Fig. 3a.—*Moma orion*, pupa, ventral view of anal armature, × 8 diam.
Fig. 3b. ,, ,, dorsal ,, ,, ,,
Fig. 3c. ,, ,, lateral view of anal armature, × 8 diam.
Fig. 4—*Acronycta* (*Bisulcia*), *ligustri*, lateral view of anal armature, × 8 diam.
Fig. 5.—*Diloba cæruleocephala*, dorso-lateral viaw of anal armature, × 8 diam.

PLATE V.

LARVÆ OF ACRONYCTAS IN FIRST SKIN.

Fig. 1.—*Acronycta* (*Viminia*) *auricoma*. Larva in first skin fed a little × 20 diam.
Fig. 2.—*Acronycta* (*Viminia*) *auricoma*. Larva full fed in first skin × 12 diam.
Figs. 3 and 4.—*Acronycta* (*Viminia*) *menyanthidis*. Larvæ partly fed in first skin, × 24 diam.
Fig. 5.—*Acronycta* (*Viminia*) *myricæ*. Larva full fed in first skin, indeed close upon first moult × 22 diam.
Fig. 6.—*Acronycta* (*Viminia*) *venosa*. Larva fed a very little in first skin × 34 diam.
Fig. 7.—*Acronycta* (*Viminia*) *rumicis*. Larva half fed in first skin × 27 diam.
Figs. 8 and 9.—*Acronycta* (*Bisulcia*) *ligustri*. Larvæ well fed in first skin × 22 diam.
Fig. 10.—*Acronycta* (*Cuspidia*) *aceris*. Larva in first skin newly hatched × 30 diam.

PLATE VI.

Fig. 1.—Larva of *Acronycta (Cuspidia) psi* × 25 diam. ; newly hatched.
Fig. 2. ,, ,, ,, *tridens* × 18 diam. ; fed two days.
Fig. 3. ,, ,, ,, *alni* × 18 diam. ; fed two days.
Fig. 3a. ,, ,, ,, *alni*, lateral view.
Fig. 4. ,, ,, ,, *megacephala* × 16 diam. ; nearly full fed.
Fig. 4a. ,, ,, ,, *megacephala*, lateral view.
Fig. 5. ,, ,, ,, *leporina* × 20 diam. ; newly hatched.
Fig. 6. *Moma orion*, × 30 diam. ; dorsal view.
Fig. 6a. ,, × 30 diam. ; lateral view.

PLATE VII.

Fig. 1 and 2.—Egg of *Viminia rumicis* × 25 diam.
Fig. 3. ,, ,, *venosa* × 25 diam.
Fig. 3a.—Sketch of group of *venosa* eggs shewing imbrication × 25 diam.
Fig. 4.—Egg of *Viminia auricoma* × 24 diam.
Fig. 4a. ,, ,, ,, vertical section.
Fig. 4b.—Sketch of imbricated group of *auricoma* eggs × 25 diam.
Fig. 5.—Egg of *Viminia myricæ* × 21 diam.
Fig. 5a. ,, ,, ,, vertical section.
Fig. 6. ,, ,, *menyanthidis* × 22 diam.
Fig. 6a.—Sketch of imbricated group of *menyanthidis* eggs × 17 diam.

PLATE VIII.

Fig. 1.—Egg of *Acronycta (Cuspidia) psi*, vertical view of upper surface × 25 diam.
Fig. 2. ,, ,, ,, *tridens* × 26 diam.
Fig. 3. ,, ,, ,, *leporina* × 22 diam.
Fig. 4. ,, ,, ,, *aceris* × 27 diam.
Fig. 5. ,, ,, ,, *megacephala* × 19 diam.
Fig. 6. ,, ,, ,, *alni* × 25 diam.
Fig. 7. ,, ,, ,, *strigosa* × 29 diam.
Fig. 8. ,, ,, (*Bisulcia*) *ligustri* × 27 diam.
Fig. 8a. ,, ,, ,, ,, side view.
Fig. 9. ,, *Demas coryli* upper surface × 29 diam.
Fig. 9a. ,, ,, side view.
Fig. 10. ,, *Moma orion* upper surface × 34 diam.
Fig. 10a. ,, ,, side view.
Fig. 11. ,, *D. cærulevocephala* upper surface × 26 diam.
Fig. 11a. ,, ,, ,, as naturally covered by maternal scales.
Fig. 11b. ,, ,, side view.

PLATE I.

Enlarged about 3½ diameters.

- **Fig. 1.**—Pupa of *Viminia rumicis.*
- **Fig. 2.**—Pupa of *Cuspidia tridens.*
- **Fig. 3.**—Pupa of *Bisulcia ligustri.*
- Fig. 4.—**Pupa of *Moma (Diphthera) orion.***

Fig. 4a.—Pupa of *M. orion*, 9th segment, enlarged about 15 diameters.

Fig. 5a.—Pupa of *V. auricoma*, **natural size.**

Enlarged about 8 diameters.

- **Fig. 5b.—Pupa of *V. auricoma ;*** dorsat view of anterior extremity.
- **Fig. 5c.**—Pupa of *V. auricoma ;* 9th segment, lateral view.
- **Fig. 5d.—Terminal segment and anal armature.**

Horace Knight ad nat. del.

West, Newman lith.

Pupæ of Genus Acronycta.

PLATE I.

Enlarged about 3½ diameters.

Fig. 1.—Pupa of *Viminia rumicis.*
Fig. 2.—Pupa of *Cuspidia tridens.*
Fig. 3.—Pupa of *Bisulcia ligustri.*
Fig. 4.—Pupa of *Moma (Diphthera) orion.*

Fig. 4a.—Pupa of *M. orion*, 9th segment, enlarged about 15 diameters.

Fig. 5a.—Pupa of *V. auricoma*, natural size.

Enlarged about 8 diameters.

Fig. 5b.—Pupa of *V. auricoma ;* dorsal view of anterior extremity.
Fig. 5c.—Pupa of *V. auricoma ;* 9th segment, lateral view.
Fig. 5d.—Terminal segment and anal armature.

Horace Knight ad nat del.

West, Newman, lith.

Pupæ of Genus Acronycta.

PLATE II.

Natural Size.—Fig. 1.—Pupa of *Viminia myricæ.*

Enlarged about 8 diameters.
- Fig. 1a.—Pupa of *V. myricæ ;* dorsal view of anterior extremity.
- Fig. 1b.—Pupa of *V. myricæ ;* 9th segment, lateral view.
- Fig. 1c.—Pupa of *V. myricæ ;* lateral view of posterior extremity.

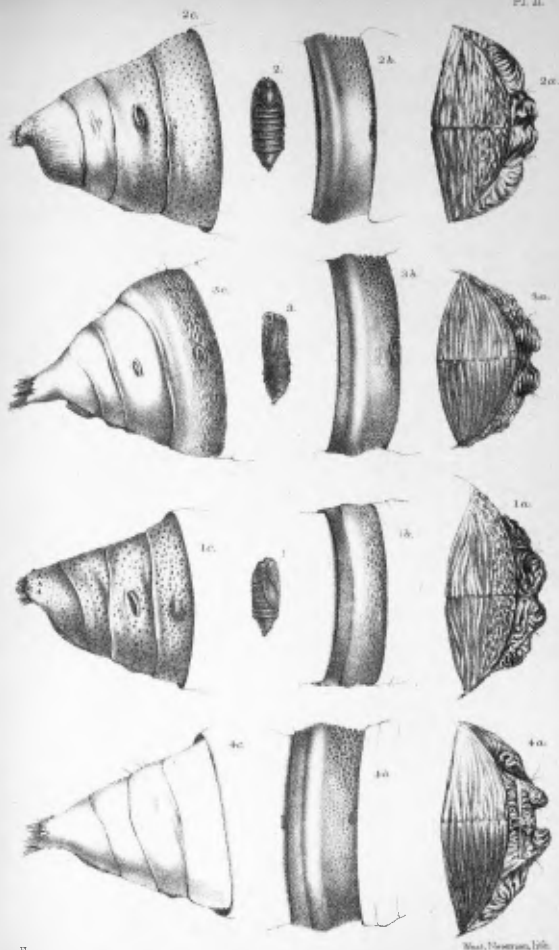
Natural Size.—Fig. 2.—Pupa of *Viminia menyanthidis.*

Enlarged about 8 diameters.
- Fig. 2a.—Pupa of *V. menyanthidis ;* dorsal view of anterior extremity.
- Fig. 2b.—Pupa of *V. menyanthidis ;* 9th segment, lateral view.
- Fig. 2c.—Pupa of *V. menyanthidis ;* lateral view of posterior extremity

Natural Size.—Fig. 3.—Pupa of *Viminia venosa.*

Enlarged about 8 diameters.
- Fig. 3a.—Pupa of *V. venosa ;* dorsal view of anterior extremity.
- Fig. 3b.—Pupa of *V. venosa ;* 9th segment, lateral view.
- Fig. 3c.—Pupa of *V. venosa ;* lateral view of posterior extremity.

Enlarged about 8 diameters.
- Fig. 4a.—Pupa of *V. rumicis ;* dorsal view of anterior extremity.
- Fig. 4b.—Pupa of *V. rumicis ;* 9th segment, lateral view.
- Fig. 4c.—Pupa of *V. rumicis ;* lateral view of posterior extremity.

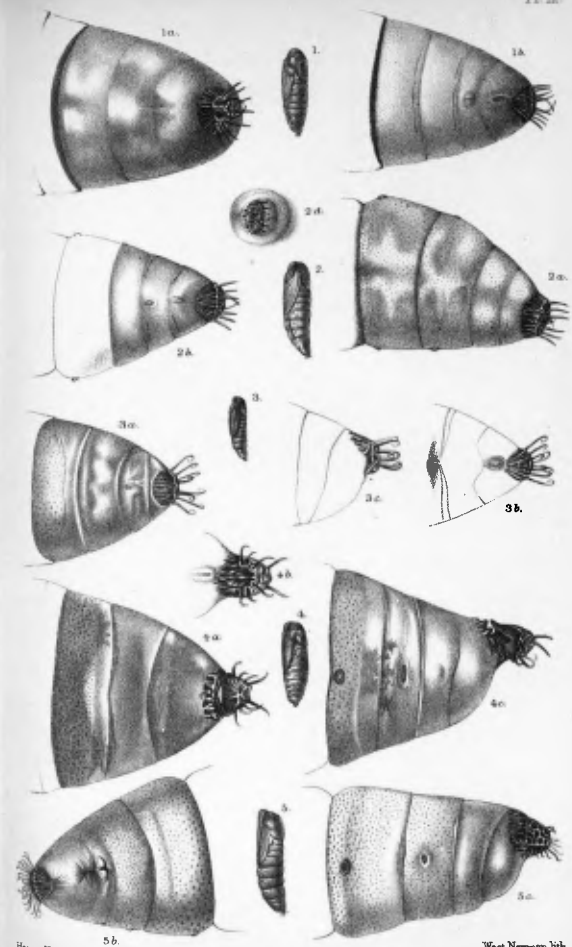


Horace Knight ad nat. del.

Pupæ of Genus Apronycta

PLATE III.

Fig.							
Natural Size.—1.—Pupa of *Acronycta* (*Cuspidia*) *psi*.							
Enlarged 8 diameters.	1a.	,,	,,	,,	,,	dorsal view of anal armature.	
	1b.	,,	,,	,,	,,	ventral ,,	,,
Natural Size.—2.		,,	,,	,,	*tridens*.		
Enlarged 8 diameters.	2a.	,,	,,	,,	,,	dorsal ,,	,,
	2b.	,,	,,	,,	,,	ventral ,,	,,
	2d.	,,	,,	,,	,,	terminal ,,	,,
Natural Size.—3.		,,	,,	,,	*strigosa*.		
Enlarged 9 diameters.	3a.	,,	,,	,,	,,	dorsal ,,	,,
	3b.	,,	,,	,,	,,	ventral ,,	,,
	3c.	,,	,,	,,	,,	lateral ,,	,,
Natural Size.—4.		,,	,,	,,	*alni*.		
Enlarged 9 diameters.	4a.	,,	,,	,,	,,	dorsal ,,	,,
	4b.	,,	,,	,,	,,	ventral ,,	,,
	4c.	,,	,,	,,	,,	lateral ,,	,,
Natural Size.—5.		,,	,,	,,	*megacephala*.		
Enlarged 6 diameters.	5b.	,,	,,	,,	,,	ventral ,,	,,
	5c.	,,	,,	,,	,,	lateral ,,	,,



5 *b*.

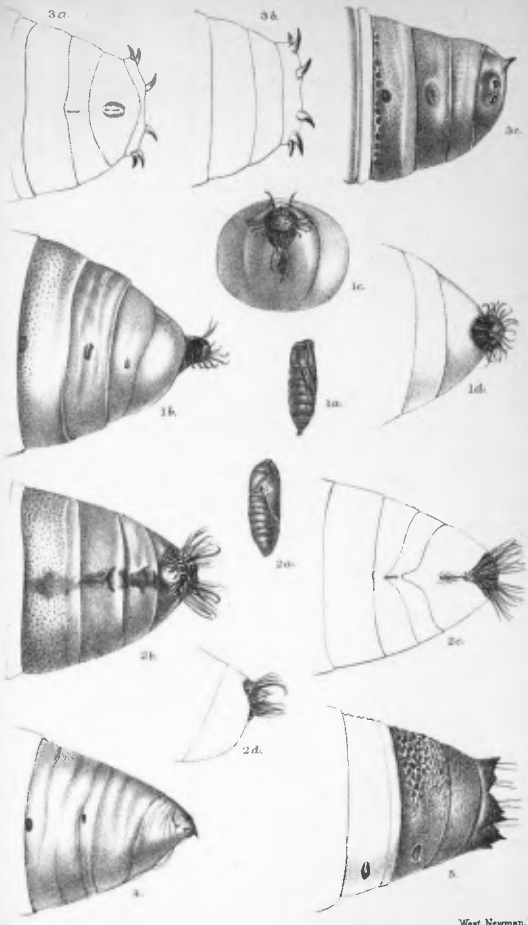
Horne&Knight ad nat del.

West, Newman, lith.

Pupæ of Genus Acronycta.

PLATE IV.

Fig. 1a.—Pupa of *Acronycta* (*Cuspidia*) *leporina*, nat. size.
Fig. 1b. ,, ,, ,, ,, lateral view of anal armature, × 9 dm.
Fig. 1c. ,, ,, ,, ,, end ,, ,, ,,
Fig. 1d. ,, ,, ,, ,, dorsal ,, ,, ,,
Fig. 2a.—Pupa of *Acronycta* (*Cuspidia*) *aceris*, nat. size.
Fig. 2b. ,, ,, ,, ,, dorsal view of anal armature, × 8 dm.
Fig. 2c. ,, ,, ,, ,, ventral ,, ,, ,,
Fig. 2d.—Pupa of *Acronycta* (*Cuspidia*) *aceris*, lateral view of anal armature, × 8 dm.
Fig. 3a.—*Moma orion*, pupa, ventral view of anal armature, × 8 diam.
Fig. 3b. ,, ,, dorsal ,, ,, ,,
Fig. 3c. ,, ,, lateral view of anal armature, × 8 diam.
Fig. 4.—*Acronycta* (*Bisulcia*) *ligustri*, lateral view of anal armature, × 8 diam.
Fig. 5.—*Diloba cæruleocephala*, dorso-lateral view of anal armature, × 8 diam.



Horace Knight ad nat. del

West, Newman, lith.

Pupæ of Genus Acronycta.

PLATE V.

Fig. 1.—*Acronycta* (*Viminia*) *auricoma*. Larva in first skin fed a little × 20 diam.

Fig. 2.—*Acronycta* (*Viminia*) *auricoma*. Larva full fed in first skin × 12 diam.

Figs. 3 and 4.—*Acronycta* (*Viminia*) *menyanthidis*. Larvæ partly fed in first skin × 24 diam.

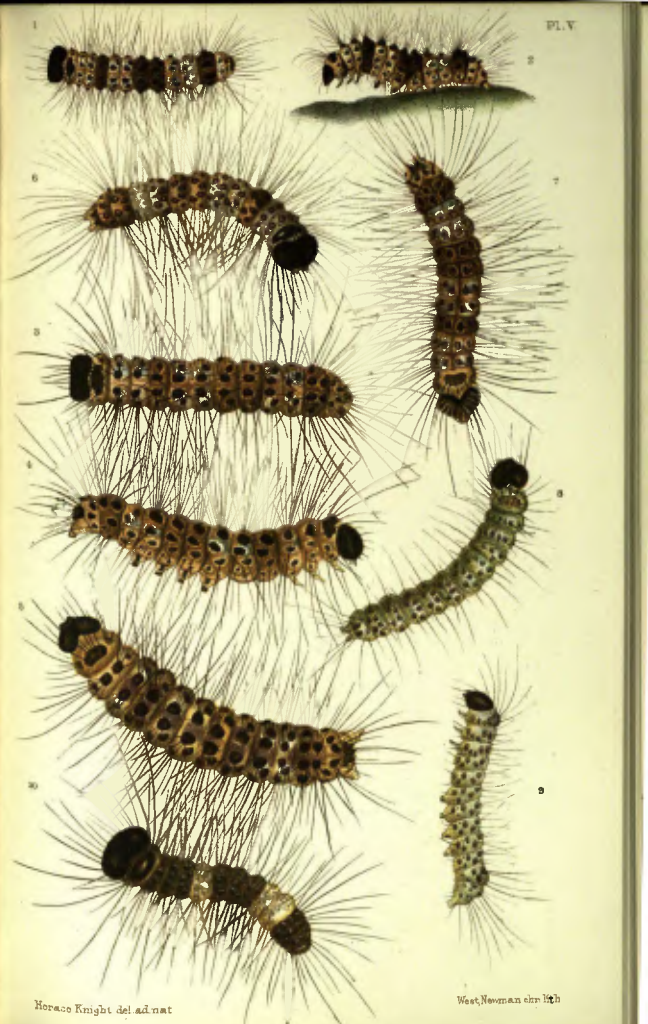
Fig. 5.—*Acronycta* (*Viminia*) *myricæ* Larva full fed in first skin, indeed close upon first moult × 22 diam.

Fig. 6.—*Acronycta* (*Viminia*) *venosa*. Larva fed a very little in first skin × 34 diam.

Fig. 7.—*Acronycta* (*Viminia*) *rumicis*. Larva half fed in first skin × 27 diam.

Figs. 8 and 9.—*Acronycta* (*Bisulcia*) *ligustri*. Larvæ well fed in first skin × 22 diam.

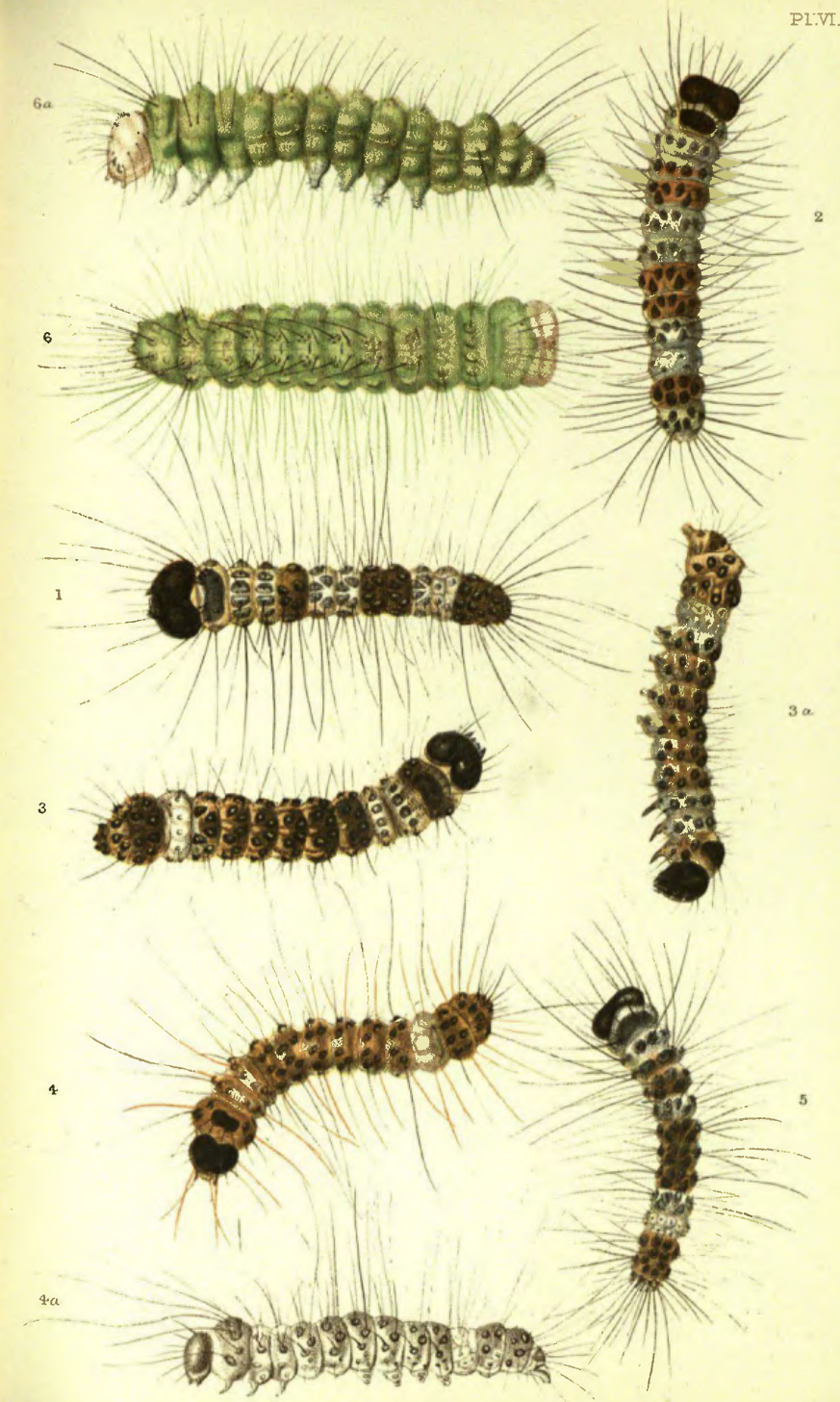
Fig. 10.—*Acronycta* (*Cuspidia*) *aceris* Larva in first skin newly hatched × 30 diam.



Young Larvæ of Acronycta

PLATE VI.

Fig. 1.—Larva of *Acronycta* (*Cuspidia*) *psi* × 25 diam.; newly hatched.
Fig. 2 ,, ,, ,, *tridens* × 18 diam.; fed two days.
Fig. 3. ,, ,, ,, *alni* × 18 diam.; fed two days.
Fig. 3a. ,, ,, ,, *alni*, lateral view.
Fig. 4. ,, ,, ,, *megacephala* × 16 diam.; nearly full fed.
Fig. 4a. ,, ,, ,, *megacephala*, lateral view.
Fig. 5. ,, ,, ,, *leporina* × 20 diam.; newly hatched.
Fig. 6. ,, *Moma orion*, × 30 diam.; dorsal view.
Fig. 6a ,, ,, × 30 diam.; lateral view.



Horace Knight del. ad nat. West Newman chr. lith.

Young Larvæ of Acronycta.

PLATE VII.

Fig. 1 and 2.—Egg of *Viminia rumicis* × 25 diam.

Fig. 3. ,, ,, *venosa* × 25 diam.

Fig. 3a.—Sketch of group of *venosa* eggs showing imbrication × 25 diam.

Fig. 4.—Egg of *Viminia auricoma* × 24 diam.

Fig. 4a. ,, ,, ,, vertical section.

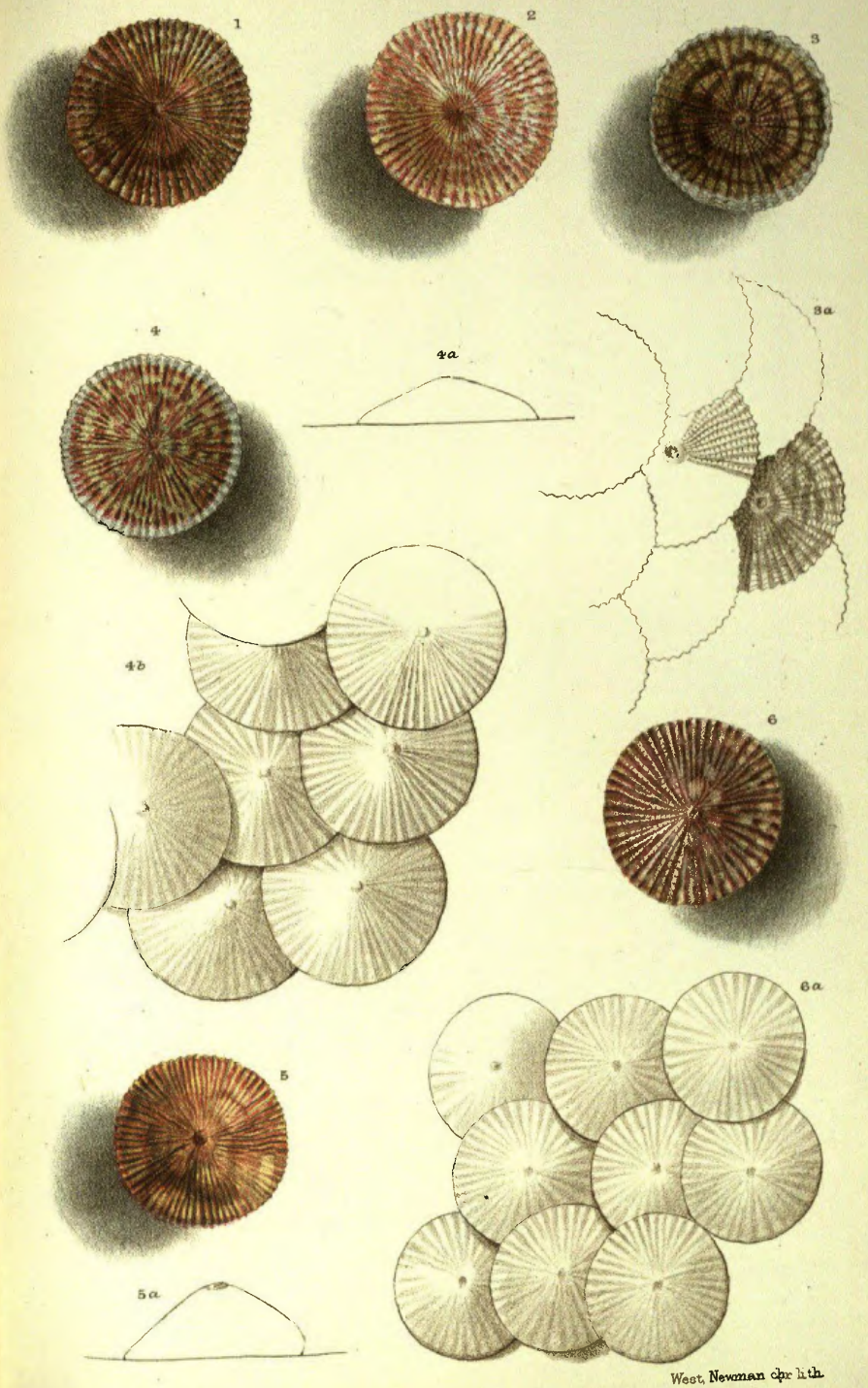
Fig. 4b.—Sketch of imbricated group of *auricoma* eggs × 25 diam.

Fig. 5.—Egg of *Viminia myricæ* × 21 diam

Fig. 5a. ,, ,, ,, vertical section.

Fig. 6. ,, ,, *menyanthidis* × 22 diam.

Fig. 6a.—Sketch of imbricated group of *menyanthidis* eggs × 17 diam.



Horace Knight ad. et nat

Ova of Acronycta (Viminia.)

West, Newman chr. lith.

PLATE VIII.

Fig. 1.—Egg of *Acronycta* (*Cuspidia*) *psi*, vertical view of upper surface × 25 diam.

Fig. 2. ,, ,, ,, *tridens* × 26 diam.

Fig. 3. ,, ,, ,, *leporina* × 22 diam.

Fig. 4. ,, ,, ,, *aceris* × 27 diam.

Fig 5 ,, ,, ,, *megacephala* × 19 diam.

Fig. 6. ,, ,, ,, *alni* × 25 diam.

Fig. 7. ,, ,, ,, *strigosa* × 29 diam.

Fig. 8. ,, ,, (*Bisulcia*) *ligustri* × 27 diam.

Fig 8a. ,, ,, ,, ,, side view.

Fig 9 ,, *Demas coryli* upper surface × 29 diam.

Fig. 9a. ,, ,, ,, side view.

Fig 10. ,, *Moma orion* upper surface × 34 diam.

Fig. 10a. ,, ,, ,, side view.

Fig. 11. ,, *D. cæruleocephala* upper surface × 26 diam.

Fig. 11a. ,, ,, ,, ,, as naturally covered by maternal scales.

Fig 11b, ,, ,, side view.

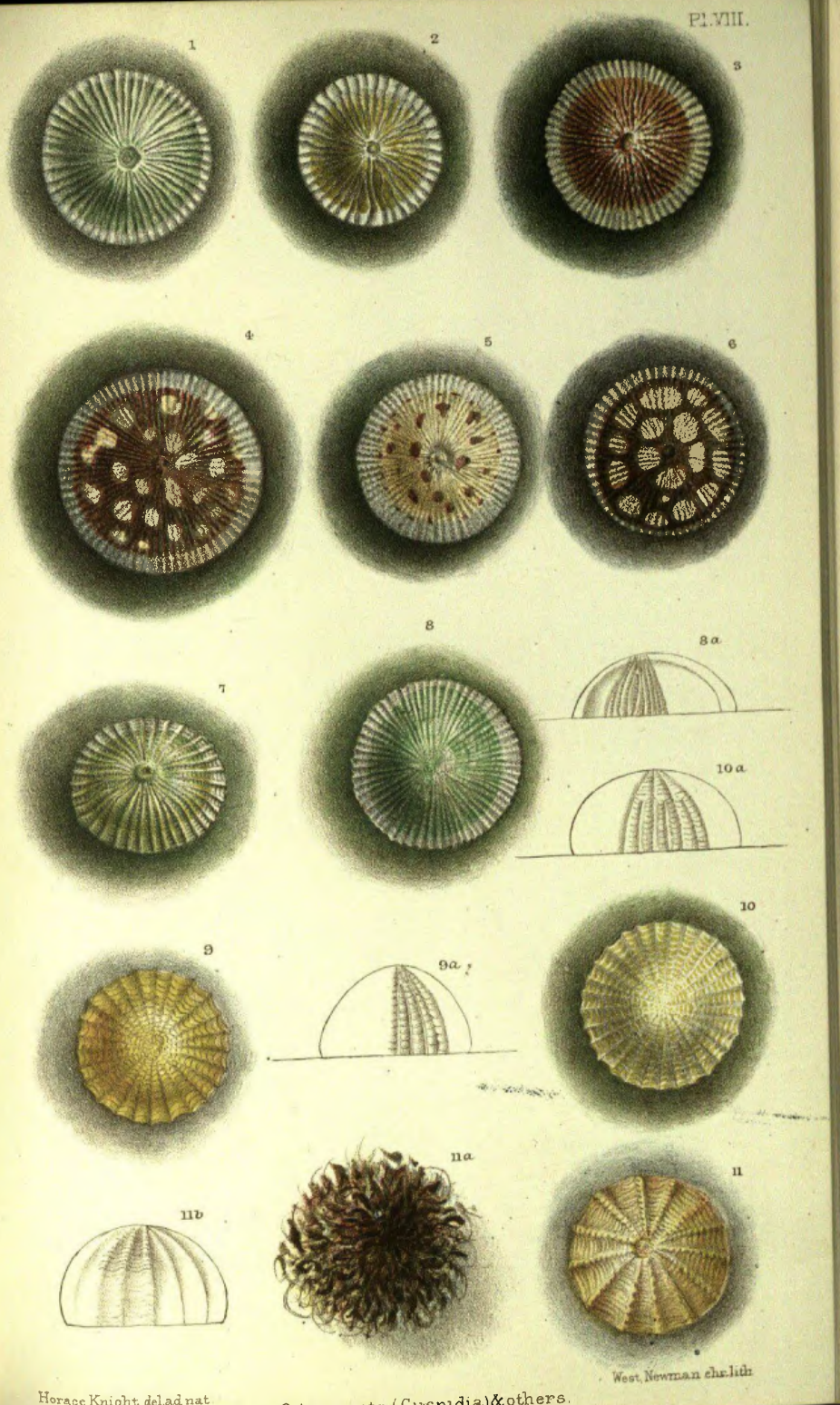
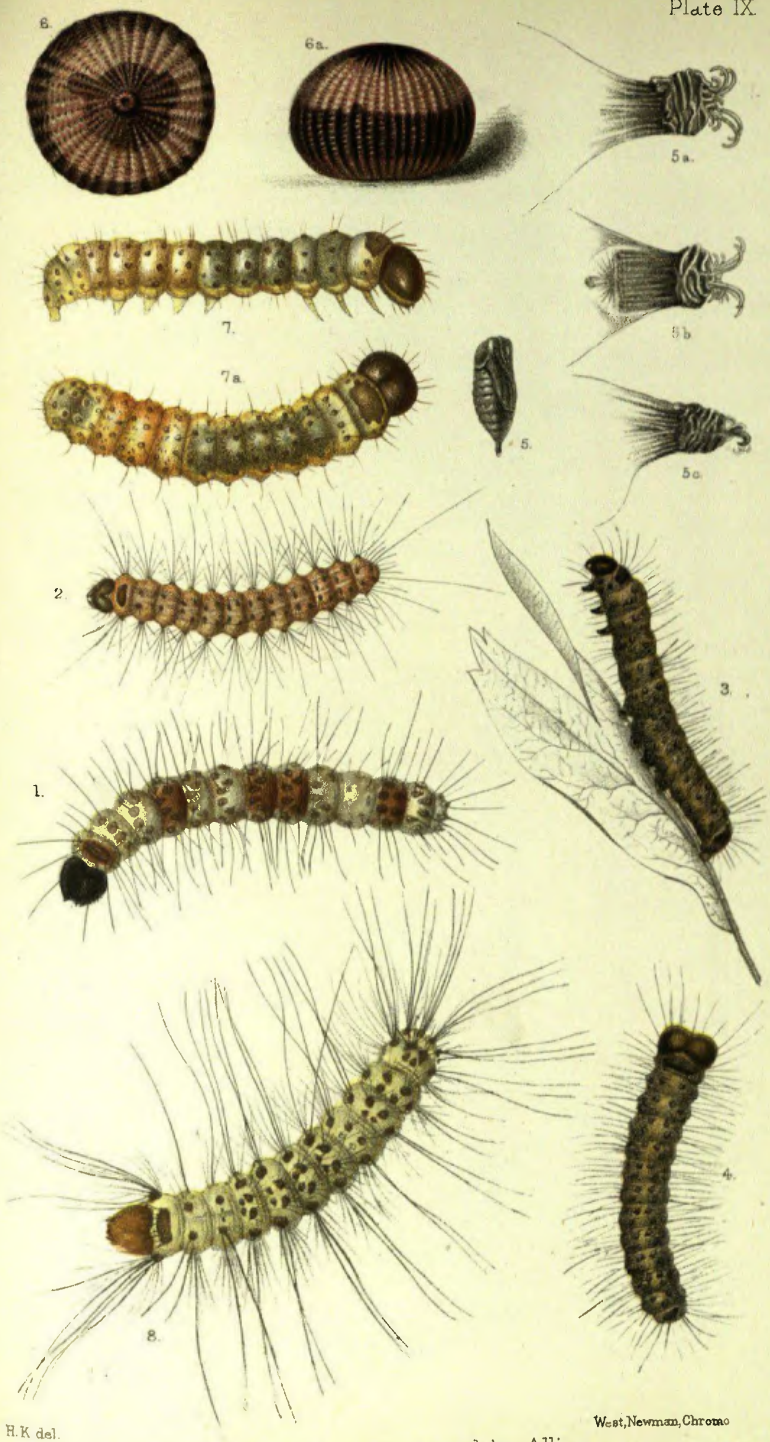


PLATE IX.

Fig. 1.—Larva of *Acronycta strigosa*, 1st skin × 24 diameter.
Fig. 2. ,, *Demas coryli*, 1st skin × 20 diameter.
Fig. 3. ,, *Diloba cœruleocephala*, 1st skin × 15 diameter.
Fig. 4. ,, ,, ,, (newly hatched) × 25 diameter.
Fig. 5 —Pupa of *Demas coryli*, natural size.
Fig. 5a. ,, ,, ,, anal armature, dorsal view, × 15 diameter
Fig. 5b. ,, ,, ,, ,, ,, ventral view, × 15 diameter.
Fig 5c ,, ,, ,, ,, ,, lateral view, × 15 diameter.
Fig 6.—Eggs of *Bryophila perla*, dorsal view × 34 diameter.
Fig. 6a. ,, ,, ,, lateral view × 34 diameter.
Fig. 7.—Larva of ,, ,, 1st stage × 30 diameter.
Fig 7a. ,, ,, ,, ,, × 30 diameter.
Fig. 8 ,, *Dasychira pudibunda*, 1st stage × 15 diameter.



H.K del. West, Newman, Chromo

The Genus Acronycta and its Allies

PLATE IX.

Fig. 1.—Larva of *Acronycta strigosa*, 1st skin × 24 diameter.
Fig. 2. ,, *Demas coryli*, 1st skin × 20 diameter.
Fig. 3. ,, *Diloba cæruleocephala*, 1st skin × 15 diameter.
Fig. 4. ,, ,, ,, (newly hatched) × 25 diameter.
Fig. 5.—Pupa of *Demas coryli*, natural size.
Fig. 5a. ,. ,, ,, anal armature, dorsal view, × 15 diameter.
Fig. 5b. ,, ,, ,, ,, ,, ventral view, × 15 diameter.
Fig. 5c. ,, ,, ,, ,, ,, lateral view, × 15 diameter.
Fig. 6.—Egg of *Bryophila perla*, dorsal view × 34 diameter.
Fig. 6a. ,, ,, ,, lateral view × 34 diameter.
Fig. 7.—Larva of ,, ,, 1st stage × 30 diameter.
Fig. 7a. ,, ,, ,, ,, × 30 diameter.
Fig. 8. ,, *Dasychira pudibunda*, 1st stage × 15 diameter.

EXTENSIVE FIRE IN RADNOR FOREST IN THE YEAR 1800.

FROM our member, Mr. James W. Lloyd, we have received the following notice of a disastrous fire in the forest, being an extract from "British History chronologically arranged," by John Wade. "August 10th, 1800. A person by accident set fire to Radnor Forest, and owing to the dryness of the season it burnt for thirty miles in circumference, destroying thousands of sheep and many cottages. The Earl of Oxford and Mr. Lewis were the chief sufferers."

Mr. Lloyd mentioned the subject to one of his correspondents, Mr. John Hutchinson (Middle Temple Library, London), who in reply stated that there was a long notice of it in the *Annual Register* of 1800, under the heading of "Ludlow, August 19th," in which it is stated that the fire was caused by the owner of a sheep-walk setting fire to the heath before digging for pitmar, which the writer explains as coal, but which probably was maun or peat. The fire seems to have spread to a vast extent when we read that "on the side of the vale adjoining Sir W. W. Wynne's estate at Wynnstay it was supposed to extend from eight to ten miles, and on the opposite side about four miles." The report adds that the fire was seen from Ludlow rising in columns to an immense height, but it was principally confined to the hills, the property of the Earl of Oxford, of Mr. Lewis and Mr. Lewin. After raging for five weeks "it was at length extinguished by the late providential fall of rain."

Mr. Hutchinson writes that the year 1800 was remarkable for its drought, and for forest and other fires everywhere. A fire in the Black Forest in Germany began in March, and in September was reported as continuing "with more fury than ever." It put a stop to the working of the Copper Mines in the neighbourhood.

Woolhope Naturalists' Field Club.

TUESDAY, AUGUST 22nd, 1893.

THE Fourth Field Meeting was held at Kyre Park, near Tenbury, the residence of Mr. Baldwyn-Childe. A large party, mustering nearly fifty, were met at Tenbury Railway Station by brakes from the Swan Hotel, which conducted them beyond the fourth milestone on the road to Bromyard, where, opposite the lodge gates of Kyre Park, they were met by the Rev. Prebendary Baldwyn-Childe, Mrs. Baldwyn-Childe, and her party, consisting of Sir Charles Rouse Boughton, Rev. T. Auden, and Mr. Garnett-Botfield, the two latter being prominent members of the Caradoc Field Club.

The deer park on the left was entered by the magnificent avenue of oak and beech trees growing alternately for the extent of half-a-mile, whose varied foliage presents, especially in their spring and autumn foliage, a most pleasing aspect. Near the middle of this avenue were planted some five or six centuries ago a circle of probably twelve oak trees, of which ten great patriarchs are still in existence. The girth of the largest at the height of five feet from the ground is 19 feet 6 inches. The girths, at five feet from the ground, of these ten oak trees, are as represented below:—

	FT.	INS.
1	19	6
2	17	6
3	16	6
4	11	4
5	17	0
6	16	0
7	15	4
8	15	6
9	13	6
10	13	6

Several other monster oak trees are scattered about the park. One giant of the forest occupies a prominent position on a knoll, a silent witness of many a winter's storm, its weird limbs, grown bald with hoar antiquity, sombre and gaunt, assuming fantastic forms. From its decayed, contorted trunk is thrown out in bold relief a naked arm, quaintly suggestive of a gibbet, whence probably it derived the name of "Gibbet Oak," by which it is distinguished, there being no traditional history to account otherwise for this, its title. The name and the age of the tree recall one's thoughts to the early period when Lords of Manors

possessed their private gallows for hanging thieves. It has a girth of nearly twenty-four feet round its hollowed stem. This oak is a Quercus sessiliflora.

In the more northern part of the Deer Park, near the Fulhams, are two oak trees, which measure respectively twenty-two and twenty-three feet; whilst a fallen oak measured by Mrs. Baldwyn-Childe had attained a girth of twenty-six feet four and a half inches. All girths were taken at 5 feet above the ground.

A beech tree in the avenue has a girth of seventeen feet four inches. Another beech tree, near the southern entrance to the Deer Park, and overlooking the Lodge, has the same girth, and from its root trunk issue about twenty boles. In the Pasture park is a Spanish Chestnut tree with a girth of twenty-four feet.

The approximate age of these trees can be shrewdly arrived at from the fact that in 1275 Edward I. in a deed dated from Gloucester gives permission to John Wyard to plant and enclose his Park at Cuer Wyard. This deed is at Kyre. Thomas Habingdon, of Hindlip, the Worcestershire Antiquary, born in 1560, says: "The Parcke of Cuerwyard is not to bee shutt up in sylence for it is adorned with so many tall and mightie oakes, as scarce any ground in England within that quantity of Akers can showe so many."

About 1650 the celebrated Beech Wood at Alderley, in Cheshire, was planted by Sir Thomas Stanley. He states in his journal that he "brought the beech masts from his father-in-law's park of Kyre (Lady Stanley being a daughter of Sir James Pytt) there being no beech trees at that time in Cheshire."

Leaving the Deer Park, seats were resumed in the carriages, and the drive was continued along the Bromyard Road, crossing Perry brook, the boundary between Worcestershire and Herefordshire, which flows into Kyre brook, here forming the eastern boundary of our county. After a drive of half-a-mile, two or three hundred yards before reaching the sixth milestone from Bromyard, at the School, the route was taken over the fields to the right through the grounds of Perry farm to Hyde farm, distant from the School about half-a-mile.

Mrs. Baldwyn Childe showed her sketch book, in which were exhibited clever sketches of "The Hyde," taken from an old drawing, before its alterations; of the "Perry," taken November, 1873; and one of the north end of Netherwood, said by Duncumb to be the birthplace of Queen Elizabeth's favourite, Earl of Essex, taken from a drawing about 1820 by Mrs. Stackhouse Acton.

THE HYDE.

The Hyde House is situated a quarter of a mile off the road from Tenbury to Bromyard, on the right hand side, near the sixth milestone from Bromyard, and underneath the high ground which formed the ancient park of Netherwood.

Upon arrival at Hyde Farm, an inspection of the exterior displayed a building standing on a ground plan about forty-four feet long by twenty feet wide, with small transepts at each extremity. Internally it has been altered so as to be adapted to the requisites of a farm dwelling. The interior reveals an exquisitely timbered oak roof of the 14th century of which, upon the ground floor, are seen

the moulded pillars, and the arch springing from the moulded capitals; on the roof of the first floor is some finely-moulded tracery on the framing and wind braces, and a well moulded tie beam, and higher up is a second smaller tie beam with tracery filling in the apex. The scantling of the oak framework was out of all proportions, being far in excess of what engineers of the present day would calculate sufficient to carry the superincumbent roof. It must be borne in mind that the roofs of five centuries ago were much heavier than the slated roofs of this century; moreover the abundance and comparative cheapness of oak timber at that time would account for such lavish use of it in building. In the southern transept the floor of the attic is upon a semi-barrelled roof dimly lighted by a timber lancet light. Over the porch doorway on the eastern side are the remains of a 14th century window with fragments of coloured glass in trefoil and quatrefoil tracery. A former tenant of the Hyde tells Mrs. Baldwyn Childe that she remembers the present kitchen roof open up to the timbered roof before the alterations. Mr. James Nott, who was present amongst our visitors, informs us that a somewhat similar tracery is to be seen at Birtsmorton Court, five miles south-west of Great Malvern, and that another formerly covered the hall of Malvern Priory, of which a representation is given opposite page 11 of "Moche Malverne," a copy of which has been presented to the Woolhope Club by Mr. Nott, the author of the work. In looking at this roof we cannot help being reminded of the Chapel Farm in Deerfold Forest, of which a detailed description by Mr. Thomas Blashill is given in the *Transactions* of the Woolhope Club for 1869, with an illustration facing page 182.

We are indulging in the hope that Mr. Blashill will favour us with a description of the Hyde so soon as a little holiday from his onerous duties in connection with the London County Council will spare him leisure for the purpose, therefore we will abstain from adding any more on the subject, beyond publishing a copy of Deeds, connected with the Hyde, supplied by Mrs. Baldwyn-Childe.

Near to the Perry, or Perrie, the original residence of the Pytts, is a field called the "Chapel Close," and nearer to Stoke Bliss Church, behind the present blacksmith's shop, is a meadow called the "Prioress Meadow," both of which places are referred to in the Deeds.

Netherwood lies about one mile south of the Hyde. Duncumb says in his *History of Herefordshire* about one hundred years ago, "Netherwood mansion stood in a park of about 300 acres, which has been enclosed and converted into tillage since the time it was held by the Devereux family. A large piece of pasture is still called "The Parks." The old building was taken down about thirty years ago, and a substantial stone building was erected on the site of the former Court. The ancient mansion formed a quadrangle, on the south side of which was an apartment called Essex Room, where the Earl is supposed to have been born. On the north side was the chapel, having a deep vault under it, which contained several male and female effigies in stone of various sizes. It seems probable that the family was interred here. The other sides were disposed in different apartments; the chimneys were circular, with a kind of lanthorn on the top. The walls were built of brown stone from an adjoining quarry, and were nearly five

feet in thickness. A moat, several yards deep, insulated the building, and the access was over the drawbridge on the south. Part of the moat still remains, and heads in stone, of human figures and also of several animals, which were placed as ornaments, particularly round the windows of Essex Room, are still preserved at Netherwood." The Elizabethan pigeon house, at Netherwood, still stands in its original position, with its pigeon holes and curious revolving ladder. Within the last twenty years large stag antlers have been dug up in the court-yard, which crumbled to dust as soon as they were exposed to the air.

DEEDS RELATING TO THE HYDE, &c.

By Mrs. BALDWYN-CHILDE.

THE following are Abstracts from Deeds at Kyre Park relating to the Hyde and other land now belonging to Edward George Baldwyn-Childe who represents the family of Pytts of Kyre in the female line. The two fields mentioned therein—'The Chapell Close' and the 'Prioress Meadow'—still retain their names. The Hyde farm house was re-edified about 60 years ago—but the outline of the ancient building remains—and a fine 14th Century oak roof still records an early occupation and history.

13TH CENTURY (UNDATED).

Hugh, son of Henry Le Bishop, of Ulveley,* renders yearly to the Nuns of Aconbury, Rent at Michaelmas (for all service—suit of Court and for royal service) 2½ Marks, 1 Messuage at Ulveley and 6 Acres of his land . . . . . whereof 12 Selions lie between the land of John de Pole and the King's Highway leading to Bocklynton †

1539 (SEP. 26, 30H.VIII.)

The Prioress and Convent of Lymebrook granted a lease to William Pytt and his assigns of the tythes of whete, of rye, of barlye, of otes, of pesen and of all other corne and graynes in the townships of Pery and Hyde within the parish of Stoke Bliss for 41 years under the yearly rent of 30s. payable at the fest of St. Peter.

(Conventual Lease in Augm. Office.)

1577.

Willm. Oliver of London to James Pytts (3 deeds).

Oliver hath bargained and soulde to James Pyte one parcel of land with the appurtenance lying and known by the name of Sainet Fleecher's Chappell churchyarde alias Chappell Close.

1579 (SEP. 1, 21ELIZABETH.)

Francis Downes of Hyde, Herefordshire, gentleman,

to

James Pytte of Stoke Bliss.

Bargain and sale of the Chapel called "Saincte Flecher's Chappell and one Acre and a half of land and half a virgate of land belonging to the said "late" Chapel situate in Stoke Blyse, Hereford and in the tenure of John Pytte—as

*Wolferlow adjoining Stoke Bliss.
†Bockleton.

amply as John Herbert and Andrew Palmer lately had the Premises of the grant of Queen Elizabeth by letters patent of 22nd Sep. in her 17th year to hold of the Queen in socage.

Witnesses, WILLIAM ROWBERYE,
THOMAS PITT,
JOHNE HUGHES,
RICHARD HARLEY.

MEMORANDUM.—That Downes gave possession by cutting ane turf and hawthorn twig and delivering the same to Pytt in the presence of the same witnesses on 22 Feby. 22Elizabeth, 1580.

Award by Edward, afterwards Sir Edward Pytt of Kyre.

1583.

. . . . Know ye that whereas there is and hath been strife, variance and discord between one Richard Barnabie of Bockleton, Co., Worc. and James Pytt of the Perry . . . . the parties have committed themselves to the final determination of Edward Pytt of Kyer, Esq., who after examining and debating of the matter makes the following award— . . .

. . . . He doth award that James Pytt shall convey to Richard Barnabie by one sufficient deed all that "*concealed*" land called and known by the name of St. Flecher's Chapel and all appurtenances thereto belonging in the Parish of Stoke Bliss now or late in the tenure of James Pytt or his assigns all which rented premises with their appurtenances the said James Pytt lately had of the gift and grant of Francis Downes, gentleman . . . . and that he pay to Richard Barneby before the Feast of St. John the Baptist next coming at the new mansion house of the said Richard Barnaby called the Hull in the parish of Bockleton the sum of £10 5s. 0d.

In consideration of the said deed Richard Barneby shall suffer the said James Pytt to hold all his lease at the Perry now in the occupation of James Pytt in as large and ample a manner as John Pytt his father deceased held the same—and further . . . . after the said James Pytt shall convey the said "concealed" Lands—he enjoys the Perry House and further that the said James Pytt shall pay a chief rent of 7/10 to Thomas Baskervile of Netherwood, gentleman, Richard Barnaby allowing the said James Pytt yearly towards the payment thereof 6/8. . . . . In witness whereof the said arbitrator to the said award has subscribed his name and put his seal.

Signed, EDWARD PYTT,
Sealed with the arms of Pytt.

1586.

The Queen to Thomas Baskerville.

License to alienate tithes of grain in "Raye's Hide" late in the tenure of William Pytt and other Tithes formerly belonging to the Monastery of Lyme brook—and lately granted to Francis Penies? Clerk.—July 2nd, 28th Elizabeth.

1649.

Whereas Thomas Baskerville late of Netherwood in 1618 demised to George Carver of London for 99 years under the yearly rent of one peppercorn all that meadow called "Prioress* Meadow" with appurtenances in Little Kyre in Stoke Bliss and also all manner of Tenths and Tithes of Corn and grain arising and coming at the Hide in the said parish with their appurtenances in 1622 John Carver did sell over the same to Roger Doughtie whose widow Margerie married Edward Smith of the Hyde. Edward Smith for considerations makes over the same to Thomas Smyth and his heirs the remainder of his lease of 99 years.

JUNE 9TH, 1649 (DEED PARTLY EFFACED).
Indenture between Thomas Smyth
and
William Smyth of Stoke Bliss (yeomen).

Touching the Prioress Meadow in Little Kyre previously let to George Carver of London, gent. by Thomas Baskervill of Netherwood.

1658 (DEED PARTLY EFFACED).
Endorsed.
"A claim to the Tyths of the Hyde."
Indenture between Edward Smythe of Newnham, gent.,
and
Edward Russell of Stoke Bliss, Clerk.

With thanks to Mrs. Baldwyn-Childe for the admirable manner in which she had imparted the interesting local history connected with the neighbourhood, the party retraced their steps by Perry farm, the former residence of the Pytts family before they occupied Kyre mansion. In the field before reaching the farm, Mr. James Nott, whose brother some years ago was tenant of this farm, showed on the top of the "Chapel Field" the locality where, as a youth, he remembered foundations of stone being dug up, which were supposed to be those of the ancient chapel.

From Perry farm, the site of an ancient camp called Garmsley, or "Wrathes," three-quarters of a mile south-west, was pointed out, an oval shaped camp on an elevation with very steep escarpments, with a narrow entrance on the west, and the well-known tortuous defended approach. This camp was visited a short time previously by Mr. Moore. Its greatest length is 340 yards, its greatest width 140 yards. Its area, say 260 yards by 110 yards, is about six acres. Time, however, did not permit of a visit to-day. A paper descriptive of the Camp, prepared by our honorary member, Mr. William Phillips, will be found a few pages further.

From "The Hyde" the members proceeded onwards to

*The Prioress Meadow is a long field abutting on the highway from Tenbury to Bromyard.

THE WOOD PATCH GROVE.

In this grove, on about three acres of ground, grow about two hundred oak trees, acknowledged by experienced timber merchants to contain the largest cubic feet of timber upon this acreage to be found in the kingdom. These oak trees are considered by experts to be now in their prime, and about 600 years old. Observations upon the oak tree have given birth to the following couplet

"Three centuries he grows; and three he stays
Supreme in state; and in three more decays."

These oak trees are of a different character in their growth to the oaks in the Deer Park. They belong chiefly to the species "Sessiliflora," or flat-leaved oak. They grow straighter, taller, and more gracefully in trunk, limb, and branch, than the more slow-growing, wavy-leaved, characteristic "Old English Oak," whose specific name is "Pedunculata."

One of the trees that was felled ran up to a "first length" of eighty-one feet, 120 feet high, 324 feet of timber. Their measurements at the girth of five feet from the ground, taken this year by Mr. Openshaw, of Brimfield, the well-known timber agent of the Midland counties, were as follows:—

	Height in feet.	Girth.	First length.	Cubic feet. Contents.
1	95	19	60	650
2	100	13½	65	500
3	100	15	80	660
4	100	17	35	500
5	100	15	35	560
6	120	18ft. 5in.	45	640
7	110	15ft. 7in.	50	600
8	110 ivy	16ft. 9in.	60	760
9	100 holly	13ft. 9in.	60	540

Mr. James Johnson, Head Forester in the Forest of Dean, was present with the party, and notwithstanding the monsters with which he is acquainted, he was obliged to admit that in his opinion this oak grove was the finest collection of oak trees within a limited area, or perhaps within even one day's exploration, in England.

Within the last ten years, twenty of these trees were felled, and sold. A timber merchant required some oak timber for Dockgates of the following dimensions:—a length of 45 feet, by 24 inches square. Some of the trees were sent at an enormous expense by rail to Grimsby, and on the road they attracted large crowds who were incredulous as to their having been grown in Great Britain. They are now in use in the Dockgates at Grimsby.

Mr. Baldwyn-Childe exhibited a sister tree, as he called it, growing adjacent to one which was sold for the sum of £96. This tree, described as so similar to the one purchased as to have received the name of "Sister Tree," was a well balanced straight tree, 19 feet in girth at 5 feet from the ground, the height of this tree was not ascertained.

Whilst on the subject of gigantic oak trees, Mr. T. R. Groom, timber merchant, of Hereford, considers one of the most finely grown trees he has met with in Herefordshire was from Croft Castle grounds, 76 feet in its first length, without a knot or offset, upright as a pine tree, and when cut off 101 feet in height with a cubical content of 348 feet of timber.

A much finer tree as to cubical contents was an oak, 70 feet long, containing 595 feet, grown on the Stanford Court estate in Worcestershire, close to the north-eastern boundary of Herefordshire.

The Giant of Oak Trees was the Tibberton Oak, known as "The Hereford Monarch," of which the following particulars are taken from a description under a photograph taken for the purchasers Messrs. R. and T. Groom, Wellington, Salop.

THE HEREFORD MONARCH.

"An Oak Tree, containing 1,200 cubic feet, felled in Tibberton Park, ten miles west of Hereford, in April, 1877. Length of tree cut off at the diameter of 18 inches, 88 feet. Length of butt only 29½ feet. Height of tree when growing, 130 feet. Circumference at 5 feet from the ground, 22 feet 8 inches." The photograph of the tree was taken as the tree lay upon the ground, showing the larger bough, (not the taller bough), shattered by lightning; Mr. Moore possesses and much values this photograph, presented to him by Mr. W. E. Groom. The tree was sold because of the injury inflicted by the lightning which removed nearly 300 cubic feet, the original contents of the tree being calculated at 1,276 cubic feet.

There is a magnificent oak tree now past its prime on the Upper Eggleton estate, at Homend, near Ledbury. It grows detached in a large pasture field going from Homend to Blackway, at the distance of about one hundred yards on the left of the footpath. A photograph presented by the owner, Rev. Wm. Poole, will be found in the frontispiece of the Volume of *Transactions* of the Woolhope Club for 1873, twenty years ago. Its circumference at 5 feet from the ground is there given 20 feet 7 inches. First length, 50 feet. Height, 115 feet. In 1872 a timber dealer offered £150 for it. Since that period a timber merchant has expressed the opinion in the hearing of Mr. Moore that it might be valued at £200, but the extremities of some of the branches are now (1893) putting on the stag's horn appearance, indicative of its having passed its prime.

For records of about sixty of the finest, and otherwise interesting, oak trees in Herefordshire, refer to the "General Index" of *Transactions* of 1882, and also that of 1892.

The Oak trees in very early ages exceeded in size any trees within the memory of the present generation, if we draw our comparison from a canoe which was excavated at Brigg in Lincolnshire, of which the following account is taken from *White's Directory, and Murray's Handbook:* "In 1885 whilst digging for Gas Works at Brigg, a British boat was discovered 48 feet 6 inches long, 4 feet 6 inches wide, depth 3 feet 1 inch at bows, and 3 feet 4 inches at the stern, made out of one huge single oak tree, and capable of carrying 40 or 50 men over the Humber. Several other evidences of very large trees were also discovered,

but were covered up again. The boat is now to be seen on premises built for it at Brigg by the Lord of the Manor, the British and also the York Museum declining it for want of accommodation. It is supposed to be upwards of 2,000 years old."

In the Fen, near Lincoln, large trees rise to the surface every year. When in the year 1846 the "Forty Foot" large Drain was deepened, Yew and Nut-trees were discovered which must have been buried some thousands of years.

To return to Wood Patch Grove. In the same field, upon its northern slope, grows a yew tree with a girth of twenty-five feet five inches at the height of five feet from the ground. This tree grows upon sloping ground, from the lower portions of which the roots of the upper portion are very conspicuous. From its age and dishevelled appearance it was by no means an easy matter to draw the line of demarcation betwixt the root and the trunk. Anyhow, a noteworthy phenomenon must be recorded that almost the whole of the cavity has within the last sixty years been filled up with their combined growth. At present two or three children would fill the cavity. In Mr. James Nott's childhood it afforded a hiding place for at least one dozen. In earlier days "Court Leet" for Worcestershire and Herefordshire was held at this trysting place.

There are two Beeches growing in a Beech Wood on the high ground above the Hyde which contain respectively 600 feet and 410 feet contents of timber—with a girth of 16 feet, and 15 feet 9 inches, and on Garmsley Camp stand three Beeches containing over 300 feet of timber.

In the Hannings to the West of Kyre House are some very beautiful specimens of Oak trees. Three of them standing close together on an area of 98 square yards contain respectively 460, 300, 289 feet of timber, a total of 1,049.

Leaving the Wood Patch Grove the members re-entered the county of Worcester by re-crossing the Perry Brook, and soon found themselves under the hospitable roof of Kyre House.

KYRE.

KYRE House, or Cuer Wyard, occupies an elevated position on one of the many knolls in the undulating Kyre Park. Ranges of heights enclosing this extensive park generally limit the view from the house, but through an opening on the north side are seen the Titterstone Clee Hill in Shropshire, and on the south is seen Netherwood in Herefordshire.

The mansion is situated in Worcestershire, and it presents an interesting variety of building. Documentary and architectural evidence prove it to have been one of the many fortified homes of the Mortimers. It obtained its ancient name of Wyard from the family who in 1275 obtained from Edward I. permission to enclose and plant the park.

From a diligently-kept manuscript memorandum book in the possession of its present owner, extracts from which by the pen of Mrs. Baldwyn-Childe have appeared in *The Antiquary*, we gather details of the "building of Kyer House and reparinge the ruines thereof," including the number of hundred thousand bricks moulded and burned every year, the quarrying of stone, the expenses of felling and hauling timber, the wages and the very names of the workmen. This manuscript is in the handwriting of Sir Edward Pytts, who purchased the manor and the ruined castle from Lord Compton, in 1586, and it occupies a period from 1588 to 1618, from which time the family has made it their residence instead of their earlier home at "The Pyrrie."

The ruined castle referred to was an Edwardian castle whose massive walls, six and seven feet thick, were enclosed and added to; the square plan of this ancient building can be most readily distinguished in the foundation walls in the present cellar. The very close proximity of the Church and churchyard on the eastern side of a courtyard on two levels connected by a flight of steps, modified the architect's originally designed plans, and his respect for "God's Acre" is well shown in the following extracts from his memorandum book under the date 1611. "In the name of God. Amen. Nowe purposing by God's assistance to go forward withe building of Kyer House and reparinge the ruyns thereof I brought John Bentley, freemason, from Oxford (where he wrought the newe addition to Sir Thomas Bodleigh his famous library) with me as I came from London to Kyer, to take instructions from me by veinge the place, to draw me a newe platte, for I altered my first intent, because I wold not encroache on the churchyard, nor alter it, nor build a new churchyarde more convenient hard by because my consyence wold have accused me of doinge the same, of purpose only to grace myne owne house." We have often noticed that in those days whenever coal was transported in barges, whether by river or canal, it was always termed sea-coal. We find the entry—"20 August, 1612, for 12 loade of see-cole at the Clee Hill for to burne lyme." In December, 1613, "paid for two tun of yron, and for drawing to small square barres almost fit for windowes £34." In October, 1614, "one tun of ledd, conteyning 18 pigges, for wch he Hodnett made me pay at Bristow £13 5s

contrary to promise, the cariadg by water to Bewdley 10s, thence 10s, £14 5s. In December and January, 1614, we find the following oak trees felled:—"30 trees in my park and 20 trees in Over Ruddings, al oks." In November, 1617, "paid to Ballard for felling and squaring 10 oks in the upper Riddinges, 30s." In those days man's labour was not limited to eight hours a day. The observance of Saints' days was not omitted, but apparently not in the holiness and sobriety which is their due, for, following such entries as "St. Luke was a holiday," and "St. Matthew was a holiday," we regret to find frequent entries such as "paid to drunken Reve 10 June, 1613, 10s 4d, and so discharged him for ever."

Sir Edward Pytts died in 1618, and left the plans of his house, with £2,000, for the purpose of finishing the same within seven years, to his son, Sir James Pytts, which was accordingly executed.

To-day the present mansion consists of the enclosed square relic of the Edwardian Castle of the Mortimers at its western end, the Elizabethan addition by Sir Edward Pytts on its north side, Georgian additions on its south-western side, and in the north-west an addition of the Victorian era by its present owner. About 1750 Edmund Pytts plastered the outside, converted the Elizabethan hall into kitchen and other offices, and carried out decorations in the Adams and Chippendale style. About 1880 the offices were added and the Hall was restored to its original state, with its mullioned windows and iron flutings.

The extensive fireplace in the Elizabethan hall contains in the rear of its chimney breast a small place of concealment about six feet square, with narrow loophole; and on the floor above there is a similarly loopholed apartment. The original means of ingress into the lower apartment having been destroyed, it is now entered by steps within the wall structure, its entrance being craftily concealed by a full-length portrait in the panelling, sliding on a horizontal base, of Sir James Pytts, by Mrs. Baldwyn-Childe. In the floor of the Elizabethan hall is another small secret hiding place for treasure which has bricked base and walls.

The walls of the house contain many portraits of the family of Pytts, of the Pyrie and Cure Wiard—now called Perry and Kyre Wyard. One portrait, a small but very good painting, which came from Netherwood, is according to Duncumb that of the famous and equally unfortunate Earl of Essex, Queen Elizabeth's favourite, who was born at Netherwood. Other portraits are of Philip, Earl of Pembroke, by Vandyck, Sir Edward Pytts and his grandson Edward, Sir James Pytts, Lady Pytts his wife, daughter of Sir Arthur Heveningham, Sebastian Bourdron by himself, Albert Durer by himself, Rembrandt, Edmund Pytts, M.P., Samuel Pytts, M.P., his third wife Catherine, Countess of Bellamont, his son Edmund, his daughter Catherine wife of W. L. Childe of Kinlet, Jonathan Pytts and his wife Annabella, Sir Baldwyn Leighton, and Louisa Stanley afterwards Lady Leighton.

The grant dated from Gloucester 1275, obtained from Edward I., for John Wyard, of Cuer Wyard, to plant and enclose his park at Kyre, is carefully preserved and treasured. It is highly probable that some of the oldest oak trees in Deer Park are at least six hundred years old, and are survivals from the original emparcment of that period. The oak trees of Wood Patch Grove also are considered by

experts to have reached five or six hundred years' growth. The rare work "The Boke of St. Albans," dated 1486, from the collection of Sir Edward Pytts, is amongst the many treasures, and a copy of the same by Elliot Stock is along side. Mrs. Baldwyn-Childe has had carefully mounted in a series of albums numerous documents, dating from 1200, with massive seals attached of Queen Elizabeth, Richard Cromwell, and of many others. Moreover, the collection contains many other objects of multifarious interest, amidst which the antiquary would enjoy a long revel. The care which has been bestowed upon the restoration, and the taste displayed in the preservation of the aucient documents, many of which for the benefit of the less initiated have been translated into intelligible language, form a model worthy of imitation, and reflect great credit upon Mrs. Baldwyn-Childe, to whom this work of assortment must have been a labour of years. What a store of local and historical knowledge we should have accumulated, to be calendared in the Record Office, and published by the Historical Manuscripts Commission, had every custodian of local documents in like manner valued as a precious inheritance the charge committed to him!

Whilst enjoying the hospitality of the host and hostess in the Elizabethan hall, the members were summoned to attention in order to hear Mr. George Piper, F.G.S., read his notes on the 2nd Earl of Essex, born at Netherwood, November 10th, 1567. This historical paper was followed by an instructive paper proving the augmentation of growth of oak trees by transplantation deduced from a series of valuable observations taken in Dean Forest during a period extending over hundred years. This paper was read by Mr. Philip Baylis, F.Z.S., &c., Her Majesty's Deputy Surveyor of the Forest of Dean.

The gardens were next visited. The extensive sheets of water on varying levels surrounding the lawns and the finely grown trees in the shrubbery presented a charming natural picture unmarred by any formality. At the western extremity near a rustic bridge grows a stately ancestral spruce fir, sixteen feet in girth, surrounded by its progeny numbering twelve, produced from the central parent by its lower boughs drooping until, on reaching the ground, they have taken root and given birth to a representative. This method of reproduction is similar to that of the great pear trees at Holme Lacy in the Vicarage garden, and in the field between the Church and the river. There are two handsome specimens, respectively eighty and eighty-five feet high, of the rare Iron Tree *Zelkoúa crenata*, of the natural order *Ulmaceæ*, *syn.*, *Planera Richardi*, a large deciduous tree from the west of Asia and shores of the Caspian Sea, introduced in 1760. This tree must not be confounded with the *Siderodendron*, natural order *Rubiaceæ*, nor with the *Sideroxylon*, natural order *Sapotaceæ*, the wood of which is so close, hard, and heavy, as to sink in water. In Loudon's "Trees and Shrubs," page 726, we read concerning *Zelkoúa crenata* that "that the flowers are greenish white in April or May, the fruit white, ripe in October, the wood is very heavy and when dry becomes extremely hard. It is employed for the same purposes as oak, and is found even superior to oak for furniture." On the lower lawns near the bathing house are a fern-leaved Beech, and a Buckeye, a species of American chestnut.

One of the approaches to the extremity of the grounds is through a tunnel,

which is called "The Grotto." Beyond the grotto, at the distance of twelve feet from each other, are two yew trees, each nineteen feet in girth, both of them more or less prostrate in opposite directions. It has often formed a subject of controversy whether these two trees were the halves of one original tree rent in twain. A careful examination by the Club's experienced dendrologists of their roots and lower trunks closed the subject of controversy by returning the verdict of "each a separate tree."

The cutting at the entrance of the grotto upon its north side reveals an interesting geological section of curved beds of gravel and sand, concerning which the Rev. J. D. La Touche has made the following remarks:—"Subsequently to the formation of the Silurian strata to the north-west of this place a vast upheaval appears to have taken place, by which that part of the country which affords exposures of the Old Red Sandstone was cut off from the ocean, and enormous lakes and lagoons were thus caused. The grotto at Kyre exhibits an interesting section of the beds of *débris* that accumulated from time to time on the bottom and shores of this inland lake. It consists of alternate layers of coarse pebbles and of fine sand, the former rounded by attrition and rolling, similar to what takes place in the present time when stones are subject to the action of water in motion. The process was not of a violent kind, but gradual, and involved immeasurable periods of time. The peculiar curved layers of sand that may be seen in some parts of this section are due to a variation in the currents from time to time. Subsequently to the deposition of these strata some ten thousand feet thick, called the Old Red Sandstone, a depression occurred, and the Mountain Limestone was formed in deep water, the Millstone Grit in shallower, and then the Coal Measures, which afford abundant evidence of vegetable accumulations on shores and in the estuaries of rivers. The fragments of carbonaceous matter found on the banks of the road between Garmsley Camp and Perry Farm confirm the view that these sandstones were rather of lacustrine than of marine origin. What are called the Devonian rocks to the south-west were contemporary with these, but there is every reason to believe that they were marine, and not fresh water as these are."

East of the mansion is a stupendous well-built barn of Elizabethan days, and at the eastern extremity stands a masonry dovecote of far earlier date, a direct descendant of the circular Norman Columbarium, and possibly coeval with the Edwardian portion of the castellated mansion. It is similar in design to that at Richard's Castle, of which a drawing is given in Mr. Alfred Watkins's "Herefordshire Pigeon-houses," see page 9. The building is plastered, the masonry portion probably extends to the projecting string-course. The upper part is of Elizabethan pattern. The feudal "right of dovecot" survived until the time of Elizabeth.

The Church, dedicated to St. Mary, consists of a nave, chancel, a south aisle or chapel separated from the nave by one large arch, and at the west end of this aisle a bell turret containing three bells. There is an Early-English doorway at the west-end, a small Norman window in the north wall of the nave, and in the chancel and south aisle are Early-English windows. The date of the chief portion

of the Church is 1310 to 1330—though the North wall and a small Norman window indicate its early foundation.

In the chancel are the remains of an aumbry and a piscina. There is another piscina in the south aisle, and on the window splays are remains of early fresco paintings of well-drawn female figures.

In the east window of the chancel were formerly the arms of Mortimer, Beauchamp, Mortimer of Cuer Wyard, Hedley, Delamere, St. George, Wyard.

There is a mural tablet to the memory of the Rev. Hugo Thomas, sixty years rector of this parish, who died October 21st, 1693, in his 107th year.

Resting upon an iron arm affixed to the west wall is an old helmet, and close by, upon another arm, rests a large cannon ball which was found near the rectory.

There is an ancient parish chest cut out of a solid tree in the Church; and a bier with swinging handles on which is inscribed 16 I.S. 82.

There are several monuments of the Pytts family in the chancel. The Pytts formerly occupied Perry farm, the grounds of which we traversed in our walk from Hyde Farm. Old documents give us the following succession, with the characteristic changeable spelling of earlier days, of the Pytts, of Cure Wiard and the Pyrie:—John Pytts, 1399, of the Pyrye; John and Richard, his sons, of the Pirie, 1401; Richard P, 1408; Robert married Jana, fil. and heiress of Thomas de la Pole; Thomas died 1504; John died 1534. Sir Edward Pytts, who rebuilt Kyre, and restored the Edwardian towers from 1541 to 1618. Sir James Pytt, Kt., was born 1575, married, 1599, Mary daughter of Sir Arthur Heveningham, of Heveningham, Suffolk, 1601 knighted, J.P. for Worcestershire, 1633 Sheriff for Worcestershire, 1640 died. His daughters, Elizabeth, married Sir Thomas Stanley, of Alderley, Cheshire. Mary married Sir John Vere, of Netherwood; Edward, son and heir, married Elizabeth, daughter of Sir Samuel Sandys; James married first the daughter and heiress of Henry Best, of Wick, Esq., secondly Anne Lady Bromley; Edward died 1672. William Lacon-Childe, of Kinlet, M.P., died 1880, aged 95, having succeeded to Kyre Estates in 1832 through his great grandmother, Catherine Pytts, the daughter of Samuel Pytts, M.P., for Worcestershire, and Catherine, daughter of Sir James Rushout. Samuel Pytts married the Countess of Bellamont, the heiress of Birtsmorton in Worcestershire. The present owner, Mr. Baldwyn-Childe, succeeded his father in 1880.

As four o'clock, the specified hour for departing, drew near, a vote of thanks, proposed by the President, seconded by Mr. George H. Piper, F.G.S., was accorded to the Rev. Prebendary and Mrs. Baldwyn-Childe for their hospitality as well as for the intellectual feast. Like the schoolboy going unwillingly to school, so the members dragged their loitering feet from the lawns of Kyre Park, eventually giving vent to their suppressed feelings in three lusty cheers for the host and hostess.

The four-mile drive from Kyre Park to the town of Tenbury is over a slightly undulating country. Tenbury guide-books commence its history by the information that the town is said to possess a charter for a market and fair granted in 1249 to Roger de Clifford, Justice of the Kings Forests south of the Trent.

The analysis of the mineral waters of the town, taken from a notice board posted up at the Wells, is as follows :—

	Grains in an Imperial gallon,
Chloride of Sodium	932·52
,, Calcium	461·09
,, Potassium	38·63
,, Magnesium	41·81
Sulphate of ,, ...	1·57
Protoxide of iron	4·89
Silica	4·54
Bromine and iodine	0·84
	1485·89

Tenbury Church, dedicated to St. Mary the Virgin, has been rebuilt, with the exception of the tower and chancel. There are some Early Norman windows in the tower belfry. In the chancel on the north side, under a fourteenth century recessed canopy, is a recumbent effigy, only two feet three inches long from head to feet, of a cross-legged knight in armour, holding a heart in his hands. The details of the drapery, chain armour, sword, straps, &c., are very carefully carved. The feet rest upon a dog.* Close by a fine alabaster tomb, with two recumbent effigies, in the south aisle is a brass plate let into the east wall representing, at the height of three feet six inches above the ground floor, the height of the overflow of the river Teme in the memorable flood of May 14th, 1886. In the south-east corner of this aisle are preserved, with other early Norman fragments, the remains of, apparently, the shaft of a Saxon cross containing carved interlaced work. These were all found during the recent rebuilding of this church. The Parish Registers date from 1653.

An excellent dinner, admirably served, in a spacious room of the Swan Hotel, was ready punctually at five o'clock; after which Mr. H. Southall, F.R. Met. Soc., gave some statistics on the subject of "The Drought of 1893." But as this drought, which commenced on March 2nd, broken temporarily by the storm of May 14th, still unfortunately sustains the designation of "partial drought," our meteorologists yet await its termination.

The evening train from Tenbury brought members to Hereford early enough to meet their trains going south, east, and west. Thus terminated the fourth and last field meeting of the Club for 1893.

The names of the following four gentlemen were given as candidates to be balloted for at the next meeting:—Mr. J. H. Barrett, of Broomsberrow Heath; Rev. Alfred Bannister, of Aston; Rev. Preb. Baldwyn-Childe, of Kyre Park; and Mr. M. J. G. Scobie, of Hereford.

The following members and friends attended:—The President, The Rev. Preb. Wm. H. Lambert; former presidents, Sir Herbert Croft, Bart., Mr. George

* This is said by Mr. Oliver Baker to be "about the oldest monumental effigy in the district, and perhaps the only sculptured effigy in the kingdom which shows the muffler or gloves of mail hanging loose from the wrists, not, as generally represented, on the folded hands."

H. Piper, F.G.S., Mr. H. Southall, and Rev. Preb. Elliot; Sir Charles Rouse Boughton, Bart., and the Revs. T. Auden and Mr. Garnett-Botfield, both of the Caradoc Club; Major Campbell, Major Doughty, Captain de Winton, Revs. J. Barker, J. O. Bevan, C. S. Hagreen, E. J. Holloway, A. W. Horton, J. S. Lea, F. O. Philpott, R. Wood, and H. T. Williamson; Messrs. C. D. Andrews, H. C. Beddoe, Philip Baylis (H.M's. Deputy Surveyor of the Forest of Dean), J. Carless, R. Clarke, E. Conder, Luther Davis, Charles Fortey, T. Hutchinson, R. Lewis, J. W. Lloyd, T. C. Paris, W. Pilley, O. Shellard, H. G. Sugden, J. P. Sugden, H. A. Wadworth, Dr. J. H. Wood, H. C. Moore (Honorary Secretary), and James B. Pilley (Assistant Secretary). Amongst the visitors were Mr. Davis, senior, Mr. W. R. Diamond, Rev. E. G. Doughty, Messrs. R. C. Horton, B. A. Horton, Lacon Lambe, James Nott, A. Prideaux, M. J. G. Scobie, Hugh Wood, and Mr. James Johnson, one of the most experienced foresters of our Royal Forests and Head Forester of the Forest of Dean.

THE GROWTH OF OAKS.
SEED *VERSUS* TRANSPLANTATION.

THE following paper, so valuable to foresters, landed proprietors, farmers, and others, showing the comparative increase of growth of oak trees as grown from the acorn, and as transplanted, to the advantage, perhaps contrary to the generally received opinion, of the system of transplantation, is rendered more valuable from the long period covered by the biennial observations, namely, from 1784 until 1882, or ninety-eight years. The inverted commas denote the extracts from the original memorandum, and we owe thanks to Mr. Baylis for bringing this information before our Club, our county, and our country.

The following observations consist chiefly of extracts from a memorandum made, in or about 1883, under the sanction of Her Majesty's First Commissioner of Woods and Forests. They were read at Kyre House before the Woolhope Naturalists' Field Club, on the 22nd August, 1893, by Mr. Philip Baylis, M.A., L.L.M., F.Z.S., Barrister-at-Law, Deputy Surveyor of the Royal Forest of Dean :—

PLANTING AND GROWTH OF TREES.

RECORDED RESULTS FOR A CENTURY.

"The experiment, of which the results are recorded below, was commenced, and has been pursued, with a view of showing the effect upon the growth of oak trees, of (*a*) transplanting them at a tolerably early age ; (*b*) treating them in this way at a more advanced period ; and (*c*) leaving them in the original seed bed or nursery.

In or about the year 1784 a small field called the Acorn Patch, in the Dean Forest, was sown with acorns. In or about the year 1798—1800 some of the plants were transplanted into the open forest ; between the years 1806 to 1812 more of the trees were transplanted, and the remainder were left in the nursery where they were raised. A few of the trees transplanted in 1800 and 1807 respectively, and also a few of those left undisturbed, were carefully marked and measured in the year 1809, and since that time they have been periodically re-measured, and the progress of each carefully noted, of which the subjoined tabular statement is an abstract."

The following statement was probably written by Lord Glenbervie, who was "Surveyor General" in the early part of this century. Lord Glenbervie took a deep and most active interest in planting timber trees, and it is to his care and forethought that the Crown and the nation are chiefly indebted for a large proportion of the Crown forests and woodlands now in existence.

STATEMENT CONCERNING THE TRANSPLANTING OF OAKS OF DIFFERENT AGES, AND THE TAP-ROOT OF OAKS.

"One of the reasons which operates with many in support of the opinion that transplanted trees, of whatever age, must be inferior to those which are left in

the place where they first sprung from the acorn, is of a *theoretical* nature. They conceive that the preservation of the main root entire, which in young oak plants generally strikes directly down perpendicularly from the seed, and is called the tap-root, must be of material consequence to the growth of the plant ; and, as it must be bruised or broken, and is generally shortened by the knife, on transplanting the tree, it is thought that the tree itself can never recover from the effects of that injury.

"But if we resort to a much more satisfactory criterion, the very general *observation* and *experience* of much the greater number of persons who took the trouble to answer the Surveyor General's printed queries are in support of the contrary opinion.

"Besides many nurserymen (some of whom have spoken from very extensive practice for more than 30 years), the President of the Royal Society, and many of the most considerable planters and owners of woods in various parts of the United Kingdom, have given their testimony on that side of the question.

"Mr. T. A. Knight's sentiments on this subject were communicated to the Surveyor General in the following words : 'The tap-root is of consequence only during the first year's growth of the tree ; and I will venture to assert (and I speak from the actual examination of more than 20,000 trees) that not a single instance can be adduced in which anything corresponding with the idea of a tap-root now exists under any one tree of twenty years' growth in England. I think I have shown, in a paper in the *Phil. Trans.* of 1806 (in which I have pointed out the cause why the radicle or root of germinating seeds descends, and why their germ ascends), that a tap-root must necessarily languish after the first year, and become of no importance. And I speak from very extensive experiments, accurately and attentively made, when I assert that shortening the tap and lateral roots of young trees tends much to increase their future growth, by increasing the number of their roots."

"Very convincing proof of the total disappearance of any vestige of a tap-root in oaks of a very large size fell accidentally under the Surveyor General's particular observation in the year 1809 in the case of three trees of that description at Moccas Court, and four and five in the enclosure called Goldsmith's Hill in New Forest, which had been recently blown down by the violence of a sudden storm, and exhibited the whole compass of their roots in a circle of earth which had been torn up with them, and exposed in a direction nearly vertical. In the trees at Moccas Court there was not the slightest appearance of anything like what could have been an original tap-root. The principal and largest roots had diverged in various ways, mostly horizontal, owing, probably, to the hardness of the substratum, or because the best nourishment was near the surface. The appearance of the four or five windfalls in New Forest was nearly the same, except that the principal roots, though none of them were central like a tap-root, seem to have descended nearly in a straight direction for three or four feet, but they then spread out all round, in a manner parallel with the general surface of the ground."

In further support of the opinions which Lord Glenbervie has expounded

above, I may add that there are at present (1893) lying in the Blaize Bailey plantation of the Dean Forest thirteen immense beech trees of great age, which were blown down by a storm of terrific violence, that swept over the Forest about two years ago. These trees, like those at Moccas Court, have torn up in their fall practically the whole of their roots, which now lie exposed to view. None of these roots had penetrated deeper into the ground than 2½ or 3 feet, and there is not in any one of the trees "the slightest appearance of anything like what could have been an original tap-root."

My own opinion, based upon careful examination, is that the "sentiments" of Mr. T. A. Knight, quoted by Lord Glenbervie, "that not a single instance can be adduced in which anything corresponding with the idea of a tap-root now exists under any tree of 20 years' growth in England," are correct.

"The small field called the "Acorn Patch," near the Speech House, in Dean Forest, consists of several acres, which was sown with acorns about 1783. Part of this field has been thinned repeatedly since that time. About 1797, Mr. Blunt, then Deputy-Surveyor, transplanted from it into the open forest about 40 or 50 trees. All these, except two or three, have continued to grow and thrive from that time. During the years 1808—1809, others were also taken from the same plot of ground, and planted in the same manner, in the neighbouring open parts, to the number of several thousands. On the 14th of September, 1809, three of the trees transplanted by Mr. Blunt, three transplanted in the year 1807, and six which remained in their original place (and where they were not so close together as to be hampered in their growth) were carefully measured under the direction and in the presence of the Surveyor General, by taking their circumference at the height of six feet from the ground. The same trees were again measured on the 24th of August, in the following year, when it appeared that those which had been transplanted by Mr. Blunt had increased the most, those transplanted in 1807 the next, and of those which remained in the original place two had not increased at all, and the other four not so much as any of those transplanted."

In order that the value of these experiments might be further tested, my predecessor in the office of "Deputy Surveyor," Sir James Campbell, Bart., had a number of fellow seedling trees selected in "Russell's" plantation in the Dean Forest. Some of these were left untouched, and others were simply "lifted," or got up by the roots, and the lateral and tap-roots shortened, and any roots that were bruised or broken in the lifting cut off, and the trees at once replanted in the holes from which they had been lifted. And these trees, as in the case of those mentioned above, received a check in their growth for a few years, but when their roots had again got well hold of the soil, and put out new fibrous roots, they overtook in growth those which had not been moved, and have continued to the present time to increase more rapidly. This, I think, clearly shows that the cause of the more rapid growth is due to the cutting of the large roots and the consequent increase in the number of fibrous and feeding roots, and not to mere change of situation.

There are preserved at Whitemead, in the Forest of Dean, the stumps with

An Account of the Admeasurement of several Oak Trees growing near the Speech House in Dean Forest, showing their Increase in Circumference at the different periods under-mentioned.

N.B.—The Acorn patch where these Oaks were raised was enclosed and planted with Acorns about 1784. The Trees marked A, B, C, were drawn out of it in 1800, and are situated in a row with others on the left-hand side of the road leading from the Speech House to Newnham. D, E, and F were drawn out of Acorn Patch in 1807, and are between the Speech House and Acorn Patch, near the corner of the Speech House fence; and G, H, I, K, L, M, and X are remaining in the Acorn Patch, and have not been transplanted.

The circumference is taken at 6 feet from the ground, except (I) which is taken at 5 feet 6 inches.

	A.		B.		C.		D.		E.		F.		G.		H.		I.		K.		L.		M.		N.		X.	
		Increase.		Increase.		Increase.		Increase.		Increase.		Increase.		Increase.		Increase.		Increase.		Increase.		Increase.		Increase.	At east corner Speech House grounds next road 5½ft. high. Planted 1807.			Increase.
1809, Sep. 14...	7⅝	—	8	—	8½	—	7	—	6	—	6	—	14½	—	13	—	12	—	17½	—	11⅞	—	15¾	—	—	—	—	—
1810, Aug. 26..	9⅛	1½	9¼	1¼	9⅜	⅞	7¼	¼	7⅛	1⅛	6½	½	15	⅝	13⅝	⅝	12	—	18¼	⅜	12⅜	1	15⅜	—	—	—	—	—
1812, Aug. 15..	11⅜	2⅜	11½	2	11½	1⅞	8⅜	1⅜	8½	1⅜	8	1½	17½	2½	14⅜	1½	12½	½	20	1⅜	13⅜	1	16¾	1	—	—	—	—
1814, Oct. 5....	14⅜	3	14	2⅜	13⅝	2⅜	11	2⅝	10¼	1⅞	9½	1½	19⅛	1⅝	16	1¼	14	1½	21⅝	1⅝	15⅝	1⅞	18½	1¾	13	—	24½	—
1816, Oct. 23...	18	3¼	16¾	2¾	16⅝	3	13½	2½	12⅜	2⅛	12	2½	20⅛	1	17	1	14¾	¾	22⅞	1¼	17	1⅜	20½	2	16	3	27⅝	3⅛
1818, Oct. 20...	20	2	19	2¼	18⅞	2½	16⅛	2⅝	14⅜	2	13½	1½	22	1⅞	18½	1⅛	15½	¾	23⅞	1	18½	1½	21⅛	⅝	18½	2½	28⅝	1
1820, Oct. 30...	23⅝	3⅞	22⅜	3⅜	21⅝	3	19	2⅝	16⅛	1⅝	16½	3	24⅛	2⅛	19⅜	1⅝	16⅜	⅞	24⅜	1	19⅝	1⅜	22¼	1⅛	23½	4⅜	30½	1½
1822, Oct. 2...	26⅜	2½	25¼	2⅞	25	3⅛	21½	2½	18¼	2⅛	19⅛	2⅞	26⅜	2¼	21⅜	1⅝	17	⅝	25⅞	1	20⅝	1	23½	⅞	26⅜	3⅜	31¼	1⅛
1824, Oct. 20...	29½	3⅛	28⅜	3½	28¼	3¼	25⅜	3⅞	20⅞	2⅝	22½	3	Cut down		Cut down		17⅜	¾	Cut down		22⅝	1⅝	23⅝	⅝	30⅛	3½	32⅛	⅞
1826, Nov. 1...	32⅛	2⅝	31¼	2½	30⅛	1⅞	27¾	2⅜	22⅜	1½	24⅝	2⅜	—	—	—	—	Cut down		—	—	23	½	24⅝	⅞	32¾	2⅜	33¾	1⅜
1828, Oct. 16...	36½	4⅜	36	4¾	Cut down		31¾	4	25¾	3⅜	29½	4⅜	—	—	—	—	—	—	—	—	25⅜	2⅜	26⅞	2⅛	37⅞	5	36	2¼
1830, Oct. 27...	40½	4	40½	4½	—	—	35¾	4	27½	1½	32⅜	3½	—	—	—	—	—	—	—	—	26½	⅜	29	2¼	40⅜	3	37¼	1¼
1832, Nov. 2...	43½	3	44	3½	—	—	37	1¼	28¼	1	35	2¼	—	—	—	—	—	—	—	—	27½	¾	29¾	¾	44⅛	3⅝	38	¾
1834, Sept. 30..	46¼	2¾	46¾	2¾	—	—	38¼	1¼	28⅝	⅜	37	2	—	—	—	—	—	—	—	—	28½	1	30	¼	46¾	2¼	39	1
1836, Sept. 29..	48⅜	2⅛	49⅛	2⅜	—	—	39½	1⅛	29½	⅝	38½	1½	—	—	—	—	—	—	—	—	30	1⅜	31	1	48¾	2	41½	2½
1838, Oct. 4...	51⅜	3	52¼	3⅛	—	—	41¼	1⅞	31	1⅜	40½	2	—	—	—	—	—	—	—	—	32	2	32	1	51½	2⅞	42	½
1840, Oct. 3...	53¼	1½	54¼	2	—	—	42½	1¼	31¼	¼	41⅜	1¼	—	—	—	—	—	—	—	—	32½	½	32	—	52½	1	42⅞	⅜
1842, Oct. 13...	55¼	2	56	1⅝	—	—	43½	1	Dead heads		43½	1⅛	—	—	—	—	—	—	—	—	33	½	33	1	54½	2	43	¼
1844, Oct. 1...	58½	3¼	58	2	—	—	45	1½	cut down.		46	2½	—	—	—	—	—	—	—	—	35	2	34½	1½	57	2⅛	44⅛	1⅛
1846, Sept. 9...	60½	2	60⅝	2⅛	—	—	47¾	2⅜	—	—	49⅜	3⅜	—	—	—	—	—	—	—	—	36½	1½	36½	2	60½	3½	46¼	1¾
1848, Sept. 18...	63½	3	62⅜	2½	—	—	49½	1⅞	—	—	52½	2⅛	—	—	—	—	—	—	—	—	38	1½	37¾	1¼	63	2½	47⅜	1½
1850, Sept. 7...	64	½	63½	⅜	—	—	50¼	⅜	—	—	53⅜	1¼	—	—	—	—	—	—	—	—	39	1	38	¼	64	1	48	¼
1852, Sept. 30...	64½	½	64	½	—	—	51¼	1	—	—	55¼	1½	—	—	—	—	—	—	—	—	40	1	39½	1¼	64⅜	⅜	48⅛	½
1854, Nov. 2...	66½	2	65½	1½	—	—	53	1⅜	—	—	57¼	2	—	—	—	—	—	—	—	—	41⅜	1⅜	41⅜	2½	67	2¼	50⅜	2¼
1856, Oct. 20...	67¼	⅜	66¼	⅜	—	—	54	1	—	—	59⅜	2⅛	—	—	—	—	—	—	—	—	44¼	2½	42	¼	68¼	1¼	51¼	⅛
1858, Sept. 6..	69½	2¼	67⅜	1⅛	—	—	55¾	1⅜	—	—	62	2¼	—	—	—	—	—	—	—	—	44⅜	½	42½	½	70½	2¼	54	2¾
1860, Oct. 22...	71¼	1⅝	69½	1⅛	—	—	57	1¼	—	—	63⅜	1⅜	—	—	—	—	—	—	—	—	45	½	43	½	71½	1	54½	½
1862, Nov. 7...	72	⅜	70	⅜	—	—	58	1	—	—	65	1½	—	—	—	—	—	—	—	—	46	1	43½	½	72	½	55	½
1864, Sept. 22...	73½	1½	71	1	—	—	59½	1½	—	—	67⅜	2⅛	—	—	—	—	—	—	—	—	46½	½	44	½	73¼	1¼	56	1
1866, Sept. 26...	75½	2	72½	1½	—	—	61½	2	—	—	70½	2⅛	—	—	—	—	—	—	—	—	47	½	44⅜	⅜	74½	1¼	56¾	¾
1868, Oct. 28...	76⅜	1½	73½	1½	—	—	63	1½	—	—	73¼	2⅜	—	—	—	—	—	—	—	—	48	1	45⅜	¾	75⅜	1½	57½	½
1870, Oct. 11...	78⅛	1⅝	74⅝	1⅛	—	—	64⅛	1⅛	—	—	76⅛	3⅛	—	—	—	—	—	—	—	—	48⅛	⅛	46	⅛	76⅝	1	58	¾
1872, Oct. 12...	80⅛	2	75⅝	1	—	—	65⅝	1⅜	—	—	80⅛	3⅝	—	—	—	—	—	—	—	—	49⅛	⅝	46⅜	⅜	78	1⅜	58⅜	⅜
1874, Oct. 14...	81⅜	1⅛	76⅛	⅛	—	—	66⅝	1	—	—	83	2⅞	—	—	—	—	—	—	—	—	49⅝	⅜	47	⅝	78⅛	⅛	58⅞	⅝
1876, Oct. 13...	82⅛	1⅛	77⅓	1⅜	—	—	68⅛	1⅛	—	—	85⅛	2⅛	—	—	—	—	—	—	—	—	50⅜	1⅜	47⅛	⅛	79⅜	1⅜	59⅜	⅛
1878, Oct. 14...	84⅜	1⅛	78⅔	1⅓	—	—	69⅜	1	—	—	87⅜	2⅜	—	—	—	—	—	—	—	—	51⅜	⅛	47⅞	⅜	80⅜	⅝	59⅞	⅛
1880, Oct. 14...	85⅛	1⅛	79⅜	⅝	—	—	70⅜	1⅛	—	—	89⅛	1⅜	—	—	—	—	—	—	—	—	52	⅛	48⅜	⅜	81	⅛	60⅜	⅛
1882, Oct. 17...	87	1⅞	80⅝	1⅜	—	—	71⅞	1⅜	—	—	91⅜	1⅜	—	—	—	—	—	—	—	—	52⅞	⅞	49	⅛	81⅝	⅝	61⅜	⅝

In May, 1827, among those on left hand, east from the Speech House, 19 were cut for thinning by John Alford—every other tree; C was one of them.
In May, 1823, among those marked for thinning by Mr. Turnbull were G, H, K, and cut down, and I in 1827, being damaged.

the roots attached of some of the transplanted trees, and some of the trees that have been allowed to grow, without being moved, where the acorns were planted, and the difference in the two cases is most striking; the roots of the trees that have been transplanted being *many times* more numerous than those which have not been moved.

"Whether a transplanted oak, or one which has never been moved, will *ultimately*, under exactly the same circumstances, attain the greatest perfection in size and quality, is a fact which the observation of no individual can ever be able to ascertain by actual comparison; and it is believed that no regular register has ever been kept through several generations of such an uninterrupted attention to the point as could at all tend to a satisfactory decision upon it; but it seems fair to conclude, from the evidence above stated, that transplanted oaks will grow as fast, or faster, and continue to thrive as long as others not transplanted, till they reach a size sufficient for the uses of the Navy; which is the only practical part of the question with which we have any concern."

GARMSLEY CAMP.

By William Phillips, F.L.S., &c.

Among the numerous camps of various dates existing along the Marches of Wales—a battle-ground from the earliest dawn of British history—there are a few which, from some unexplained cause, have either escaped the attention of antiquaries or have been very inadequately described. Garmsley Camp is one of these. Hartshorne, in his excellent work, "Salopia Antiqua," does not mention it, although he had occasion to enumerate other camps in the counties adjoining Shropshire. Duncumb, in his "History of Herefordshire," is alike silent, and the late Mr. Lines, of Worcester, who surveyed and described in a full and able manner nearly all the camps in Herefordshire and Worcestershire, and devoted a special chapter to Thornbury Camp, on Wall Hills, a little more than a mile south of Garmsley Camp, either did not know of it or deemed it unworthy of his attention. Under these circumstances a detailed description of its position in relation to the surrounding country, the physical features it presents, and some remarks on the probable age to which it may be assigned, cannot be without interest, and may lead to its further investigation by more competent hands.

Garmsley Camp lies a little west of the high road from Tenbury to Bromyard, one mile south of Kyre Magna, where is the seat of the Rev. Prebendary Baldwyn-Childe, on whose property the camp is situated, and to whose kindness I owe the opportunity of examining it. It can be best reached from Tenbury, from which it is about six miles distant, on the extreme border of Herefordshire, being only a quarter of a mile from the northern boundary of that county.

The camp occupies, somewhat in the form of a saddle, the crest of a narrow ridge of elevated land extending east and west, about four hundred feet above the level of Kyre Magna. On the south side of the ridge is a deep dingle—Kyre Batch—forming a steep declivity down to the little brook flowing at the bottom; on the east and north sides of the ridge there are also steep declivities of rough ground partly overgrown by trees and scrub, while on the west the land has a gentle decline to Garmsley farmhouse, which is a hundred and fifty yards distant from the entrance to the camp.

The country in the immediate vicinity has much the appearance of partially cleared forest land broken up into low hills and deep ravines, especially towards the south.

Approaching the camp from the farmhouse, its lofty rampart presents a formidable appearance extending about 300 feet across the summit of the ridge, in front of which the remains of a dry ditch are plainly visible. Here was the most assailable part of the camp, and here the defensive works are the strongest.

The accompanying plan, traced from the Ordnance Survey, will enable the reader to understand the following description:—

The entrance is at the south-west corner (A), and makes an abrupt curve to the left, a marked feature of British works, the ramparts bending inwards on

either side, so as to expose an assailing force to a destructive opposition from the defenders after the ditch and outer barrier had been carried. Similar features are observable at Aconbury and Credenhill Camps in the same county, and Caer Caradoc and other British camps in Shropshire. Having entered the enclosure we see before us a plateau of an irregular oval form, somewhat raised in the centre, retaining the natural formation of the land, its outline following the conformation of the crest of the ridge. The enclosed area is 1,000 feet from east to west, and 400 feet from north to south; or, roughly speaking, about eight acres.* The rampart can be traced distinctly in some parts, but in others indistinctly; the denuding action of the elements, on a somewhat gravelly soil, during many centuries, has nearly effaced it on the east and south-east, but on the north, and especially on the north-west, it is sufficiently well marked to convey an idea of the line it pursued. This longer endurance has doubtless arisen from its greater strength where the natural glacis was less abrupt; that is, on the west and north-west sides; here also are the traces of the outer ditch having been continued along and towards B in the plan. At this point (B) a small trackway approaching from the north-east turning abruptly at a sharp angle, enters obliquely through the line of the rampart into the interior of the camp. This has all the character of a contemporary work, and was probably a sally port, such as is commonly met with in other camps. There is also an entrance at the east end, at C in the plan, which, from a slight indenture inwards of the earthwork may be assumed to mark the site of another original entrance—but of this I am doubtful.

From the interior a fine view is obtained of the country towards the north and north-west, including Kinlet, all the slopes stretching up to the Titterstone Clee Hill, and the high land in the neighbourhood of Ludlow. Towards the south and east the adjoining hills obstruct the view. No supply of water has been found within the Camp, but an abundant and never-failing spring exists at Garmsley Farmhouse. We now come to the more difficult task of assigning a probable date to this camp, which of necessity must be conjectural. The name of Garmsley helps us in no degree, being an English word, the prefix of which may be a man's name, and the suffix ley is from *lea*, a field.

It is worth noting that there is a Garmston in the parish of Leighton, Shropshire, the prefix of which is probably derived from the same person. Garmsley was known by a second name in the reign of Queen Elizabeth † according to deeds preserved in the muniments of Kyre Park, viz., *Wrathes*, which, according to one of the highest authorities (Professor W. Skeat) means "the defences," and is derived from the Anglo-Saxon (fem. sub.) *wrathu*. This name points to the existence of the camp prior to the Norman Conquest.

But we need not insist upon this fact as there are other grounds for believing that it is even of prior date to the Saxon Conquest. The presence of Thornbury

*In an estate schedule of 1774 appears the following:—"Garmesley Great Camp, 5a 2 20; Little Camp, 2a 3 22." From this it must not be inferred that there were, or are, two camps.

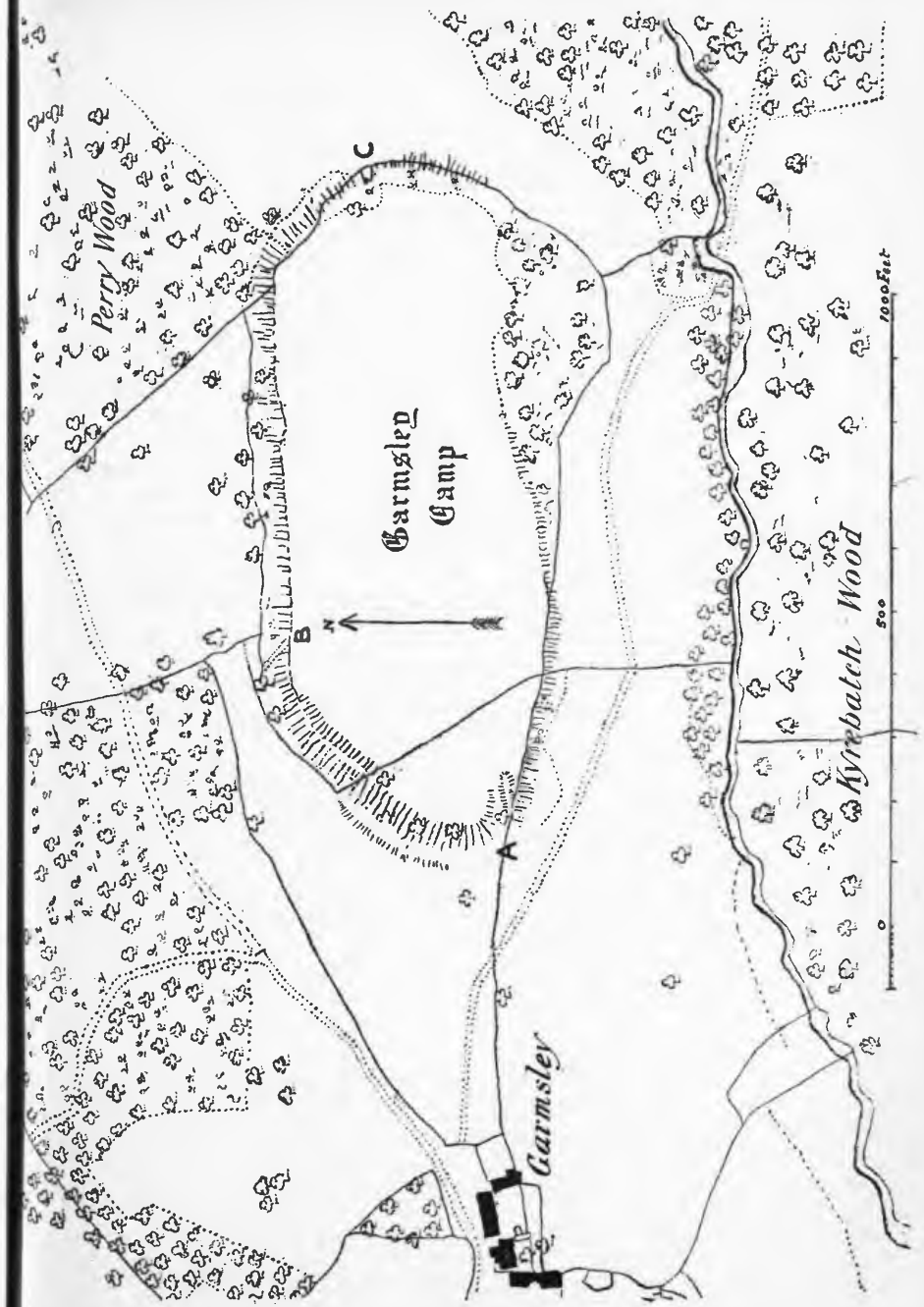
†1602, October 1st, Edward Pytt, Esq., of Kyre Wyard, buys Wrathes, otherwise Garmesley, from William Barneby, Esq., of Bockleton (deed 55).

1602, Edward Pytt, of Kyer Ward, Worcestershire, Esq., leases Wrathes, or Garmesley, for 80 years, rent £6, to Roger Pytt, *alias* Cowper, of Stoke Bliss, wheelwright. Lessee not to plough more than 21 acres, unless it be for sowing hemp or flax (deed 56).

Camp, already mentioned, situated a short distance to the south of Garmsley, is important in this connection. If Thornbury Camp was, as most writers have contended, originally British, taken possession of and altered by the Romans, the probability is that Garmsley was abandoned by the British, as being too small for their requirements, and the larger one constructed in a superior position. Mr. Lines differed from his predecessors, and wrote as follows:—"This camp (Thornbury) in the ancient Siluria, shows some indications of Roman work in construction. Its position on a moderately elevated hill, commanding a vast and uninterrupted view of the horizon, with an absence of natural difficulties in its approaches on all sides, seems to indicate a Roman selection of site. Again, the general symmetry and regularity of form (though not of the typical parallelogram) and the partial exterior fosse, with the natural glacis of a sloping country going off at once from its counterscarps, are all Roman characteristics. The width (from 50 to 60 feet) of the entrance gates, and the manner in which they enter straight into the camp is decidedly Roman. Against all this we have to consider the very great bulk and strength of the vallum and its ramparts. The latter are double the usual height and width of Roman work, corresponding with the best examples of ancient British fortification. The camp gates also, though entering straight through the vallum in the Roman manner, are placed more in the old British fashion at the corners of the camp. Had uniformity been aimed at, they would have been placed in the centre of the two circular ends of the camp (instead of at terminal ends of the curves), where they join the long sides of the ramparts. . . . . The size of Thornbury camp is about equal to that of a Roman legionary camp, when a little below its effective strength of 5,280 men without auxiliaries. It appears to me that after the settlement of the Romans in Britain, probably after the year 58 A.D. and the campaign of Suetonius Paulinus, Thornbury camp may have been thrown up by native auxiliaries, who had acquired some idea of Roman castrametation, though perhaps vaguely. I do not look upon it as an altered camp; no addition has been made to it by subsequent occupiers, nor has it been curtailed in its proportions."

I have reproduced this extract to show that the occupation of Thornbury camp by the Romans or their auxiliaries is an opinion held by Mr. Lines, as well as others, although he takes a different view from that of the majority of writers, as to its purely Roman character. If then it be admitted that Thornbury camp was held by the Romans, it is impossible to conceive that a smaller camp like that at Garmsley could have been constructed by the Britons, under its very walls. Such a supposition carries with it its own refutation. It is much more reasonable to believe that Garmsley camp was a British camp rendered untenable by the immediate neighbourhood of Thornbury, especially as it presents all the leading characteristics of a British work.

But the question might naturally be asked why these two camps came to be in this remote situation in the midst of what must have been a rough and difficult country to traverse, with no great thoroughfare to guard. I think the answer will be found in the fact that there was running south from the ancient British settlement on the Titterstone a trackway, not difficult to trace, which passed near



where these camps are found. If we take the Ordnance Map we shall see it leaving the road from Ludlow, at a point near the south base of the Hoar Edge Hill near the Treen Pits, whence it passes over Knowl Hill, in a direct line to Tenbury, a short distance from which town it divides, one branch taking a south-westerly course over Old Wood Common to Portway; the other branch runs nearly due south by Terrells, the Firth, over Haw's Hill, across Kyre Common, near which point it crosses the county boundary within half a mile of Garmsley camp; it then goes through Drabington and Thornbury, within half a mile of Thornbury Camp, and so on to Stretfield, Wacton, Boulter's Close, Noaks, where it enters the road leading to Bromyard. I would particularly call attention to two names of places on this road—Portway and Stretfield—which are highly significant. In the existence of the branch road running near to the two camps, we at once see the reason for their presence in the places they occupy. That Garmsley Camp is the older of the two camps, and became untenable at a very early period of the Roman campaign, appears to me in the highest degree probable. From inquiries made on the spot, it would appear that no relics of any kind have been found in the course of cultivating the enclosure, which is arable land; but a judicious use of the spade might possibly bring to light some fragment of pottery, or stone implement, which would be more valuable as an indication of the age of this Camp than a thousand speculations.

THE EARTHQUAKE ON NOVEMBER 2ND, 1893.

At about 5.45 p.m. on Thursday, November 2nd, an earthquake occurred disturbing nearly, but not quite, the same area as the earthquake of August 18th, 1892.

The epicentrum was that part of South Wales enclosed within Merthyr, the Rhondda Valley, Cardiff, Neath, Swansea, Llanelly, Whitland, Carmarthen, Tenby, Pembroke, Milford Haven, Haverfordwest, St. David's, and Cardigan.

The earthquake is reported to have been distinctly felt as far west as the County of Wicklow in Ireland, and notices of the disturbance have been reported from the north as follows—Ruthin and the Vale of Clwyd, St. Asaph, five miles north of Liverpool, and from Manchester. In the east the oscillation was felt at Great Malvern, and in the south at Bath, Bristol, Bude in the north of Cornwall, and Gunnislake on the borders of the river Tamar.

The boundaries of the sound area are more limited than those of the oscillation or earth-disturbance area.

It is somewhat extraordinary that in the City of Hereford whilst the shock should have been generally unobserved, it should have been conspicuously felt in the Castle House, a portion of one of the ancient defensive works near the Castle Green, with walls in some places six or seven feet in thickness. Mr. Barton, resident in the Castle House, in his report to Mr. Charles Davidson, states that the duration of the shock was for 2 to 3 seconds; that he was downstairs and his wife was upstairs; each of them thought that some accident had happened to the other, and starting up at the same time met each other on the staircase with the remark: "What accident has happened." Mr. Barton describes the sound as similar to that of the passing by of a large steam roller.

This is the third earthquake which has been felt in Hereford during the last thirty years. For the earthquake of August 18th, 1892, see *Transactions*, 1892, page 354, and for the earthquake of October 6th, 1863, see *Transactions*, part 5, page 115.

Woolhope Naturalists' Field Club.

THURSDAY, NOVEMBER 23rd, 1893.

At the Central Committee Meeting on Thursday copies of the diagrams for the volume of *Transactions* ending 1892 were laid upon the table, and the bills were directed to be paid, also all accounts connected with the usual contingent expenses. At the Annual General Meeting of the members on the same day, Mr. James Davies was elected President for the year 1894. Four gentlemen were elected Members, and Mr. Ernest Ballard, of Colwall, and Mr. J. H. Parry, of Harewood Park, were proposed. Rev. J. D. La Touche was elected an Honorary Member of the Club; the Rev. J. O. Bevan was re-elected Delegate to the British Association for the Advancement of Science, Dr. T. A. Chapman, Corresponding Member, and Mr. Thomas Blashill, Delegate to the Society of Antiquaries. The following Members attended:—Rev. Preb. W. H. Lambert, President; Rev. M. G. Watkins, Vice-President; Mr. James Davies, President elect; Members, Sir Herbert Croft, Bart., Surgeon-General W. Perry, Dr. T. A. Chapman, Revs. H. A. Barker, E. R. Burroughes, H. B. D. Marshall, H. North, and H. Trevor Williamson, Messrs. W. H. Banks, J. Carless, R. Clarke, G. Davies, T. Hutchinson, H. Southall, and H. G. Sugden; H. C. Moore, Hon. Secretary, and James B. Pilley, Assistant Secretary.

The drought of 1893 having come to its termination, Mr. H. Southall was able to present his long-promised report upon the same brought up to date. It will be remembered by those present at the Field Meeting at Kyre Park on August 22nd, that Mr. Southall made at that meeting some remarks upon this subject.

THE GREAT DROUGHT OF 1893.

By Mr. H. Southall, F.R. Met. Soc.

So much has already been written on this subject, that it may seem almost a work of supererogation to attempt a further description. At the same time the truly exceptional and extraordinary character of the season has been such as to make some record of it in our journal of proceedings desirable, and I therefore have been induced to yield to the request of our Hon. Secretary in giving some account of the leading features of the weather, more especially as they have particularly affected the county of Hereford.

The more prominent characteristics of 1893, so far as it has gone—and I am now writing on November 22nd—have been :—

Firstly, the great deficiency of rainfall.

Secondly, the unusual amount of bright sunshine almost throughout the year.

Thirdly, the intense heat experienced during certain periods, and especially in August.

Fourthly, the extensive prevalence of similar conditions in many other counties and countries.

Fifthly, the antecedent weather of the last seven years as a factor in producing present experiences.

I may be allowed a few words on each point, and perhaps some reference also to the question of comparison with former similar seasons.

First then as regards rainfall. The following figures will show conclusively that the deficiency, though most marked since November 27th, 1892, and especially so since March 2nd, 1893, dates from January 20th, 1887, and has consequently lasted up to the present time, not even as yet having given way for at least six years and ten months. It will be seen that there have been some considerable intervals of wet weather, the months of July and November in 1888, and the three spring months of 1889, having been exceptionally wet. The summer and autumn of 1891 had also very much above their average rainfall, the months on which the principal excess occurred being those of August and October in that year with 4.90 and 6·70 inches respectively; November, 1888, having been the wettest November since 1852, yielding 8·17 inches.

The following summary will show the principal periods with their length and deficiency from average. The average is calculated on the twenty years' fall at Ross, 1867-86, or for the two decades immediately preceding the commencement of the dry weather :—

	No. of days.	On which fell.	Amount.	20 years average.	Departure from aver.
Dry period Jan. 20th, 1887, to Mar. 7th, 1888	413	181	21·91	36·23	—14·32
Dry period June 2nd, 1889, to Mar. 6th, 1891	643	313	37·28	57·94	—20·66
Dry period Dec. 14th, 1891, to Nov. 22nd, 1893	709	313	39·87	61·72	—21·85
Total in 3 dry periods	1765	807	99·06	155·89	—56·83

The two intervening wet periods :—

	No. of days.	On which fell.	Amount.	20 years average.	Departure from aver.
Mar. 8th, 1888, to June 1st, 1889	451	261	46·31	37·58	+8·73
Mar. 7th, 1891, to Dec. 13th, 1891	282	176	30·69	23·97	+6·72
Total as above	733	437	77·00	61·55	+15·45
Total of whole period	2498	1244	176·06	217·44	—41·38
Total ending Dec. 15th, 1886	2498	1310	224·91	217·44	— 7·47
Differences	—	—66	—48·85	—	—48·85

This proves that in less than seven years, as compared with a period of equal length just preceding, there has been a deficiency in the fall of rain amounting to upwards of four feet in the level or equivalent to 4930 tons of water on every acre of land. Now the area of Herefordshire is given at 860 square miles or 550,400 acres, so that it follows that the quantity of water deposited in the form of rain over the county is in defect by no less than 2,713 million tons, or in round numbers 608 thousand million gallons. This quantity is so prodigious that I will leave to our engineers the task of calculating the size of a tank or reservoir for its storage. If, however, conveyed by railway it would require a continuous train extending one and a half million of miles, or sixty times round the earth's circumference. Such are the forces of nature silently going on around us. It may be asked whether we have not had previously a similar succession of dry years? I find that from 1853 to 1865 we had twelve years with a fall at the same rate per year. It was then considered probable that the rainfall over England was declining, but it proved that the next twelve years showed an increase of five inches per year, thus restoring the balance. From 1854, to 1868 inclusive, the fifteen years averaged 27 inches per year, and from 1872 to 1886 upwards of 33 inches. The mean (just 30 inches) is within a small fraction of the annual fall in this part of Herefordshire for the seventy-five years, 1818 to 1892, thus giving us another instance of the doctrine of compensation.

As regards the drought of the present year. Mr. Symons, the great authority on rainfall, calls an absolute drought any interval of as much as fifteen days without rain, and a partial drought of at least 28 days with not more than one hundredth (·01) of an inch per day. It is somewhat singular that at Ross we have according to this standard no absolute drought in 1893, although I have occasionally in other years had one of 30 days to record, three periods of fourteen days each in March, April, and May not counting as such. As regards partial drought from March 3rd to May 14th, only ·33 inch was measured here. This is by far the driest period I can find on record. I now give for comparison the most remarkable cases which I have recorded since my observations commenced in 1859 :—

1874, April 14th to June 22nd	= 70 days.	·71 inches.	
1865, Aug. 25th to Oct. 7th	= 44 days.	·07 inches.	
1893, April 2nd to May 14th	= 43 days.	·09 inches.	
1893, March 3rd to May 14th	= 73 days.	·33 inches.	
1893, March 3rd to July 3rd	=123 days.	3·04 inches.	About one-third of average.

1864, May	1st to Aug. 31st=123 days.	3·50 inches.	
1870, April	1st to July 31st=122 days.	3·56 inches.	
1852, Feb.	1st to May 31st=121 days.	3·50 inches.	Recorded by the late Mr. Herbert.
1893, March	3rd to Sept. 27th=209 days.	7·70 inches.	Less than half the average.
1893, March	3rd to Nov. 22nd=265 days.	11·03 inches.	Less than half the average.
1892, Nov. 27th to Nov. 22nd 1893.....	=361 days.	16·98 inches.*	Only two instances in 75 years of so small a fall.
1893, July 20th to Nov. 22nd 1893.....	*126 days.	5·50 inches.*	

One word more as to the effect of the drought upon the springs and supply of water. These, I suppose, are fed principally by autumn and winter rains, because there must be so much less loss from evaporation, and from the more rapid drainage into the rivers during very heavy storms in summer. The steady rain in a damp atmosphere must, one would think, cause greater percolation to take place. With this view I have dissected the deficiency of 48 inches before spoken of, and I find that seven-eighths of it has occurred between September 1st and March 1st, the figures showing about 35 inches for these months against only five inches for the spring and summer months. No wonder that the springs are low, the two months with the greatest deficiency from the average during the seven years being September and February.

We will now briefly refer to the great summer droughts of this century. That of 1818 was like that of last summer, very severe in the neighbourhood of London. It followed a very wet spring. The meadows were flooded as late as May 13th. It lasted till September 13th, or for 113 days, with scarcely a break, the rain which fell on 16 days yielding only 1·38 inch. This was accompanied by great heat, July 24th being the hottest day with a mean temperature of about 80 deg. At first the brilliant sunshine caused extraordinary growth and the foliage of the trees was particularly luxuriant. At the close, however, the ground was much scorched, a remarkably rapid change to greenness occurred in September, when copious rains fell, and afterwards the weather was very mild up to Christmas. This year the want of rain was perhaps more felt towards the close of September than earlier; practically no keep in many places for the cattle.

The great heat and drought of the summers of 1825 and 1826 are still remembered by a few. I met an old gentleman only last week who remembered skating on the Thames in the year 1814! In 1825 the principal feature was the intense heat of July; the temperature of the water of the river Wye having been as much as 81 deg., and on the 18th and 19th of July the heat was so intense—97 deg. in the shade—that it quite overpowered the draught animals. The heat continued into 1826, and with increased drought. Scarcely any rain fell in June

*The last eighteen weeks are considerably less than half the average fall: no other instances of so small a fall. For the same period of 1852 about four times the quantity was registered, viz.—20·38 inches.

and July. Trees had to be lopped for food for cattle, and barley scarcely grew at all. The next great drought occurred in the year 1844, but as it began earlier in the year, and was not accompanied by such great heat, it was more bearable than that of 1826. It commenced on March 15th, and, as I remember very well, broke up with a heavy thunderstorm on June 25th. During this period of 101 days scarcely any rain fell at all. Barley was said not to have even sprouted. The hay crop was nearly a complete failure, the price rising to £8 or £9 per ton, which was considered an excessive one at the time. Notwithstanding this, the wheat crop and hops were very good, and the later summer proved most propitious. To come down to more recent years, 1864 and 1870 were both very dry, 1870 being, however, the hotter summer. In each case the rains which fell in September were very welcome. Again, the months of June and July, 1868, were almost rainless. The ground was terribly scorched by the blazing heat, the day temperature in July averaging 80·5 deg. at Ross, and 82·0 deg. at Greenwich, and a maximum of 96·0 deg. was reached on the 22nd there and at Hereford. The wheat crop was good in quality and quantity this year, and there was a very early harvest; in some cases it was finished in July. August was notable for heavy storms of thunder rain. Speaking of temperature, it may be observed that 1893 is remarkable for the unusually high day temperature of every month; February to October inclusive being slightly higher than 1868, although July of that year was much warmer than in 1893. The average comes out 65·6 deg. 1893, 65·3 deg. 1868; as against the cold years of 1879 and 1888, 57·4 deg. 1879, 57·8 deg. 1888. This was undoubtedly due to the clear bright sunshine which has been so unusually prevalent. For instance the month of March, often cloudy, cold, and sunless, this year had a day temperature of 58·8, against only 53.4 in 1868; the amount of cloud being remarkably little. The record of 3·7 for the whole month's observation (10·0 being overcast) is unprecedented: as a matter of fact 14 days were cloudless, three nearly so, and only four overcast. In April nine were cloudless, seven nearly so, seven overcast, three nearly so.

I have not dealt as yet with the rainfall in other parts of England. During the spring months, March to June inclusive, London and the south-eastern counties had even less rain than we had, the district most affected being bounded by Dorsetshire on the west, Wiltshire, Berkshire, and Middlesex in the north and Kent in the east. The longest period of absolute drought was at Hurst Castle, where for 59 consecutive days no rain fell. Several other stations nearly approached this. The partial drought lasted at London for 114 days against our record of 76, but Dungeness, near Dover, appears to show the maximum of 127 days, from February 27th to July 3rd.

It has been said that a line drawn from Bristol or Cardiff to Hull would divide the region of greatest drought. To the north of this line much more rain fell, and even in our own county I find that the north has been more favoured than the central or southern districts. In the north of Ireland and Scotland an excess even is spoken of. In the lake district the fall has been nearly an average. At Seathwaite 127 inches in the twelve months, which is about seven times as

much as Hereford, the difference in the month of March being very striking, 8·67 against ·21. The following comparison for places in our neighbourhood may be interesting. December, 1892, to September, 1893 (10 months) :—

Worcester	13·03	Stroud	15·69	Aberystwith	29·83
Malvern	14·01	Orleton	17·36	Cardiff	24·90
Hereford / Burghill	13·85	Church Stretton	17·08	Haverfordwest	16·86
Ross	14·15				
Leicester	14.31				
London	12·91	Compare Seathwaite in Cumberland	97·02		
Cheltenham	14.27				

The sunshine recorders in various parts of the country tell the same tale. We find in March that the percentage of possible duration was 50 per cent. in the eastern, central, and southern stations and 60 per cent. in the Channel Islands. In April the same districts are represented by 60 per cent. and 72 per cent. At Westbourne the sun shone brightly for ten hours a day. There were only two sunless days over a considerable portion of England, and at the Channel Islands none. May was more cloudy, but still at Guernsey and Jersey 65 and 62 were recorded. In June 72 per cent. was recorded at the same places. At Jersey 11½ hours a day were experienced, the largest amount ever known. At Manchester the percentage was reduced, probably by smoke, to 38 per cent., and at Fort Augustus in north Scotland only 22 per cent., showing the very cloudy and stormy weather prevalent there. I have not time to go into the particulars of the barometer, or to describe the pressure and anticyclonic conditions which prevailed so largely and produced this exceptionally calm and brilliant season. Why we should this year have escaped to so large an extent the Atlantic storms (the last few days' experience tells us we have not done with them yet) is a problem still to be solved. Probably the largely unknown phenomena of the Arctic regions account for a good deal. Icebergs, for instance, have been seen unusually far south. I think I have said enough to prove that 1893 will rank as one of our most memorable years for drought.

NOTES ON THE ORNITHOLOGY OF THE BRECON BEACONS.

By E. A. Swainson.

The Raven is to be found on the mountain at all seasons, but otherwise the higher parts are nearly devoid of bird-life. In April a few Ring Ousels arrive and occupy the rocky ravines, Meadow Pipits become common, and the Curlew is found sparingly on the lower slopes. About three or four pairs of Ravens nest yearly on the mountain, chiefly, I believe in the Cwm Serré cliffs, immediately to the north-east of the highest summit. This precipice is about 600 feet high, and affords these fine birds a retreat quite secure from molestation. They also breed yearly in a precipitous ravine on another side of the Beacons, generally in an inacessible spot; I once, however, found a nest to which I was able to climb; it contained five eggs, three of which I took for my collection. The Buzzard is to be seen occasionally in Cwm Serré, and a few years ago a nest of this bird was found in a cliff.

ON THE DISTRIBUTION AND HABITS OF THE PIED FLYCATCHER IN WALES.

By E. A. Swainson.

Having lived for ten years in the midst of one of the chief Welsh haunts of the Pied Flycatcher (*Muscicapa atricapilla*), it has occurred to me that, so far as Wales is concerned, this bird has been rather overlooked in works on British ornithology, and that more details on the subject would be of interest. Most of the books describe it as occurring in a few places in North Wales, while Central Wales, where it is probably as common as in any part of the kingdom, is but briefly alluded to. In reply to a request for information, which the editor of *The Field* was kind enough to publish for me, I received letters from several observers, bringing to light some fresh localities where this bird passes the summer, or has accidentally occurred; and I am now able to add two more counties—Cardigan and Montgomery—to the six from which it had been before recorded. I propose to bring together the notes kindly sent me by correspondents, and to make a summary of the already published matter on the subject, also to add some of my own notes on its habits in Breconshire.

The home of the Pied Flycatcher in Wales appears to be the long mountainous tract reaching from Snowdon to the Brecon Beacons; but even here it is local, and only plentiful in the high-lying valleys at an elevation from 400 to 1,000 feet above sea-level. It has a liking for the proximity of a fast-running, rocky stream, and the presence of old trees, especially oaks, on account of the nesting sites they afford by reason of their holes and fissures, is a desideratum. These conditions are found here and there, but generally in remote, unfrequented districts. In such localities in Breconshire a diligent search will often reveal the presence of this bird, and it is probable that it spends the summer in many places in Central Wales unnoticed. Its migratory instinct is peculiar, and for some hidden reason it presses on to the mountain-side valleys to find a summer home, disregarding during its long flight other apparently suitable spots. A correspondent, in sending me some notes about its habits in the Elan valley, Radnorshire, writes as follows:—"To me it has always been a wonder how these migrants ever reach localities such as I have described. This valley, for instance, is practically surrounded by mountains of extensive moorland; not that this fact would present any difficulty to them in itself, but whence do they gain the knowledge that there are isolated spots suitable to their requirements?"

I propose here to deal with the eight counties from which this bird has been reported, commencing with the north.

Denbighshire.—A pair nested at Hendre House in 1843—4 (*Annals and Mag. Nat. History*, 1845). The fact of its nesting in the county was also recorded in *The Field* in 1871.

Merionethshire.—In 1872, and in previous years, it nested at Llandderfel (Harting's *Our Summer Migrants*), Mr. F. H. Birley, in 1885, found it by no

means rare about two miles south of Cader Idris, and discovered six of its nests (*The Zoologist*, 1886, p. 75). Mr. A. B. Priestley, writing from Cae Ddafydd, in the north-west of the county, informs me that "Pied Flycatchers are quite common here now; in saying this I mean that they are of more or less recent introduction to one's notice here. I question if I saw many of them much before 1870; after that date they have become commoner every year I think, and we have now annually considerable numbers of them in the breeding season." Mr. F. C. Rawlings, of Barmouth, has informed me that it is tolerably plentiful in certain localities in his neighbourhood, and that several nests have been found.

Montgomeryshire.—Mr. C. H. L. Ewen writes to say that in 1888 or '89 he found two of its nests, in holes of trees,—one in a birch and the other in an oak—close to the river Cowny, about one mile and a half south of Lake Vyrnwy; and that he saw at least three pairs of these birds, which he generally discovered by hearing their song. A friend of Mr. Ewen's, who was with him when the nests were found, writes to say that each contained six eggs, and that he has often seen this bird in the county. A letter in *The Field* of October 15th, 1892, from Mr. Alfred George, states that he has twice noted it near Meifod in twenty-six years, and that on one occasion the nest was found.

Cardiganshire.—Capt. G. Weir Cosens, Bronpadarn, near Aberystwith, writes to me as follows:—"A Pied Flycatcher was shot in my garden at Cwm, about two miles from Aberystwith, by my gardener, in June, 1877, and was brought to me a few minutes after, when I stuffed it, and it is now in my collection; it was a male and in perfect plumage." He adds that he has never heard of any other instance of its occurrence in the county.

Radnorshire.—Mr. C. Bingham Newland, Killetra, Mallow, informs me by letter that:—"The Pied Flycatcher is not uncommon in the woods, and on the banks of the rivers Elan and Claerwen, in the neighbourhood of Nantgwyllt, five miles from Rhayader. In these woods there are a great number of very old pollard oak trees, hollow and full of holes, in which I have found the nest of this bird; and I am strongly of opinion that it is these trees that attract it to this locality, for the purpose of nidification. The male appears to arrive very early in the season, before the leaf is on, and the female later." I have also heard from a bird observer, who formerly lived at Nantgwyllt, that it is rather common there, and that several nests have been found. Under the heading, "The Birds of a Welsh County," a writer in *Temple Bar*, in the year 1887, states that it is a summer visitant to the west side of the range of hills named Radnor Forest.

Breconshire.—In this county the chief haunt of the Pied Flycatcher is the district included in the basin of the river Usk, where it is fairly common. This river, with most of its tributaries, is in many parts fringed with old trees, which are an attraction to this bird, on account of the nesting sites they afford. It occurs, at the rate of one or two pairs to the mile, along the Usk, from Lanthetty to Pant-ys-gallog bridge, a distance of about twenty miles. It is still more frequent on several of the streams running into the main river, such as the Honddhu, Yskir, and Bran, which are much wooded and well suited to its habits. It is also not uncommon in the following woods:—In Fenni Vach, a well-timbered, hilly

track of over 100 acres, it is found to the extent of about nine or ten pairs. It occurs every year in the Priory Grove, adjoining Brecon; also in the west of the county, in a certain hill-side wood, remarkable as being one of the few remaining Welsh nesting-places of the Kite. No doubt the Pied Flycatcher also occurs in other places in the large woods in the wilder districts. A pair or two generally settle down close to Brecon. In 1889 I several times saw a male bird about the fine trees in the "Captain's Walk," a promenade skirting the town; and a pair come most summers, to a grove of old oaks near my house, and have nested there at least twice.

They arrive in this district about the fourth week in April. Certain spots, well known to trout anglers, are then sure "finds" for this bird. Among these are Dinas Corner, Aberyskir rapids, and the stretch of water above Cwm Ysk. Here, and in other similar spots, the trout-fisher, with an ear for bird music, is pretty sure to recognise the lively song of this little migrant, and perhaps get a glimpse of its striking black-and-white plumage. The song resembles that of the Redstart in duration and frequency of utterance, but it is shriller, and not so loud, and in pitch is nearer to that of the Hedgesparrow. The first three or four notes remind me rather of the spring song of the Coal Tit. I have made several attempts to write it down, and find it varies from time to time. The passages which occur oftenest are:—"Tichee tichee chuck chuck chee," and "Cheety cheety cheety chee."

It nests in holes in trees, generally in oaks, at a height of from 10 to 20 feet from the ground. Holes bored by the Great Spotted Woodpecker and Nuthatch are often selected, as well as those formed by decay. Such cavities abound in the well-wooded Usk valley; but other species which nest in holes have also to be provided for, and no doubt the competition for nesting sites is keen. The nest is easily found by watching the birds, but the eggs are difficult to obtain, owing to the hardness of the wood, and the difficulty in reaching the site. Out of over a dozen nests I have found, I have only been able to obtain eggs from four. Two nests which I took are composed chiefly of honeysuckle bark strips and dead oak leaves. I have examined eggs from five nests, and believe the only ones with which they are likely to be confused are those of the Redstart. On comparing a series of eggs of these two species, I find those of the Redstart are larger, of a deeper blue-green, more glossy and more pear-shaped; those of the Pied Flycatcher being much paler, almost an oval in shape, and with little or no gloss. Eggs from one clutch of seven are very small, and less in size than those of a Wood-warbler. Mr. E. Cambridge Phillips, in his "Birds of Breconshire" (*The Zoologist*, 1881, p. 409), writes:—"This county seems to be a favourite resort of this bird, and I may say with truth that it is fairly plentiful. It has bred in my garden at Vennyvach, and it nests also in several places in and near this town. Ornithologists residing here (and they are very few) agree with me that it is far from rare; and therefore I can only arrive at the pleasant conclusion that, although elsewhere generally considered a scarce bird, this county seems exceptionally favoured." Mr. Alfred Crawshay, writing to me, says that he sees the Pied Flycatcher every spring, about the banks of the Usk near Buckland: that it

seems to be fond of alder trees; and one year he noticed a pair of these birds going to feed their young in a nest placed in a hole of a decayed tree.

Pembrokeshire.—Mr. Thomas Dix writes:—"Pied Flycatcher.—Specimens in the collection at Stackpole Court (Mr. Tracey tells me), were killed in the neighbourhood; also that the bird is occasionally seen in the spring and autumn." (*The Zoologist*, 1869, p. 1671).

Glamorganshire.—Mr. Digby S. W. Nicholl, writing from The Ham, Cowbridge, says:—"On May 8th, in the grounds adjoining this house, I obtained a male specimen of the Pied Flycatcher. This is, to my knowledge, the only authentic occurrence of this Flycatcher in Glamorgan." (*The Zoologist*, 1888, p. 229).

Woolhope Naturalists' Field Club.

ANNUAL MEETING, APRIL 12TH, 1894.

THE Annual Meeting of the Woolhope Naturalists' Field Club, in the Club-room, Free Library, Hereford, on April 12th, was invested with special interest by reason of a presentation to Mr. H. Cecil Moore, the Honorary Secretary, for services which may truthfully be described as invaluable. There were present :—Rev. Prebendary W. H. Lambert (the President), Mr. James Davies (the President elect for 1894), His Honour Judge G. H. Lea, Deputy Surgeon-General Perry, Captain R. H. de Winton, the Revs. J. O. Bevan, J. Barker, E. J. Holloway, H. T. Williamson, A. J. Capel, H. B. D. Marshall, M. G. Watkins, M. Hopton, R. Burges Bayly, and E. R. Firmstone, Dr. Fitzsimons, Messrs. J. Lambe, T. C. Paris, Attwood-Mathews, H. C. Beddoe, O. Shellard, G. H. Piper, T. Hutchinson, W. Pilley, H. G. Sugden, J. E. Ballard, Dr. T. A. Chapman, J. Carless, jun., H. Vevers, C. H. East, S. Carrington, G. Davies, P. Levason, F. Bainbridge, J. Cockcroft, H. C. Moore (Hon. Sec.), and J. B. Pilley (Assistant Secretary), Mrs. and Miss Levason, and Mrs. H. C. Moore.

REPORTS.

The Hon. Treasurer (Mr. H. C. Beddoe) reported that the total receipts for the year amounted to £114 18s. 1d., and the payments to £55 19s. 9d. leaving a balance of £58 18s. 4d. in the bank. The accounts had been audited by Mr. O. Shellard.

The Assistant Secretary (Mr. J. B. Pilley) presented the following report :—

The report for the past year is again of a very satisfactory character. During the last three years the Club has advanced by leaps and bounds ; twenty-two new members have joined in 1893, bringing the number of Ordinary Members to the unprecedented total of 204. It may be well to mention that there is an impression that the Club is not as strong as it was during the time of the publication of the *Herefordshire Pomona*. A reference to the transactions embracing that period gives the following results :—The greatest test number was 190, but allowing for £14 written off at the close as lost, and £41 carried forward as arrears, it is only reasonable to suppose that many were members on paper only. The income for the past year was £104 10s., against £108 in 1892, when the usual number of thirty new members was added to the Club. The arrears were a little more than in the year previous ; owing to illness in several of the families of the members, application for payment was not made at the close of the year. It is satisfactory to mention that subscriptions for 1893 only are in arrear, a circumstance that has not occurred since 1853. The losses during 1893 have been small ; four members, having left the county, have resigned ; death has removed three others, among

them the Rev. Preb. R. H. Cobbold, who had been a member nearly twenty years. The Field Meetings were well attended. The numbers were :—In May, 37 ; June, 49 ; July, 85 ; and August, 51.

A suggestion from the Assistant Secretary that the membership should be limited was not adopted, the President-elect pointing out that, the greater the membership, the more were the subscriptions, and the better the *Transactions*.

FIELD DAYS.

The Field Meetings for the year were fixed as follows :—Froome Valley, May 24th ; Cwm-Elan, near Rhayader, June 26th ; (Ladies' Day) the Longmynd, west of Church Stretton, July 26th ; and Caerleon (the President's Day), Aug. 28th.

NEW MEMBERS.

Mr. Ernest Ballard, Colwall, and Mr. J. H. Parry, Harewood Park, were elected members by ballot, and a number of other gentlemen were proposed for ballot at the next meeting.

A REQUEST.

Mr. Hutchinson drew attention to Rules 10 and 11, and proposed that the Honorary Secretary be requested to ask on future programmes for reports of rare and interesting articles of natural history and archæology.—Dr. T. A. Chapman seconded, and the recommendation was carried.—Mr. Hutchinson then reported the finding of a *Plusia Festucæ*, a rare moth of the same species as the common Gamma ; and that on the 6th March a male Otter was seen in the Wye opposite Hereford Infirmary, and was afterwards shot. Mr. Hutchinson also exhibited a Short-eared Owl, shot near Ross in 1890, and a pair of Kingfishers, which were killed by flying against his dining-room window.

ARCHÆOLOGICAL MAP OF HEREFORDSHIRE.

The President elect (Mr. James Davies) read letters to the effect that the manuscript of the Archæological survey of Herefordshire was completed.

PRESENTATION TO MR. H. C. MOORE.

The President (Prebendary Lambert) said that at the very close of his office he found himself called upon to perform a duty of the responsibility of which he was fully sensible, but which, at the same time, gave him great pleasure. He had received letters of apology from some members for their unavoidable absence to-day, and placed before the members amongst many others the following two letters :—

BULLINGHOPE VICARAGE, HEREFORD,
Monday, April 9th, 1894.

DEAR MR. PRESIDENT,

Absence from home prevents my attendance at the Annual Meeting of our Club, and I write to express my regret for this. I am particularly sorry not to be present when the Testimonial is given to the Honorary Secretary. And this for two reasons. Because it was in my first year of office as President that Mr. Moore assumed the duties which he has since so very worthily discharged, and consequently I feel (from association) a peculiar interest in this recognition of

his services. And also because, although it is patent to every one of us what great labour his assiduous, and most successful, editing of our *Transactions* has entailed on him, there are perhaps few who are able to appreciate the extent of that labour, and the admirable patience and accuracy with which he has performed it, better than I can, whom he has allowed (even in a small way) to assist him in the passage of the pages through the press. Pardon my desire to add my individual expression to what the Club will corporately express of its sense of the value of Mr. Moore's work ;

And believe me,

Yours very truly,

WM. ELLIOT.

MOCCAS COURT, HEREFORD,

April 2nd, 1894.

DEAR LAMBERT,

I am on the point of leaving home for Hyères and Mentone so shall be unable to take part in the presentation which is to be made to Mr. Moore by the Woolhope Club.

I am sorry to be absent, for I am well aware how valuable his services have been to the Club, how much all members at our meetings are indebted to him for his friendly aid, and last, not least, we must thank him for the great labour he has bestowed in editing the *Transactions* of the Club.

It may have been a labour of love, very probably it was, all good work is of that nature, but none the less does it deserve recognition on the part of the members of a Society which has done much to bring to light what is scientifically interesting in the County of Hereford, and whose records will, I am sure, prove valuable to generations to come.

Believe me,

Yours sincerely,

GEORGE H. CORNEWALL.

It was well-known to the older members of the Club that the late Dr. Bull, in the later months of his life, took a despondent view of the future of the Woolhope Club, and expressed a fear that when he was removed the Club might cease to exist. He was sure that Dr. Bull, were he alive, would rejoice to see that his migivings were not well-founded, and that one who had during the later years of his (Dr. Bull's) life been his trusted lieutenant and right-hand man in connection with the good work of the Club had stepped into the vacancy caused by his lamented death, and had filled that post with a capacity and devotion which had left nothing to be desired (applause). The members could not have taken part in the field excursions, from which they had derived so much pleasure and profit, without being aware of the great amount of labour which was thrown upon the person who undertook the management. Diplomacy was required in approaching landowners and others whom it was desirable to conciliate and interest, a knowledge was required of the country to be traversed in the excursions, with an intelligent appreciation of the different objects of interest to be inspected, and a vast quantity of details to be inspected on those occasions. There was also a vast amount of correspondence, which was increasing, and of

which even the assistance of the most capable Assistant Secretary could not entirely relieve the Honorary Secretary. Mr. Moore had also had certain extraordinary duties cast upon him. It had happened, from unavoidable circumstances, that the records of the *Transactions* of the Club had fallen into arrear for as much as ten years, and Mr. Moore had had a great deal to do in bringing them up to the present date. The handsome printed volumes on the table showed to a certain extent what that extra amount of labour had been. No one but Mr. Moore could be aware what a number of letters he had written and how many hours he had spent in the offices of the *Hereford Times* searching through the files of that newspaper for many years back, for the particulars of the Club's transactions, which were now collected and printed in handsome books, thus to be preserved for the benefit of the members of this Club and other students of the history of this county. No one could tell the amount of time he had spent hunting up records and collating valuable facts, which otherwise must have been lost in oblivion. The members of the Club had been aware of that, and when one or two of them thought the time had come to give expression to their feelings of appreciation, they all responded with a promptitude that showed how well the few had spoken the minds of the rest. After due deliberation, it was decided to limit the amount of the subscriptions to a moderate sum, but he was sure the Honorary Secretary would not look at the intrinsic value of the gift, but as an expression of the feeling of the gratitude which they entertained towards him. To some at first sight, it might seem almost superfluous to offer a watch to one with whom they had been accustomed to associate the idea of punctuality itself—(laughter)—and who so well utilised the flying moments of a summer's day as to compress into them as much instruction and enjoyment as possible—(applause)—but, at the same time, it was the wish of the Committee, representing the whole Club, that the present should be good of its kind. It was to be hoped that for many years Mr. Moore would kindly continue his exertions for the benefit of the Club as acceptably as he had done, and that he would be encouraged in the labour and trouble they had caused him by the feeling that his kind and valuable exertions on behalf of the members were appreciated by them. And more than that, when the time came, as it must, that he must seek some respite from his labours and had resigned, they hoped he would by it be reminded of the pleasant days gone by, and of the large amount of goodwill, regard, and gratitude, which he had won from his comrades and fellow-members of the Woolhope Club (applause). In felicitous terms, the President then presented Mr. Moore with an exceedingly handsome gold demi-hunter watch and chain (manufactured by Dent), a cheque for 64 gs. (the balance of the subscriptions), and a bound book containing the names of the subscribers. The President further congratulated Mr. Moore on his improved state of health, and wished him and Mrs. Moore many additional years of health and happiness (applause). The following was engraved on the case of the watch :—"Presented to Henry Cecil Moore, Honorary Secretary to the Woolhope Naturalists' Field Club, in grateful acknowledgment of many years of good service. Hereford, April 12th, 1894."

The President elect said that nothing could have given him greater pleasure than to support the movement when it was set on foot, because Mr. Moore had energetically laboured for the good of the Club, not only in compiling the *Transactions* for publication, after they had for so many years fallen into arrear, but also in, from time to time, arranging the excursions, in which a great deal of work was also involved, and last, not least, in writing comprehensive reports of the meetings, and of the many interesting subjects associated therewith in numerous branches of natural history. Long might Mr. Moore continue his labours on behalf of the Club (applause).

Mr. H. C. Moore who was very cordially received, thanked the President and the President elect for their very kind remarks, and all the members of the Club for their generous and valuable presentation. He said that when it first came to his ears that he was to be honoured with a presentation it made him reflect and ask himself the question, what have I done to be worthy of such honour? and even after much reflection it still appeared a puzzle. The President had come to his relief, and solved that question in the eloquent and, to himself, complimentary language he had used, concluding with this very handsome gift, as a memento of many pleasant Field Meetings, bearing with it expressions of gratitude from so many companions. He would accept as much of the compliments as he honestly could, and put down the balance to the good feelings and kind hearts of the donors. Turning to the portrait of Dr. Bull hanging on the walls of the room, Mr. Moore said :—"When that worthy man, whose speaking likeness looks down upon us here assembled in this Woolhope Club Room, was taken away from us after only a few days' warning in the latter part of Oct., 1885, we suddenly found ourselves, as it were with our ship in a storm at sea, the man at the helm washed overboard." At the first meeting in 1886, the Club honoured him (Mr. Moore) by electing him Editor of the *Transactions* then ten years in arrears, the last volume so far published being the volume of *Transactions* of 1874, 1875, 1876. At that same period the late Secretary, Mr. Theophilus Lane, was in an infirm state of health, and he was called upon to act for him during that year, until he was elected Honorary Secretary in the year 1887 with Mr. James B. Pilley as Assistant Secretary. The task of making up the arrears of ten years *Transactions* was, he felt, serious in character; at the same time he was conscious that it was an imperative duty to be performed, rather than to permit the records of so many proceedings and valuable papers to fall into total oblivion. One shrewd friend, a Scotchman, who held the office of President in 1876, in whose judgment he had always placed great confidence, looking upon the task as almost hopeless, advised him to proceed with the *Transactions* of the present date, leaving it to posterity to bring up the arrears. As he seemed indisposed to follow this advice, however highly he might think of the adviser, his friend laconically remarked, "then ye mon gang yer ain gate."

Placing himself in correspondence with the authors of many valuable papers which had never been published, he succeeded in rescuing numerous manuscripts, and with the assistance of the official reports of the *Transactions* of the Club as from time to time they appeared in the *Hereford Times* (and he took this opportunity of thanking the Editors for permission to spend so many hours in their offices), he collated material far beyond his expectations. The result was exhibited in the five volumes now lying upon the table—and to those five volumes he would delegate the duty of speaking for themselves—(applause). Although from 1876 to 1886 no volume of their proceedings was published, the members of the Club had not been idle (applause), nor did they fail to pay their subscriptions (laughter), for it appeared that, for a period of eight years, a sum of £60 was annually devoted out of the funds of the Club, to subsidise Dr. Bull in the publication of that standard work which he had produced at so much labour, and so much expense out of his own purse, *The Herefordshire Pomona* (applause). Proceeding with the history of the publication of the arrears of the *Transactions* from the year 1876, Mr. Moore said he would call to the notice of the members the periods of publication. In the early part of 1887 the members received the *Transactions* of 1877, 1878, 1879, 1880, and in April, 1888, the *Transactions* of 1881, 1882, with a General Index to the volumes from the commencement in 1852 to the year 1882, compiled by the Rev. Dr. Havergal.

In 1888, *Notes on the Birds of Herefordshire* was published on the sole responsibility of Mrs. Bull, dedicated affectionately to the members of the Club "in memory of many happy years of research spent together in the varied fields of interest connected with the County of Herefordshire." This work was originated by a careful and intelligent observer of bird-life, Mr. D. R. Chapman, librarian of the Free Library, his first paper being read at the Field Meeting of the Club on May 15th, 1884. Numerous members of the Club added from time to time contributions from their personal observations. On the title-page of the volume we read, "Notes on the Birds of Herefordshire, contributed by members of the Woolhope Club, collected and arranged by the late Henry Graves Bull, M.D., etc." As Mr. J. Tom Burgess, author of *Historic Warwickshire*, feels grateful to Shakespeare (*Transactions*, 1883, page 65), "whom his contemporaries, envious of the fame which he himself seems to have despised, charged with decking himself out in other men's garments, forgetting that the man who digs the clay, makes the bricks, or hews the stone, is not the architect or creator of the fabric, which artists admire, poets love, and in which princes love to dwell"—so we may say that we are deeply grateful to Dr. Bull the compiler of this pleasantly written volume for "using up as he went along the garnered facts of others, which he polished and set until the rude pebbles became precious jewels."

In the following year, 1889, another valuable publication was issued, namely, *The Herefordshire Flora* (applause). It was at this critical period that at one of our meetings we were staggered by the exclamation of our Honorary Auditor, Mr. James Davies, "we are bankrupt!" (great laughter). By a prudent arrangement with Mr. Carver, the printer of *The Flora*, to whom we are indebted for a compromise, and owing to contributions from members towards defraying the expenses of our illustrations, including the very generous gift of £10 by Mrs. Bull, and the photograph of her late husband, Dr. Bull, which forms the frontispiece of the volume 1883, 1884, 1885; not omitting to mention the steadfast adherence to the motto of our Club "Forward!" we re-embarked, added fresh

cargo in the increase of our numbers, and sailing onwards, in 1890, we launched the volume of *Transactions* for 1883, 1884, 1885 (applause). In 1892 the volume for 1886, 1887, 1888, 1889 was published. To-day, April 12th, 1894, the members receive the volume for 1890, 1891, and 1892, with an Index to the last ten years 1882—1892, and the printers have commenced the pages of the *Transactions* of the year 1893 (applause). From this time forward, if authors will only contribute their manuscripts, the *Transactions* may be published annually.

Continuing, Mr. Moore said, that he would remind the members that though he had been instrumental in completing the compilation of their *Transactions* up to the present date, all the contingent expenses had been paid out of their own money. It was an earnest signification of their gratitude, and of their optimist temperament that they had so unanimously come forward and opened their purses in his interests by their subscriptions to this handsome testimonial at a period when he was apparently piloting them into bankruptcy, for was not there lying upon the table a bill from the printers amounting to £150, whilst our bank book showed that we had in hand only £58 to meet this account? (laughter). Let them not be disheartened: they had only to stick to the Club and its motto, and pay their annual subsriptions to the Assistant Secretary, who was now present to receive them, and the Club would continue to prosper (applause). As the President remarked truly, the organization of the Field Meetings, and the compilation of *Transactions* had been a labour of love, but when he looked round this room, and saw so many names as subscribers to that beautiful gold watch and chain, evincing their kindly recognition of his efforts, he felt—and he was sure his wife would agree with him—that it had not been "love's labour lost" (laughter and applause). A wise man had said, "Oh! that mine enemy would write a book" (laughter). He (Mr. Moore) had compiled and edited these five volumes ranging over the proceedings of sixteen years, and looking around he could say how happy the man must be who has achieved this without finding an enemy! (applause).

Mr. Moore then remarked upon the value of the Index in the last volume carried on from 1882 to 1892 which had been prepared by Mr. W. H. Banks, to which Mr. Moore himself had added Errata and Corrigenda for the last sixteen years.

Mr. Moore went on to say that this day April 12th was a very red-letter day not only to himself, but in the annals of the Woolhope Club. The Club was instituted in 1851. It soon had a name but possessed no local habitation where it could hold its meetings without paying for them. If they would look in the *Transactions*, 1875, page 76, they would find that, due to the generosity of our Member of Parliament, Mr. James Rankin, who was President in 1869, the Club obtained its local habitation in this Woolhope Club Room under the same roof as the Free Library, and that the first meeting was held on April 12th of that year. It was a coincidence at which he rejoiced that the date of so important an event should be inscribed, and so beautifully inscribed, upon his presentation watch (applause).

In conclusion he again thanked the members of the Club, and especially the

President, for his very kind expressions in speaking on behalf of the Club, as also for his kind wishes for his wife, and his own restoration to health. He hoped that this gold watch would be his trusty companion in maintaining, in his office of Honorary Secretary, that punctuality and discipline which was so essential in the Field Meetings and other meetings of the Club, and he saw before him a great deal of good work to be done (applause).

Votes of thanks to the President, and to the Honorary Secretaries of the Testimonial Fund (Mr. Thos. Hutchinson and Rev. J. O. Bevan) concluded the proceedings.

ADDRESS OF THE RETIRING PRESIDENT, REV. PREBENDARY W. H. LAMBERT.

ONE duty remains to be performed before resigning into better hands the honourable office which your favour has allowed me to hold during the last twelve months. The rules of the Club require from the out-going President a retiring address. There are many reasons for brevity, and I shall endeavour to restrict my observations within narrow limits.

The four Field Meetings of 1893 have been so fully and admirably described by Mr. Moore, our Honorary Secretary, that there remains no necessity for any lengthened notice from the retiring President.

The season opened on Thursday, May 27th, with an excursion to the Brown Clee Hill, a district in which the student of natural science (whether geologist, ornithologist, or botanist) the archæologist, the lover of nature for its own sake, and, in Lord Boyne's beautiful and well-ordered pleasure grounds, the landscape gardener also, found abundant sources of enjoyment: while the reading of a valuable paper on the geology of the district, sent by Mr. La Touche, who, unfortunately, could not be present in person, added greatly to the interest of the day.

On Tuesday, June 27th, the Club took an even wider flight, visiting in a long summer's day (which was, notwithstanding, all too short for the enjoyment of the varied objects of interest presented during its course) Ledbury, Eastnor, Pendock, Tewkesbury, and the extremely ancient and curious Priory Church and Chapel of Deerhurst. On this occasion it had the great advantage of being personally conducted by Mr. Piper, who was by turns geologist, historian, and archæologist, illustrating the geology by coloured diagrams prepared by himself, the archæology by valuable papers, and all the subjects by oral explanations of the greatest value. Sir Herbert Croft, who was unfortunately prevented by illness from being of the party, contributed an appropriate paper on his ancestor, Sir Richard Croft, to whom the ill-fated young Prince Edward surrendered after the Battle of Tewkesbury. This paper was read by the President during a short halt at the Swan Inn, Staunton, in the course of the return journey.

For the Ladies' Day the Club went to Water-break-its-Neck, and the President rejoices to believe that both the choice of the locality and the arrangements by which the programme was carried out had the approval of the many ladies who honoured it with their attendance on the occasion as well as of their friends, the sterner sex. Science and archæology were not allowed to be forgotten amid the other attractions of the day, and two important papers were read by Mr. Moore, "On the supposed Roman well recently discovered in the grounds of the New Weir, and the supposed Roman bridge in the same locality," and another paper, too long to be read, was prepared by Dr. T. A. Chapman "On the Acronycta and their allies."

Then came Kyre Park, on Tuesday, August 22nd, where Woolhopeans had the great advantage of inspecting the magnificent oaks and other forest trees in the company of Mr. Philip Baylis and one of his head foresters from the Forest of Dean, and where they received a most gracious welcome and the fullest hospitality of which time would allow from the owner of this noble place and from Mrs. Baldwyn-Childe. Members will have observed with satisfaction that Mr. Baldwyn-Childe has since been elected a member of the Club. Papers were were read in the course of the day by Mr. Piper on the Essex family, and by Mr. Philip Baylis on the results of experiments in the Forest of Dean as regards the transplanting of oak trees; and remarks were made by Mr. Southall on the drought of 1893.

Agriculture may have suffered from the deficiency in the rainfall of last year, but the dry summer was favourable to the success of the Field Meetings of the Club. On each occasion the weather was most enjoyable, and the average attendance consequently good.

The Fungus Foray was for various reasons not held last year.

In quitting the subject of the Field Meetings the President asks your permission to make two suggestions.

1. Inconvenience arises when members intending to join the excursion neglect to signify their intention to the Assistant Secretary by filling up and forwarding to him, by the appointed time, the printed form which usually accompanies the notice of the meeting. The result is often that the careful arrangements of the Honorary, and the Assistant, Secretary are disordered by the conveyances provided proving insufficient for the party actually assembled. This may possibly cause disappointment to defaulting members themselves; but in any case it involves a delay which is detrimental to the punctuality of the day's proceedings, a matter often of much importance, or an interference with the comfort of the whole party through the inconvenient crowding of such conveyances as are alone available. By giving the required notice, whenever possible, members would at once lighten the labours of our excellent Honorary Secretary, and promote the convenience of their fellow-members of the Club and of themselves.

2. When in the course of a Field Meeting a Member is so fortunate as to have an important find, or to make any observation or discovery of scientific or archæological interest, it is much to be desired that he would, as soon as possible, communicate it in writing to our Honorary Secretary, or to the President for the year. Many a fact worthy of record in the *Transactions* of the Club would be thus preserved from oblivion, and our Honorary Secretary would be saved much unnecessary correspondence. He has furnished me with an instance in point. Shortly after the Kyre Park Meeting the lady who so courteously welcomed the Club there wrote to him for the name of a peculiar aquatic plant which one of our members found growing in an ornamental pond in the grounds. But the Honorary Secretary had never been informed of the discovery. The number of members present was large, and he has no idea to which of them he must apply for the information desired. But a slip of paper addressed to him by the finder

at the end of the day's excursion would have enabled him to answer the question without trouble.

At the last Annual Meeting an alteration, verbally slight, yet significant, was made in Rules 1 and 4; by the introduction of the words "and Archæology" after the words "Natural History," in each case.

By this recent note a subject which for many years, if not from its first foundation, has occupied the attention of the Club in varying degrees is now formally recognised as coming within its scope.

It seems to your retiring President that his successor may be congratulated on taking office under encouraging circumstances. Few tests appear to be wanting which are usually taken as indicating the prosperity of such an Institution. The call on the finances of the Club has been heavy, owing to an unusual amount of printing, but they have proved equal to the demand, and may be considered in a healthy condition. The number of members is larger than at any earlier period, and they continue to be fairly representative of the different localities, classes, and interests, which the Club has from the first succeeded in combining for its objects.

The recent volumes of *Transactions*, which had fallen into arrear, but which, through the patient labour of our Honorary Secretary, are now, happily, completed down to 1892, contain, it is hoped, like the earlier ones, sufficient evidence that the studies and investigations which the Club exists to promote are by no means neglected. These objects will receive fresh encouragement under the President for the present year, whose long membership in the Club, and intelligent interest in its proceedings, whose local knowledge and archæological attainments, combine with other valuable characteristics to qualify him for the position which has been filled, I fear, so inefficiently in the year just ended. I sincerely wish him a successful season and a tenure of office as agreeable as your courtesy has made my own.

I once more express to our Honorary Secretary my personal sense of his invaluable services to the Club and to the President of the year; and to all the members of the Club my thanks for the honour conferred upon me in my election to the position, and for the unvarying consideration which they have shown me during my term of office.

REVIEW OF THE VOLUME OF *TRANSACTIONS*, 1890, 1891, 1892,

From the *Hereford Journal*, May 5th, 1894.

HIDDEN away, buried rather in countless volumes, some printed in one remote district, others four hundred miles off, a curious student of natural history and archæology would find in the *Transactions* of our ever-growing army of Field Clubs a perfect library of entertaining and useful papers. Take up any volume at random, and it may seem to consist of a few grains of gold in a vast heap of rubbish, or, to be more complimentary, of very common-place material, but when it is remembered that nearly every such volume contains at least half-a-dozen really good papers, and that volumes of Field Club *Transactions* are counted by hundreds, perhaps by thousands, we must do full justice to the stores of wealth hidden away, generally out of the reach of all except a handful of indefatigable students. The chief faults of most of the papers in such a volume are that they are the handiwork of men little accustomed to elegant and accurate writing, and who, though they may have valuable material at their command, lack the necessary experience, and do not know how to arrange and marshal their facts in a pleasant and attractive form. Many other papers are simply useful to professed students of the particular branch of science dealt with, for it is not ungenerous to say that even the most enthusiastic scientists seldom have a large fund of sympathy, and they are not always the most appreciative admirers of the labours of others. We cannot altogether blame them: modern science covers a vast range of subjects; any one of these subjects will find material enough for the life-long investigations of a little army of ardent workers and observers. The days are long past when any man, however vast his erudition and indomitable his perseverance, could pretend to regard all learning, all science as within his proper province. Nowadays it is something if he can pretend to a fair knowledge of one branch, with a thorough grasp of a very small portion of that branch. It is something to our credit that not only has every county one or more Field Clubs, but that the members are usually drawn from a wider area than a single county. This leads to a pleasant interchange of ideas and to the same subject being presented to the members in very different lights; at the same time friendships are formed which are among the most agreeable fruits of a connexion with these societies. We do not see any hope that the literary merits of Field Club *Transactions* will greatly improve. Practised literary men can command from £1 to £3 per page from the leading reviews, and they are not likely to favour any association with a contribution worth to that association very little indeed, but which to the writer might have meant a cheque of £40, great popularity, and a large circle of readers. As an example of what we mean we would point to the work on "Oysters and All About Them," reviewed by Dr. A. J. H. Crespi at page 126 of the present volume. We shall say nothing here about the article itself, but the work consists of two huge, and we fear we must candidly say, heavy volumes, stuffed full of dreary and uninteresting reports. Had the author of the work pruned his material unsparingly he might, in a modest book of 400 small

pages, have got in all the general reader would ever be likely to care to know of a subject of very minor importance. Unfortunately, ignorant that a big book is not necessarily a great one, he has weighed down his subject with extracts and reports, and Acts of Parliament that hardly anyone will ever wade through. There is no easier way of making up a book than with the free use of paste and scissors; but few readers in our busy age can read a tenth parth of the really good books they would like to get through. Books must be small and readable, or they are thrown aside, and we fear that "Oysters and all about them" will not find many students content to wade through it.

The present volume is a most favourable specimen of its class. The Club has a large number of able men among its members. It was fortunate in being one of the late Dr. Bull's chief hobbies, while it has found in the present Honorary Secretary (Mr. H. C. Moore, of Hereford)—a most painstaking and conscientious worker—one whose perseverance and thoroughness excite the envy of less careful and accurate investigators. Mr. Moore must have devoted many an hour to preparing and editing the present volume. Such work is never easy; but it is particularly difficult to anyone who does not claim to be a man of letters, and who has a laborious profession to fill up all his time. We congratulate him warmly on his labours, and do not hesitate to say that the present volume is not only a credit to him, but a great honour to the Club, and will take a high place among the *Transactions* of Natural History Societies. This is the fifth large volume which has passed through Mr. Moore's hands, and the fourth volume was also very ably edited.

A glance at the table of contents shows us the names of the Rev. Augustin Ley, the eminent botanist; of Dr. M. C. Cooke, the world-renowned fungologist; and of the Rev. J. O. Bevan, whose sympathies are so wide that they embrace the higher mathematics and yet include craniology and other kindred subjects; Mr. Moore contributes some of his carefully finished reports; Sir Herbert Croft finds time to prepare an excellent address; Rev. Sir George Cornewall, Rev. J. E. Vize, Rev. William Elliot, Rev. J. D. la Touche, Mr. Henry Southall, and not a few others have done their best to enrich the volume. Perhaps few outsiders will fully appreciate the intense and long-continued labour which one exhaustive series of observations generally represents. The labours of the year may only fill a couple of rather dry pages, but nevertheless the worker has his reward and the world of science gains something. We almost feel bound to apologise for singling out a dozen names and leaving out so many others, but the truth is that nearly all the contributors have done their part well and have helped to enrich the volume; and we only omit their names because were we to attempt to do full justice to all we should have to mention almost every writer.

We must say a word about the field excursions—so delightful a part of the Society. These excursions are nearly always most interesting; great care is taken to pick out beautiful and fascinating places for them, and Hereford is peculiarly rich in ancient churches, camps, castles, stately gentlemen's seats, exquisite scenery, and quaint old towns. Generally someone is found thoroughly posted up in the antiquities and wonders of the place visited, and those members who had the rare good fortune to visit Kingsland Church, on June 24th, 1890, and remember the Rev. Joseph Barker's courtesy and inexhaustible fund of

information—and who could forget them?—will see the value of outings which so happily combine healthy amusement with solid information. Given a fine, bright day, and nothing more delightful can be imagined than one of the Woolhope Club excursions. We are glad to see from the last annual report that the Society is actually stronger than ever, that its finances are satisfactory, and that the attendance at its field days is very large and better than that of some other clubs.

Before going on we must draw attention to two very valuable pages—22 and 23 Errata and Addenda. A careful examination of them shows how well the book has been brought up to date. There is, for example, a notice of the sale of the egg of the Great Auk for 300 guineas on February 2nd, 1894. The illustration of the egg, facing page 32, is faithfully coloured, and shows the exact size. Errata, page 72, gives a succinct account of the distribution of the Roman Legions in Great Britain, on the authority of Mr. F. Haverfield, writing from Christ Church, Oxford, under date April 21st, 1893. Errata, page 279, shows that in Cripps' "Old English Plate," fourth edition, the elegant salt cellar and pepper caster of the date of 1607, at Christ's Hospital, London, has a very close resemblance to one of the seven silver vessels exhibited before the Woolhope Club by Mr. C. E. Moore, the Herefordshire County Coroner. These beautiful articles were found in a rabbit hole in the parish of Stoke Prior. The Court of Chancery decided that they belonged to the Crown, and refused to allow them to adorn the Hereford County Museum. They are now exhibited at South Kensigton Museum, but may we not hope that some day they will be restored to the county which surely has some claim to keep them?

One of the not least important functions of a Field Club is to give members an opportunity of permanently recording in the *Transactions* any natural phenomenon or antiquarian discovery of more than common importance. Such matters are soon forgotten, or are only remembered as very unreliable traditions unless committed to writing at the very time. The present volume is rich in such paragraphs and notes. One of the most valuable is found in pages 146-7, and is from the Rev. M. G. Watkins, of Kentchurch. It records the finding, during the clearing out of two watercourses to the north of Abbeydore, of nine old keys, ranging from two to six inches in length, and some of these were cut into very remarkable wards. One resembled an intricate modern latch key, and may have fitted a padlock. A keen-edged, pointed dinner knife was also found, and three coins; one of these was a silver groat of Elizabeth, the second a fine specimen of a copper sixpence, dated 1689, and the third was probably a copper halfpenny, bearing the legend "Nummorum famulus." All these relics are carefully preserved.

Let us now examine some of the more notable papers. Among these a very interesting one is the substance of a lecture on Herefordshire pigeon-houses, given by Mr. Alfred Watkins before the Woolhope Club. It is richly illustrated with engravings which are very beautiful, and greatly add to the value of the volume. Ten pigeon-houses are faithfully represented on plates between pages 22 and 23, and one is given as a vignette on page 14. Two other pigeon-houses are now demolished, but they were fortunately photographed before they were destroyed; they are given as the frontispiece of the volume.

The most ancient pigeon-house in Herefordshire, and probably the finest in England, is found at the Church Farm at Garway. It is of the date of 1326, and is in perfect preservation. The remains of a Norman Columbarium, which Mr. Watkins considers may probably be of as early a date, are to be seen at Cowarne Court. This Columbarium was similar in construction to the Garway one: the latter was built by Brother Richard, one of the Knights Hospitallers, who had a Commandery at Garway. The Knights of St. John, as is well known, took possession of the property of the unfortunate Knights of the Temple, when the latter were dispossessed of their houses, and Garway was once in the possession of the Templars.

Mr. Watkins has surveyed no fewer than 74 pigeon-houses, and gives a vast amount of curious information relating to them. Pigeon houses continued to be built in great numbers in the 17th and 18th centuries, but the fashion suddenly died out at the beginning of the present century. Chancellor Fergusson very forcibly says that "mangel-wurzels killed them"; in other words the introduction of the modern improved system of winter feeding of cattle made it no longer necessary to have an abundant supply of pigeons. At one time at least 500 pairs of pigeons were considered to be an indispensable part of the winter meat supplies of a great house. The last Columbarium was built about 1810, though a third of the existing dovecotes are still used. Unfortunately many of these curious and interesting relics of other days and fashions have been recently destroyed, and we fear that the work of devastation continues.

Between pages 164-5 will be found a geologically coloured plan of the Woolhope Valley, and facing it is a section across the valley. Thus, for the first time, this interesting geological formation has been beautifully illustrated in the *Transactions*. The Rev. William S. Symonds was, we believe, greatly interested in the many remarkable problems presented by this strange valley, nor is this astonishing.

Several pages between pages 316 and 330 are given to remarkable phenomena in the Channel of the Severn and at the mouth of the Wye; and some very curious letters are published as to the real height reached by the tide at Chepstow. The subject is one of some interest to all students of natural phenomena, and of very great moment to the inhabitants of the low lying parts of that ancient and picturesque little town. The authors of the Woolhope report hope that henceforth geographers will erase the oft repeated error "that the rise of the tide in the Wye reaches 70 feet," and will be content with the more accurate statement on page 326, line 7, that "the highest tide of which we have any authentic record was 49·13 feet above the lowest point of ebb that I ever saw; if anyone should hereafter see the water lower than my datum, or more than 7 feet 1½ inches above the piers, he will please note."

While dealing with this question of high tides and floods, we must draw some attention to some notes on page 235 relating to "floods of the river Wye." The highest flood on record at Hereford was that of February 11th, 1795, when the Wye rose 20 feet above summer level. The rise of flood on February 6th, 1852, was 18 feet 4 inches. The great rainfall of May 12th and 13th, 1886, did not

affect the river Wye so severely as to reach higher than ordinary high floods, its chief downpour raising both the rivers Teme and the Severn to a flood exceeding that of 1852 and 1795. (See *Transactions*, 1886, p. 48).

Pages 351 and 352 give some curiously interesting statistics as to the distances at which the eye of man has been able to see objects from great heights. Mr. W. M. Conway's computation of 200 miles from an elevation of 22,500 feet, in a clear air of dimished pressure, may be readily believed. In our country, however, the murkiness of the air seldom allows us to discern objects at any great distance, and we have to be satisfied with being told that one can see distant landmarks—usually the eye only sees a dim, hazy outline—which might be anything or nothing.

Papers on botany are interspersed through the volume from the pen of that eminent authority the Rev. Augustin Ley; others on entomology by Dr. Wood, others, again, on geology, including some valuable and hitherto unpublished correspondence between the late Mr. R. W. Banks with Sir R. Murchison, Sir P. Egerton, J. W. Salter, and others, enhance the value of this volume.

The ornithology of the county of Hereford, page 381, has been brought up to date (since the publication of *The Birds of Herefordshire*), by Mr. W. C. Ashdown, F.Z.S., the observer most fitted to give it correctly. A paper of more than ordinary interest is the one on the Welsh Names of Birds of Prey, by Mr. E. Cambridge Phillips. The author is widely and most generally known for his accurate knowledge of birds, more particularly, we presume, of those of Breconshire. Mr. Cambridge Phillips gives some very curious information as to the Welsh names, and seems to trace a well marked connection between them and those in use in Eastern Turkistan, and, what is less surprising, in Brittany. The subject is more fascinating to the ripe scholar than the origin of languages and the changes that have taken place in particular words. Professor Max Müller has made this a special study, and his well known dissertation on the "Name of the Cat" must be familiar to all our readers. But philologists are often said to find just what they look for and want.

After 407 pages of text follows an Index of the last 10 years—1883 to 1892. It commences with the most important Errata and Addenda for the years from 1877 to 1889.

The volume closes with papers connected with the transcription of Parish Registers, published under the direction of the Congress of Archæological Societies in union with the Society of Antiquaries, and a list of all Archæological papers published during 1891 and 1892 is given.

We have seldom seen a volume of greater interest than the present. It runs to about 500 closely printed pages of really useful and suggestive matter. The illustrations, which are numerous, are of superior quality and finish, and add a great charm to the work. We can only hope that this Association will continue its useful labours for many a long year, stimulating its members to observe, experiment, and record, and it may be, giving their observations an enduring place in the literature of Field Clubs in many another volume as well edited and put together as the one now before us.

S. U. M.

Woolhope Naturalists' Field Club.

FIRST FIELD MEETING, THURSDAY, MAY 24th, 1894.

THE First Field Meeting of the Club this year was held on the Queen's 75th birthday, over ground previously untrodden by the Club, and was favoured with the proverbial Queen's weather. The members trained to Ashperton, whence, in brakes, the following places were visited in succession :—Mainstone Court and Moat, Munsley Church, Bosbury Church, the occasional residence in earlier times, as recent as five centuries ago, of the Bishops of Hereford, the Crown Inn, formerly the residence of Richard Harford, the steward of the manor of Bosbury, Temple Court, whose roof still covers some of the walls, varying from three to five feet in thickness, of the ancient Preceptory of the Knights Templars, Castle Frome Church, Canon Frome Vicarage, and Ashperton Moat surrounding the site of the Castle of the Grandisons, of the traces of which we cannot quite say that not a stone is left, for one stone was found which might possibly have served its duty as one of the component parts of the large defensible house, which was "grubbed up" so recently as the close of the last century. The distance of the circular tour was about 12 miles.

Local history was given in a paper on Mainstone Court by the Rev. Michael Hopton, vicar of Canon Frome, and that connected with Bosbury was given by the Rev. Samuel Bentley, vicar of that parish and author of *History of Bosbury*. Mr. Piper contributed quotations from *Robinson's Castles and Manors of Herefordshire* connected with the localities visited, especially Canon Frome and Ashperton Castle. Archæology and Church architecture were represented by the Rev. M. Hopton, the Rev. S. Bentley, and the Rev. B. Bayly, rector of Castle Frome.

The party consisted of the President, Mr. James Davies; Vice-Presidents: Rev. Preb. W. H. Lambert, Rev. Morgan G. Watkins, and the following members :—Charles D. Andrews, F. Bainbridge, J. Edy Ballard, Rev. J. Barker, Rev. B. Bayly, H. C. Beddoe, Rev. S. Bentley, Major J. E. R. Campbell, S. Carrington, Dr. T. A. Chapman, R. Clarke, Rev. C. E. Craigie, Dr. Crespi, George Cresswell, Luther Davies, Rev. Preb. W. Elliot, Rev. C. S. Hagreen, W. Hebb, Rev. E. J. Holloway, Rev. C. E. Hopton, Rev. M. Hopton, Thomas Hutchinson, Rev. A. J. Jones, Rev. A. Ley, J. W. Lloyd, Rev. H. B. D. Marshall, Rev. H. North, W. Pilley, G. H. Piper, Thomas Salwey, Rev. F. S. Stooke-Vaughan, J. P. Sugden, Alfred Watkins, Dr. J. H. Wood, H. C. Moore (Honorary Secretary), and James B. Pilley (Assistant Secretary). The following

visitors attended :—Ernest Ballard, W. Carless, George Child, G. Davies, P. Douglas, Rev. C. Harington, Lacon Lambe, Hugh Lambert, Rev. M. Marshall, Rev. L. B. Mumm, H. J. Parker, J. H. Pitt, Lomas, and Rev. Canon Snowden, from Yorkshire.

At Ashperton Railway Station the brakes from Ledbury were in attendance, and conveyed the party without delay to Mainstone Court, on the Ledbury road, distant half-a-mile. During the inspection, which occupied about half-an-hour, the following paper on its history was read by the Rev. M. Hopton.

MAINSTONE COURT AND MOAT.

By the Rev. MICHAEL HOPTON.

(Mainly compiled from notes supplied by Mrs. Salwey, the daughter of Captain Johnstone, who sold the property to the Rev. John Hopton in 1848.)

IN the very early times when the British and Welsh tribes were at war, a stockade for cattle surrounded by a moat is said to have existed here, into which the cattle on their way to the ancient British town on the Holly Bush Hill were driven for safety. The remains of a drawbridge are said to have existed as late as 1821; it is supposed to have been defended by two towers, and connected with the trackway by a narrow footway.

The Roman road from Glevum (Gloucester) to Cicutio (Stretton Grandison) runs just below, and no doubt the moat at Mainstone often afforded a useful shelter to "the Silures" occupying the camp at Wall Hills during their 30 years' struggle with the Romans; and at a later period to "Creda," the first King of the Mercians, who ruled from 586 A.D. to 600. But it is impossible to do more than "speculate" on the early history of this district, for as Dr. Bull, in his admirable paper on "Wall Hills Camp," read before the Club in 1883, quotes:—"No written record tells us how Saxon and Angle dealt with the land they had made their own."

In the middle ages a large monastic establishment seems to have occupied the site. The remains of the fishpond, now an ashbed, are still clearly to be seen. Mrs. Salwey, whose father, Captain Johnstone, bought the estate in 1821, remembers a large building, with dungeons below, and stone steps above, leading to a large handsome chamber with stone-mullioned windows and tracery. The heavy wooden doors cramped and studded with nails were there, and one was still existing a few years ago. This monastic building was pulled down about 1850, but an archway leading to the present coal-hole indicates where it stood, and the walls of the dungeon or underground vaults were found in building the new hop-kiln. Could it have been the monastery farm belonging to the Benedictine establishment at Ledbury? or of the Priory of Little Malvern, which certainly owned a considerable portion of this parish of Pixley?

In the 17th and early part of the 18th century the estate was held by the Jones's, of Putley, as lessees. In 1768, Anna Maria, widow of Henry Jones, married John Durbin, an Alderman of Bristol, who died here aged 80, and was buried at Ledbury Church in 1792—he laid out the ground in the Dutch style. The garden was levelled from the house to the moat—a stone terrace with walls on either side, on which at intervals were large vases, bordered the moat; and steps (which may still be seen) led to the water, on which a boat was kept; on one side was a boat-house, on the other side a summer-house. The garden between the house and moat was laid out with formal walks and hedges and bright with tulips. The space enclosed by the moat was an orchard or "pleasaunce" planted with choice trees. The house

then had three stone gables looking on to the garden, and extending to the wall behind the present greenhouse. The front door was in the centre of this. The old monastery building stood at the back, and some half-timbered rooms behind. When this was pulled down the garden wall built by the Durbins was destroyed, and the stones used to re-construct the house. The garden was quarried for stone, and the stone vases which decorated the walls were stuck about the top of the house. (The spare ones were moved to the Lower House, Canon Frome, in 1879.)

Mrs. Salwey states that many coins were found in the garden and the moat when cleaned out. *One* supposed to be the oldest extant, struck by one of the consuls, to commemorate the founders of Rome. Obv. Head of Minerva armed—Rev. A female wolf with young. *A coin* of Servius Tullus, B.C. 578—534. *A fine coin* of Ptolemy Philadelphus, B.C. 235. Several English silver coins.

After the Durbins a family named Workman came, but they stayed only a short time in consequence of their son being drowned in the Wye whilst at the College School. Francis Workman died June 7th, 1821, at Longcroft House, Cardiff. Mrs. Salwey also states that a son of Mr. Workman was killed by a fall from his horse at the front-door of Mainstone. In 1821 Captain Johnstone, who bought the property from Mr. John Wood, of Burslem, Staffordshire, built the present house, and the old front facing the garden and running down to the coal-hole was pulled down in 1855 by the Rev. J. Hopton, who had bought the property from Captain Johnstone in 1848, since which time it has formed part of the Canon Frome estate.

From Mainstone Court the party proceeded in the brakes to Munsley Church. The antiquity of this Church is denoted by the various Norman lights in its thick walls, and fragments of herring-bone masonry on its east end; but the chief object of antiquity is the stone with a hitherto undeciphered and supposed Saxon inscription. A rubbing of it was taken by Mr. Robert Clarke, care being taken to mark correctly the more faint and the more deeply incised delineations. A rubbing was also taken of an inscription on one of the two recumbent slabs with floriated crosses, which, at the restoration of the Church, were deposited in the churchyard at the base of the west wall. The old yew tree at the north-eastern angle of the churchyard was found to have a girth of 24 feet at the height of five feet above the ground. Two hundred yards south-west of Munsley Church is Lower Court, situated on an elevation evidently surrounded originally by a moat, part of which still contains water, on the south and west, whilst traces are visible elsewhere of its large extent.

Before leaving this Church the following paper was read on

MUNSLEY CHURCH.

By the Rev. MICHAEL HOPTON.

MUNSLEY, mentioned in the Domesday Survey as "Moneslie," was held by William Fitz Baderon by free grant from the Conqueror—the Saxon owner was Aluric, it was evidently a Saxon clearing in the forest. The mound close to the Church, on which the Lower Court stands, with the remains of a moat still to be seen, may well be the site of the residence of the ancient lord of the manor. There is another residence in the parish, called "The Castle," now a modern erection with no trace of antiquity about it and no traditions as far as I know. The quaint little Church with its bell turret bears traces of Norman work in the small and deeply splayed windows inside, but narrow outside; the cap of each formed by one stone in which the circular head is rudely cut. At the restoration in 1861 these windows were found walled up, and were carefully rebuilt with the same stones in exactly their old positions. The ancient glass now to be seen in the north wall of the nave was removed from other windows.

The east end was not rebuilt—the window, and herring-bone work above it, is exactly as it was, only re-pointed.

During the restoration in 1861 a cavity was found underneath the small window in the wall of the chancel, where was a small coffin, which fell to dust on being exposed to the air. It was enclosed again in the same place.

The Norman arch also was left as found with its one side out of the perpendicular, and the only new Early English window was that nearest the door on the south side of the nave. The level of the chancel was somewhat raised, and a wooden partition at the west end removed; the old roof was replaced by new timber. The general features of the Church were carefully preserved in all other respects.

In the interior of the Church beside the Norman arch and the three old windows, I would call your attention to the old parish chest cut out of one solid oak tree, and a curious old stone, found during the restoration, which has puzzled many—some think it an old Saxon notice stone, and that the letters represent "Oyez, Oyez" so well known as the opening words of the public legal notice now used.

The old porch was larger than the present one and was a wooden superstructure on a masonry basement.

The old Registers previous to 1708 are lost, but there are the remains of some old tombstones in quaint characters bearing the date of 16 · · and 1665, forming parts of the chancel-floor, and outside, under the west window, are two old stone coffin lids; on one of these is a short inscription, apparently a name. Externally the three windows with their curious rude caps, formed of one stone each, and the herring-bone work above that at the east end are worthy of note, and together with the closed-up doorway in the north wall, with the arch formed of two stones,

THE INSCRIBED STONE, MUNSLEY.

Half size of the original inscription. The darker markings denote deeper incisions. The stone upon which the inscription is cut is an exceedingly hard and compact Old Red Sandstone of the district, about 2 feet 3 inches by 1 foot 11 inches in the largest part.

tend to raise a strong feeling of respect for the religious aspirations of our forefathers.

In the churchyard is an old yew tree, an account of which appeared in the *Hereford Times* of March 12th, 1881, written by the Rev. S. Jenkins, who was the curate here. He calculated that from its girth of 23ft. 3in. at the base it was planted about 825 A.D., and, in consequence would be over 1,000 years old, and be growing during the Saxon Heptarchy.

The old Communion plate, consisting of a large chalice and paten with the donor's name "John Elton, of Paunceford," engraved on it, was, by a great error of judgment, sold in 1869 for £6 18s. 5d., and an electro set bought for £7 2s. 6d. A branch of the Eltons, of Ledbury, seem to have been settled at Paunceford in the 16th and 17th centuries, and some of the Skynners, of Ledbury and Pixley, are buried here.

Leaving Munsley the members, resuming their seats in the brakes, drove to Bosbury, where they were received by the Vicar, the Rev. S. Bentley, who conducted them over the fine Church; thence to the remains of the Bishop's Palace, whence the members, returning through the village, walked to Temple Court, the residence of Mr. T. Harford Pitt. In the back part of the present building some few of the walls of the ancient fabric of the Knights Templars have been retained; they are of great thickness, varying from three to five feet thick in the wall containing the present chimney breast. But little of the old moat remains. From Temple Court the members returned and collected punctually for luncheon in the large oak-panelled room at the Crown Inn. It is unnecessary here to attempt a condensed description of the objects of interest at Bosbury. The Church and the manor are described in the Rev. S. Bentley's paper which follows, and every historical detail connected with the village is given in full in his "History and Description of the Parish of Bosbury," many copies of which were purchased by the members.

CHURCH AND MANOR OF BOSBURY.

By the Rev. S. Bentley.

There is very little reason to doubt that a Church existed for some years on the same site as that which is now occupied by the present fabric. The population of the village, its comparative importance, as containing within it one of the largest manor houses of the Bishop of the Diocese, together with the circumstance that a Saxon font was found on the spot about 60 years ago seem to prove that a Church must from very early times have stood on the present site. No record, however, of it exists, the episcopal register of the diocese not beginning until 1275.

The present Church was built at the end of the 12th century, or beginning of the 13th; its style is Transitional Norman. It consists of nave, north and south aisles, a chantry chapel (16th century) and chancel.

The tower is detached, being one of the seven detached belfries of Herefordshire. The others are Garway, Holmer, Ledbury, Pembridge, Richard's Castle, and Yarpole.

The architectural details of the Church may be noted thus: As to the nave—there are two entrances, one (the principal) on the south side, the other on the north. The south entrance is through an open timber-work porch rising from side stone walls and probably dating from the 15th century. The doorway is Norman, recessed with a bold moulding. The arch is supported by circular shafts with simple bases and capitals. In the middle of the eastern shaft there was a holy water stoup, the remains of which, and of the canopy, are still visible. The entrance to the Church on the north side is by a simple circular headed doorway with no porch of any kind.

The chancel is 38 feet in length; the east window is a Perpendicular erection, with four lights, substituted about 60 or 70 years ago for three Early English windows, which it is supposed, were out of repair at the time. This Perpendicular window was filled with painted glass in 1882, by the Rev. E. Higgins, as a memorial to Mrs. Higgins and two of his grandsons.

On the north side of the chancel is a simple Early English window, filled with painted glass, by Mr. Pitt, of Temple Court, and on the south side are two similar Early English windows, filled also with painted glass, all by Wailes, of Newcastle.

Within the Sacrarium are two remarkable monuments (one on each side) with effigies of members of the family of Harford, who lived in Bosbury in the 16th century. There is a certain amount of richness in the appearance which these monuments present, but there is much in point of taste and execution to be condemned. One is dated 1573, the other 1578; they are specimens of Early Renaissance, and are the workmanship of one John Guldo. There are no traces of either piscina or sedilia: they were probably destroyed to make room for the Harford monuments.

The roof of the chancel is match-boarded, ribbed, and panelled.

A very beautiful 16th century oak screen separates the chancel from the nave, having five well-proportioned bays, with tracery. The coving beneath this rood screen is ornamented with very elaborate fan tracery, finely carved and rich in detail. This screen is considered to be one of the best of its kind now to be seen in this country.

The nave is 72 feet in length and 46 feet in width. On both sides is a well-proportioned arcade of six pointed arches resting on circular shafts. Each pier has a circular-moulded base, on a plain square plinth, with octagonal capitals and abacus. The bell of the capital is carved with the Norman escallop moulding, and the arches are recessed with a bold splayed label moulding.

The Clerestory has single-light windows, with rude straight-sided pointed heads.

The aisles have narrow Early English lancets.

In the west wall of the nave is a small Norman window filled with painted glass in 1881 by Wailes.

The roof of the nave is lofty, with open timber-work in excellent preservation. On the outside, under the eaves of the roof, is a Norman corbel-table, and at the junction of the chancel with the nave is a small bell-cot containing the old sanctus bell.

At the east end of the south aisle there is a beautiful chantry chapel, erected and endowed by Sir Rowland Morton, who lived at The Grange in Bosbury for some time in the 16th century.

It was built by Sir Rowland in memory of his wife, who died in 1528. It is 15 feet in length and 10 feet in width, and contains three Perpendicular windows, one looking east, the other two south. The roof is stone, richly grained. On three pendants from the roof, the rebus of Sir Rowland Morton may be seen, M upon a tun.

The Saxon font, of which mention has been made, was found in 1844, when some workmen were removing the font now in use to its present position. It was found two feet beneath the nave floor, turned upside down, and serving as a base for its successor. No precise date can be fixed for it, but its rude workmanship and shape prove it to be of great antiquity.

The font now in use is Early English, and has a square bowl (2 feet 9 inches) supported on a central pillar with shafts at the angles. The original lead lining of the bowl still remains. There are very fair mouldings on the capitals, and at the bases of the shafts.

The pulpit is pentagonal, and contains on four of its sides some carved oak panelling. The front of the prayer desk is also similarly panelled.

Against the south wall of the nave there is an interesting memorial stone erected by Bishop Swinfield to the memory of his father in 1282. It is fast passing to decay; indeed the words are scarcely legible. It was discovered in 1776 by the Vicar, covered with lime and mortar, and bears the following inscription (in Latin):—"Here lies Stephen, father of the Venerable Father Lord Richard Swinfield, by the grace of God Bishop of Hereford, A.D. 1282."

On the floor of the south aisle there are two interesting stone slabs, probably of the 13th century, which are supposed to cover the remains of two Knights Templars who died at the adjacent Preceptory of Temple Court.

The tower, of which mention has already been made, is distant from the Church about 60 feet on the south side, and was built at the beginning of the 13th century. It is 29 feet square, and has massive walls, and is divided into three stages by set-offs. The two tower stages are pierced on each side by a single lancet. On the ground story on the north side, instead of a window there is a well proportioned door. There are six bells in the tower. One has no date, and is probably pre-Reformation; the other five date from 1632 to 1681. The tenor has the founder's arms and the date 1660 cast thereon.

In the churchyard, about 25 feet distant from the south porch, stands a stone cross, erected in the 14th century, and now remaining entire. It has a well-proportioned shaft rising from a substantial base placed on three steps, and is surmounted by a St. Cuthbert's Cross. It was spared in the days of mutilation and destruction, through the Vicar at that time interceding for its preservation, and on the condition that the inscription, "Honour not the +, but honour God for Christ's sake" should be inscribed thereon. The condition was gladly fulfilled.

THE MANOR OF BOSBURY.

The Manor of Bosbury, Coddington and Colwall (as it is termed) is supposed to be one of the earliest endowments of the Bishopric of Hereford. From very early times the Bishops have had a Manor house or Palace at Bosbury, and the Lordship, now vested in the Ecclesiastical Commissioners, has always appertained to them. The customs of the Manor are very similar to other possessions of the same kind, and call for no special mention.

The gateway of the Palace still exists. Mr. J. H. Parker in his *Domestic Architecture of the Middle Ages* writes: "In the Bishop's Palace at Bosbury there is no tower, but the gateway is placed in a range of very uniform height. It consists of an unusually lofty pointed arch reaching the whole present height of the building with a smaller one. The two stand between two large flat buttresses. The arch in the inner side is of wood."

The Palace itself was large and convenient, containing court and stage halls and other apartments suited for the occupation of a person of rank and consideration. Since the time of Queen Elizabeth the building has undergone considerable change, and many of its interesting features have been obliterated. A handsome oak roof, supposed to have been the ceiling of the refectory, is about the only remnant of the old fabric.

Since the time of Elizabeth none of the Bishops have lived at Bosbury; the Palace has been occupied by tenants who have farmed the estate.

A very interesting account of the household of Bishop Swinfield (1282-1316) may be gathered from the "Household Roll" of the Bishop which was published by the Camden Society in 1855, and edited by the learned Antiquary, the Rev. John Webb.

After a long halt at Bosbury for both men and horses, the members on leaving this pretty village, shortly re-entered the Bromyard and Ledbury Road, and drove up Stanley Hill towards Castle Frome. At the bottom of Stanley Hill is Stanley House on the left, near which is a small track of land called Barland or Barelands. From this place the Barland Pear assumed its name; the perry which it produces has a reputation for being wholesome and beneficial in nephritic complaints. It is represented on Plate xviii. of the *Herefordshire Pomona*, Vol. I. The road runs over a mass of Cornstone, represented in the Ordnance Geological Map, averaging about a quarter of a mile in width, and less than two miles in length, with a direct east and west fault at its northern extremity a little south of Castle Frome Rectory. On the elevated ground, about half a mile south of the Smithy, where the road to the Rectory joins the main road, is an exposure on the left hand, where the stone, of a compact durable structure, and fit for building, is quarried.

It is to these masses of hard Cornstone that our county of Herefordshire owes its charming landscapes, and its physical features of hill and valley. The Cornstones have retained their positions, whilst the softer Old Red Sandstones have been more or less denuded through countless centuries of exposure to deluges and the disintegrating forces of Nature. The formations of all the surrounding hills were effected under a sea. Cornstones contain carbonate of lime in variable proportions, and are formed chemically by segregation, aided by mechanical pressure round some nucleus. In one form, the masses of Cornstone are mixed with marls and material less hard and calcareous, in which form they are readily decomposed into their component parts. In the harder and more durable form, owing to mechanical action, the stone assumes more the character of a coarse conglomerate, ranging up to a compact fine grained stone, such as we observe at this quarry. Occasionally the process of crystallization occurs. In the recent excavation of the new tunnel under Dinmore Hill, opened for traffic in the autumn of 1893, some pretty specimens of crystals of calcite, interspersed with a little quartz, were met with. The greenish grey coloured nodular concretions thrown out of the excavation, owe their colour to hydrated protoxide of iron, whilst the more red coloured masses are coloured by the peroxide of iron. Some of the masses sparkled under sunlight with innumerable white spangles of the *muscovite* form of mica, the more brownish colourations being due to the *biotite* form of mica.

The mention of Dinmore Tunnel excavation reminds us of the value of a knowledge of chemical and mechanical agencies in changing the character of a rock. The old tunnel under Dinmore Hill, on the Shrewsbury and Hereford line, was opened on December 5th or 6th, 1853, having occupied about two years in its excavation. The new tunnel, commenced at the end of 1890, or early in 1891, was opened for traffic on Sunday, October 15th, 1893, and took more than two and a half years in excavation, notwithstanding the great advance made in excavating implements, such as "The Steam Navvy," and the use of the brilliant "Wells light," whereby work could be performed during the night. The old tunnel is 1,100 yards long, the new tunnel is 1,060 yards long, and situated at a distance of only eight yards from the former. The contractors naturally expected to have to deal with

material most probably similar in every way to what was excavated from the old tunnel, whereas the rock was found in larger quantities and of a more compact composition. This was noticed by some of the workmen who had been employed forty years ago upon the older tunnel. The explanation is given by the Rev. J. D. La Touche. "Whenever rock in a moist condition is by any means deprived of its moisture, the process of crystallization of its component parts is liable to set in. The old tunnel at the base of Dinmore Hill has, for a period of forty years, acted as a huge drain pipe, thus making the hill more dry than it was originally. The process of crystallization has taken place in the massive nodules of which carbonate of lime is a constituent, the interlacing crystals all tending to render the rock more hard. The same alteration is found even in such hard rocks as Portland, Grinshill, and others. The same thing may often be seen on a small scale where are found nodules of rock of any kind that have been exposed to similar conditions. The first effect is to increase their internal density at the expense of that at the surface, which "weathers," and in so doing draws off the moisture from inside, causing a number of concentric layers which are seen when the nodule is broken across." Again, a stone cutter, especially if he is working by piece-work, always knows which stone he would prefer to chisel, a stone from a quarry in daily use, or a flagstone which has been extracted forty years ago from the same quarry.

Upon arrival at the blacksmith's smithy at the top of the Castle Frome pitch, the members quitted their carriages with directions to drive down the hill and await their arrival at Castle Frome Church, the members themselves proceeding on foot towards Castle Frome Rectory. On their way they entered the small coppice on the left of the road termed in the Ordnance Map, Camp Coppice, and inspected, at its northern extremity, the small elevated mound, the supposed site of the tradional castle. Its site is certainly as commanding as any to be found here, and although no vestiges remain of masonry,* or even of the more ancient wooden stockade, nevertheless the sunken road of approach for ingress and egress betokens from its great depth an age of several centuries and a work of no slight manual labour. In *The Castles of Herefordshire*, the Rev. C. J. Robinson, President of the Club in 1875, devotes three pages to the history of the possessors of the estate of Castle Frome, dating from Walter de Laci to whom it was granted for his services to William the Conqueror, down to the present proprietors, the Rev. Wm. Poole, and the Rev. John Hopton. As regards the Castle he writes: "There is upon the hill side, within the limits of the parish, a grassy mound (called within the memory of man the Castle Tump) around which are some faint traces of a stream-fed moat, and in one ancient title deed (undated, but probably of the 12th or 13th century) certain lands are described as "infra ballivam castri de Froma Castri," *i.e.*, within the bailiwick of the Castle of Castle Frome. The present lord of the manor, the Rev. Prebendary Poole, has an interesting series of deeds connected with the early lords of Castle Frome. The de Lacys were early lords, as appears from a deed (being a grant of lands in

*Since the period of our visit a small fragment of masonry has been exposed amongst the roots of a very fine tree which was blown down in a gale."—Ed.

Frome Herbert from King John to Stephen de Ebroicis) dated July 6th, 1205, in the possession of the Rev. Wm. Poole, with the royal seal, in a tolerably perfect condition, attached thereto.

FROME'S HILL.

This hill on the old Hereford and Worcester road is in the present day much avoided, and consequently but little known. Proceeding northwards, from Castle Frome Rectory, for about a quarter of a mile, the pedestrian attains an elevation of 595 feet on Frome's Hill, on the Hereford and Worcester road, at a junction distant about 12½ miles from Hereford, and 13½ miles from Worcester. On the Ordnance Map, scale six inches to the mile, a bench mark with the altitude of 599·3 is given; the broad arrow is apparently incised on the north wall, near its eastern corner, of the school grounds. Proceeding eastwards from this point towards Worcester for the distance of only 50 yards the pedestrian finds himself above the contour of 600 feet. The dangerous portion of the hill lies westwards in the direction towards Hereford, the name given to this part being Lock's Hill. At the base of Lock's Hill the Bromyard and Ledbury road forms a junction dangerously near a right angle; the difference of elevation ranging from 595 to 248 feet in the short distance of three quarters of a mile, or more than 115 feet in quarter of a mile, or an average gradient of 1 in 12.

Upon the lawn of Castle Frome Rectory, Mr. George H. Piper read notes on the local history, and after the members had surveyed from this commanding elevation of over 500 feet the country of Herefordshire, rich in orchards and hopyards, with the range of the Malvern Hills, Herefordshire Beacon, and the distant Cotswolds in the background, they walked down the grassy slope to Castle Frome Church.

The approach to Castle Frome Church from the much higher grounds of the Rectory, crosses near the churchyard the ancient trackway leading to the Castle Tump. This trackway surrounds the churchyard on its eastern and northern sides, assuming, upon its northern side, the character of a very deep moat, now dry. On the south side of the churchyard is a yew tree 21 feet in girth at the height of five feet from the ground.

CASTLE FROME CHURCH.

Mr. Robert Clarke furnishes us with the following description of this Church: The Church, dedicated to St. Michael, is a Norman structure, and consists of nave, chancel, a wooden porch on the south, a bell turret on the west end of the nave roof, and a modern vestry on the north side of the chancel. Its walls are three feet in thickness. Externally there are three plain Norman doorways, all of similar pattern, with square headed lintel and circular tympanum above. Of these doorways one is at the west end, one to the south porch, and the third for the priest's entrance on the south side of the chancel. Of the Norman windows there is one at the west end, two in the north wall of the nave, and one in the north wall of the chancel. The east window is a three light in the Perpendicular

style, and there is an Early English and Perpendicular light in the south wall of the chancel. The west end is a perfect Norman front, with a Norman doorway, surmounted by a Norman window, above which is a set off course, from the centre of which arises a flat buttress which extends to the apex of the roof.

Internally there is a large semicircular chancel arch. The eastern half of the chancel ceiling is richly moulded and panelled with Perpendicular carved bosses at the intersections. On the south side of the chancel there is a low recessed arch, now empty, which probably originally contained a figure or a slab. Adjoining is a plain square-headed aumbry. Above the recessed arch, at the base of the mullion of the south window, is a diminutive stone effigy (half figure only) of a knight in chain armour, holding a heart in his hands. The length of this effigy from head to elbows is eight inches. It is supposed to represent the interment of the heart only of a crusader knight, or other person whose body was buried elsewhere. There is at Tenbury Church under a recessed arch in the north wall of the chancel a complete effigy of a knight in armour, with his legs crossed, only two feet two inches in height. An episcopal effigy fifteen inches in length is to be seen in Abbeydore Church.

On the north side of the chancel is an altar tomb with two full length effigies of a Cavalier and his wife, beautifully carved in alabaster, of the period of Charles I., with shields of arms underneath as follows :—Shield No. 1 : Arg. a fess gul. in chief three roundels az. Shield No. 2 : Arg. a fess, in chief three martlets gul. Fragments of 14th and 15th century glass, figures, and ornamental work are interspersed over the upper part of the east window. According to Vol. III., page 362, of Hill's manuscripts of the 18th century at St Michael's Priory, Belmont, containing the book plate of Robert Biddulph Phillips, of Longworth, there were at that period "in the eastern window imperfect inscriptions in old English character, such as Scæ Johes evangelestiæ ora pro nobis ; also the figure of a man kneeling with the same arms as upon the altar monument." The fragments, however, of glass now to be seen in the upper part of the window are of a much earlier date than that of the Cavalier and his wife. The chalice, not elegant in form, with cover, is Elizabethan. The register dates from 1624.

On the right-hand side of the south doorway to the nave, in the thickness of the wall on the jamb, is a circular-headed recess large enough for a holy water stoup ; a rather unusual position.

A very striking feature is the fine old Norman font, richly carved in coarse Old Red sandstone. Around its bowl it has in bold relief the Insignia, or emblems of the four evangelists, viz., angel, lion, bull, and eagle. The Holy Trinity is also represented by an angel, a male figure, for the Father, an infant on the sea for the Son, and a dove with the hand pointing downwards for the Holy Ghost. An interlaced band of foliage runs round the upper and lower portions of the bowl, which latter is supported by three grotesque figures, the whole resting upon a plain circular base. The bowl is three feet four inches in diameter. There exists in Eardisley Church another fine example of a richly carved Norman font, with interlaced scroll ornamentation upon the same lines. Mr Piper exhibited a very neat sketch of the font taken in the year 1877, executed by his sister, Miss Piper.

From the ancient Chancel arch at Shobdon, built temp. Stephen, A.D. 1135 to 1154.

THE FONT, CASTLE FROME.

CANON FROME.

Leaving Castle Frome, the next halt was at Canon Frome Vicarage, where Mrs. M. Hopton received the members and hospitably regaled them with tea and refreshments. The Rev. M. Hopton exhibited his collection of Herefordshire prints and coins. The coins are chiefly British from 1066 to the present date, but there are in the collection some Roman and Saxon coins. Some few members visited the Church, dedicated to St. James, rebuilt at the end of the 17th century, probably on the site of the former Church, which had been destroyed during the civil wars for the better defence of the adjoining Court, which, originally held in 1642 by a Parliamentarian (Sir Richard Hopton), had to submit to its occupation by a Royalist Governor, who was dispossessed and killed by the Earl of Leven's Scotch army, under the Earl of Callender, David Lesley, and Middleton, on July 22nd 1645, on their advance down the valley of the river Frome from Bewdley and Tenbury towards Hereford. At that period the Court, called in local histories "The Strong House," was moated and entered by a drawbridge, "the graffes were about nine feet deep and as broad, and in most places full of water. The works above the graffes were so high that all the ladders we could get were too short." Colonel Barnold, the governor, and a great part of the garrison were killed, and the Strong House was occupied by a Scotch force of 120 men and 20 horse, under Colonel Edward Harley, shortly superseded by Major Archbold. During some digging operations in the early part of this century at the Lower House, on the south side of the road midway between the Vicarage and Blacklands, numerous human bones were met with—possibly where the slain were buried. The brave governor was buried at Ashperton. (See *Webb's Civil Wars in Herefordshire*, Vol. II., pages 209 and 210, and Appendix xxiv., on page 378 *et seq.*) The present mansion was built by Richard Cope Hopton in 1786.

From *Webb's Civil Wars in Herefordshire*, Vol. II., page 240, we learn that on October 9th, 1645, Canon Frome, (whose occupation was an annoyance to the Governor of Hereford), was summoned to surrender but only returned a contemptuous reply. Consequently a skilful carpenter and machinist—probably John Abell, who built the beautiful old Town Hall—was engaged to build a large machine called "a sow," constructed of a wooden tower on wheels, (to be drawn by oxen), with musket-proof rooms, loopholed, one above the other, sufficiently lofty to overlook the defensive works. Scudamore, with 400 men from Hereford, had advanced with this strange engine about a mile and a half from Canon Frome House, but whilst endeavouring to effect a junction with a reinforcement from Worcester, Archbold, the governor of Canon Frome, having got help from Colonel Morgan, surprised the Hereford men and put them to flight. The guard of the engine having abandoned the "sow," it was brought to Canon Frome, and the failure of the Royalists in their cunning device excited triumphal laughter.

With reference to the brick-built Church, an aisle was added about 1716, the tower, replacing a wooden steeple, was built in 1730, and the present Early English building was rebuilt in 1859—60. In the south wall of the chancel is a lancet widow painted by Preedy. A figure of St. John the Baptist is in the upper compartment, and in the lower compartment is a representation of Old

Llanthony Abbey and a monk or canon of St. Augustine. The name of "Canon," Frome is probably derived from its connection with Llanthony Abbey.

At 4.45 p.m. Canon Frome Vicarage was left, and the journey resumed to Ashperton Railway Station, allowing a halt of half-an-hour for an inspection of the site of Ashperton Castle, with its surrounding large moat.

Proceeding from Canon Frome Vicarage, the road from Gloucester to the north through Leominster and Ludlow is entered at a place called Blacklands. A farm called Cinders Farm is two miles further south, close to and before reaching Ashperton Railway Station. We have not heard of any traditional origin for either of these names, and all we have heard is that the present keeper of the lodge of Canon Frome Court, digging deeply under the hedge of the roadside north of the lodge, testifies to having found the soil like black cinders. The village of Stretton Grandison, supposed to be the ancient Cicutio, is half-a-mile north of Blacklands. For information respecting this Roman station members are referred to Dr. Bull's able paper on Roman Stations and Camps in Herefordshire (see *Transactions*, 1882, page 255). We have but little to add. The site of the camp referred to is on the Homend Bank, and is most easily reached by entering Homend Park from the Gloucester and Leominster road. Before reaching the second gateway of the drive, ascend the inclination on the left or north. The well called Catherine's well is on the glacis, about midway between the drive and the outline of the wood on Homend Bank, and the supposed outer southern line of the entrenchments is crossed before reaching the margin of the wood on Homend Bank. Proceeding hence in a north-westerly direction a deep fosse is conspicuous. Turning hence easterly and keeping along the summit of this wooded hill, two small mounds, like tumuli, surmounted by Scotch fir trees, are passed, and still further eastwards on higher ground is a much larger circular mound, also surmounted with Scotch firs, which probably was the principal part of defence or keep of the large camp.

Older writers make mention of the square camp at Stretton Grandison. We have made diligent search and enquiry, and find nothing to answer the description of a square camp, unless it might be the oblong and nearly square plateau on the elevated ground two or three fields west of the western extremity of the before-mentioned camp, but if so, time and cultivation have obliterated all traces of artificial encampment. This is a fitting opportunity of remarking how misleading the term "square camp" has been frequently found. It is a misnomer which has been applied again and again by writers of the earlier part of this century, apparently whenever any angular outline of an encampment has been found, whatever may have been the shape of the ground plan of the work—oval or irregular.

Of the Roman objects discovered in 1842 by Mr. Philip Ballard during the excavations for the foundations in Budbury meadow, a little on the Hereford side of the old wharf, for the aqueduct of the Hereford and Gloucester Canal over the river Frome, it is very much to be regretted that nearly all have been lost to the family by having been lent at various times to different Archæological Societies. Fortunately a few which have been presented to the Hereford Museum are to be found there under safe custody. Mr. Herbert Ballard possesses a Roman lamp which he found within the enclosure of the encampment on Homend Bank.

THE HOMEND OAK TREE.

Before leaving this locality, mention must be made of Catherine's Oak, which is perhaps the most valuable oak tree in Herefordshire. It may be seen by extending the walk eastwards through Homend Park. It stands a conspicuous object in a large pasture field on the estate of the Upper Eggleton Farm, being about one hundred yards distant on the west or left-hand side of the footpath leading from Homend to Blackway. In the autumn of last year, 1893, it was visited by the Rev. M. Hopton and Mr. Moore, when its height was taken by one of Negretti and Zambra's dendrometers, and its girth at five feet above the ground was measured with a tape. A photograph of this beautifully grown tree is represented in the beginning of the volume of *Transactions* of 1871, 1872, 1873. The dimensions in May, 1873, are there given, and the following comparisons after an interval of twenty years are interesting :—

In 1873.	In 1893.
Girth at 4 feet from the ground, 20 feet 7 inches.	Girth at 5 feet from the ground, 20 feet 3 inches.
At 50 feet the bole divides into its main branches.	N.B.—The measurement at 4 feet from the ground was not taken.
Extreme height, 115 feet.	The first length was calculated to be 55 feet.
Spread of foliage, 105 feet.	Extreme height, 126 feet.
	Spread of foliage, 113 feet.

In the year 1872 a timber dealer offered £150 for it.

In the year 1893, Mr Groom, timber merchant, of Hereford, expressed the opinion that the tree has been worth £200, but a stag's horn appearance of some of its terminal boughs indicates that the tree has now passed its prime.

There is no local tradition as to the origin of the terms Catherine's Well and Catherine's Oak, nor do either of them appear by tradition to have any connection with St. Catherine, of Ledbury.

Ashperton Castle formerly stood on the island close to Ashperton Church. The moat is extensive, deep, and forms a fine sheet of water. Apparently, from traces still existing, it originally enclosed the Church on its eastern side. It is very remarkable that no vestiges remain of the mansion, which in the year 1292 William de Grandison obtained licence from King Edward I. "to crenelate." A short family history of the Grandisons was read on the spot by Mr. George H. Piper. See Robinson's *Castles of Herefordshire and their Lords*, where he states on page 7 that "the site on which it stood, now belonging to the Rev. John Hopton, was planted about the close of the last century, when the foundations were grubbed up."

From the Castle the members proceeded to the Railway Station, and reached home in the train which, by the courtesy of the Great Western Railway Company, was specially allowed to stop at Ashperton, at 7.17 p.m.

REMARKS ON SAXON ARCHITECTURE.

In the course of the day traces of Norman architecture were frequently seen, whilst there were found a few who desired to attribute some of the narrow lights in walls of the Church to the work of our Saxon builders. The earliest building of the Saxon period that we read of is the portal of the Convent at Lorsch, near Mannheim (see *Ferguson's History of Ancient and Mediæval Architecture*, Vol. II., p. 255), depicted in woodcut 731, with its "series of pilasters supporting straight-lined arches—if the expression may be used." These straight-lined arches, or triangular heads, were seen in the Church at Deerhurst on the visit of the Club there last year. Although the tribes following the departure of the Romans were equal to making extensive works such as Offa's Dyke, or Stonehenge or Avebury, it is probable that their Churches were built of wood. In our country a specimen remains at Little Grinstead in Essex, whilst several are to be found in Norway, as at Hitterdel, Burgund, Urnes, and other places. Whilst the earlier seeds of Christianity were being sown, the churches of the period would be made just sufficient for temporary purposes of the comparatively small population. Rickman enumerated 20 churches in which fragments of the pre-Norman type could be distinguished. About 15 more have been brought to light since his death, including the chapel of Deerhurst discovered so recently as August, 1885. In Saxon masonry we have the jambs of windows and doorways characterised by "rude pilaster strips" bonded in what is called "long and short work." The balustrated shafts being copied, so Mr. Scott suggests, from Roman balusters, whilst many archæologists perceive in it an imitation of the former wooden structures. The Saxon doorway at Monkwearmouth, *Ibid*, woodcut 891, is an excellent specimen. We know, from the chronicles, that Benedict Biscop went, by a grant by King Egfried, to Gaul in A.D. 674, to obtain masons with the object of building this Church in imitation of the basilicas in Rome. At Monkwearmouth turned baluster shafts have been found *in situ*. At Jarrow, again, almost a counterpart of Monkwearmouth, of date 681, baluster shafts were freely used. About A.D. 750 the second Archbishop Cuthbert erected a Church which is supposed to be occupied by the site of "Becket's Crown" at the eastern end of Canterbury Cathedral. Archbishop Odo, about 940 to 960, erected at Canterbury a Church with, apparently two apses, to replace the old Church of St. Augustine. From documentary evidence, the nave of Waltham Abbey was Harold's original work (*Ibid.*, p. 344). The inscription upon the stone found in the year 1675 by Judge Powell, close to Abbot's Court, at Deerhurst, "Odda Dux jussit hanc regiam aulam construi atque dedicari, &c., . . xiiii. anno regni Edwardi Regis Anglorum," ascribes the date 1056 to the chapel discovered so recently as 1885. The little Church of St. Lawrence, at Bradford-on-Avon, has been brought to light as a nearly complete Saxon Church since the publications of Carter, Rickman, and others. In 1880 a very ancient Church at Escomb, Durham, was, after restoration, re-opened: a paper by Mr. C. Lynam, with illustrations, is to be found in *Journal British Arch. Association*, Vol. xxxv.; and a more elaborately illustrated account is to be found in the *Illustrated Archæologist*, Vol. i. No. 4, for March, 1894. The long and short work is displayed in the arch in the view from the chancel looking west, as well as in some of the window jambs externally.

Another characteristic of Saxon building must be mentioned, if only from its striking peculiarity; and that is the "batter" or inclination inwards, as they rise from the ground, of the jambs of doorways and windows. At Escomb the north door and all the original windows have this inclination, and so also have the side walls of both nave and chancel. Our members will recall to mind seeing at Deerhurst this same peculiar construction in a few of the openings.

From the above remarks it will be seen that the number of buildings discovered with any traces of Saxon architecture is very limited. The late Mr. J. H. Parker, C.B., in the last edition (1881) of Thomas Rickman's *Attempt to Discriminate the Styles of Architecture in England*, omitted the chapter on Saxon Architecture, but expressed his error before his death, and his regret for having misled many investigators. In the Churches we have visited to-day we can find no trace whatever of Saxon work. The jambs of the ancient Norman lights are constructed of several stones all laid horizontally. There is no trace whatever anywhere of the rude long and short work. The system of cutting the head of the arch out of one stone was retained in the Norman period of architecture, and the interlacing ornamentation was copied in after years up to a period between the Norman and Early English architecture, with Early English foliage entwined, as may be seen at Strata Florida Abbey, in Cardiganshire.

H. C. M.

FLINT FLAKES.

Mr. Edy Ballard exhibited a selection from several hundreds of chips, cores, and scrapers of worked flints which he had discovered during the last year or two strewn over several acres of the Old Red Sandstone about a mile and a half from Ledbury, between the Frith Wood and Wellington Heath. The occurrence of flint flakes in a spot so many miles removed from the cretaceous area is perhaps rare, but by no means unprecedented. Dating as far back as the times of our earlier parents implements of stone must have been used in the chase, as also for dressing the skins of animals which served as their clothing. In Exodus iv., verse 25, and in Joshua v., verse 2, again in chap. xxiv., verse 30, we read of sharp knives of stone, in the Hebrew literally "knives of flint," from the word tzūr or tzōr, a flint; and from the discovery not infrequently of instruments of flint in Saxon graves, we learn that even after the use of bronze and of iron was known to the ancients, the employment of stone instruments was continued, especially in the poorer and more inaccessible parts of Britain. A cist containing pieces of pottery and flint chips found in a horned cairn in Caithness, believed to be a Viking's grave, is supposed to date no earlier than A.D. 970. Again, according to William of Poitiers, weapons of stone were used "*et lignis imposita saxa jactant*" by the Anglo-Saxons at the Battle of Hastings.

On the subject of the age of Neolithic flint flakes, we will quote the remarks of Sir John Evans in his exhaustive work on the *Ancient Stone Implements of Britain*: —"If it be uncertain to know how late a period these neolithic implements remained in use in this country it is still more uncertain to how early a period their introduction may be referred. If we take the possible limits in either

direction the date into which they fell into disuse becomes approximately fixed as compared with that at which they may have first come into use in Britain, for we may safely say that the use of bronze must have been known in this country 500 or 600 years B.C., and, therefore, that at that time cutting tools of stone began to be superseded; while by A.D. 1100 it will be agreed on all hands they were no longer in use."

"We can, therefore, fix the date of the desuetude within, at the outside, two thousand years; but who can tell within any such limits the time when a people acquainted with the use of polished stone implements first settled in this island, or when the process of grinding them may have been first developed among native tribes? The long period which intervened between the deposit of the river gravels (containing, so far as at present known, implements chipped only, and not polished), and the first appearance of polished hatchets, is not in this country so well illustrated as in France; but even there all that can be said as to the introduction of polished stone hatchets is, that it took place subsequently to the accumulation, in the caves of the South of France, of the deposits belonging to an age when reindeer constituted one of the principal articles of food of the cave-dwellers."

This oldest trade in the world is still carried on by gun-flint makers, or "flint knappers" as they are called, at Brandon, a village on the borders of Norfolk and Suffolk, about seven miles from Thetford, where there are reported to be at present seven diggers and about twenty knappers, probably all to be found in the Kingdom, with the exception of two who follow this trade at the village of Icklingham in Suffolk.

Before the invention of percussion caps this was a trade of considerable importance. The writer is old enough to have seen and used many a flint matchlock, and has seen many in use by the natives in India and Arabia. The trade still flourishes, for to this day there is a considerable export to Africa and a demand also from India, China, and South America.

Upon the subject of gun-flints it may be remarked that the roughly circular, oval, or ovoid flints made for "strike-a-lights," known in the trade as "Englishmen," in contradistinction to the square flints like the large musket-flints called "Frenchmen," can scarcely be distinguished from the "scraper" of the stone age.

In earlier days great varieties of implements were made of flint, such as adzes, arrowheads, battleaxes, chisels, gouges, hammers, lances, scrapers, spearheads, &c. There is every reason to believe that Brandon was a very important centre for this trade, for the exploration, by Rev. W. Greenwell, of two hundred and fifty depressions in the ground in its vicinity, has resulted in the confirmation of his belief that they were disused pits for excavation of flints by pre-historic man. One of these hollows had a diameter of twenty-eight feet.

In the modern day uncivilized man still uses weapons made of stone in peace and in war.

In *The Illustrated Archæologist* for June, 1893, there is an interesting article on this subject from the pen of Edward Lovett, under the heading "A very

ancient industry"—in which the method of flaking flints is illustrated, and the various instruments such as the quartering hammer, the flaking hammer, and the knapping hammer, &c., are explained. Mr. Worthington G. Smith, honorary member of the Woolhope Club, whose artistic pen has enlivened so many pages of the *Transactions*, has recently produced a work on the subject of flints of the neolithic and palæolithic man under the title of "Man, the Primeval Savage." It is reviewed on page 56 of the *Illustrated Archæologist* for June, 1894.

Mr. Worthington G. Smith was a large contributor to our mycological papers and illustrations from 1868 to 1879. He has had also an experience of forty years in the subject of flint chips, and is an adept in discovering the forgeries of arrowheads and stone axes or "celts"; see page 294 of his book above referred to.

The collection of Mr. Edy Ballard does not embrace a single arrowhead—the flakes are generally small, with the characteristic conchoidal fracture, and some few possess the rough cortical silicate of lime investiture. Out of a selection of twenty-five flint-chips, sorted into six varieties, sent to Mr. Worthington Smith, that gentleman reports as follows:—

"More than half are simple flakes; I detect three cores and three typical scrapers." Out of a packet of six irregular pieces he marks two as "no human work," two as "doubtfully human," one as a "core," and of the sixth he says "This is a very old flake, with newer chipping upon it, the latter perhaps natural."

He remarks "I think there is no doubt as to their Neolithic age; they do not resemble gun-flints at all, and the scrapers are Neolithic examples. The common flakes, erroneously named 'scrapers,' show some marks of use. Mr. Ballard probably noticed this, and termed them 'scrapers' in consequence."

"It is by no means uncommon to find flint flakes far away from chalk districts. Flints were carried about in olden times. They were often collected from the sea shore when near. I saw flints in glacial gravel at Oswestry last year, at a place called Gloppa."

H. C. M.

Woolhope Naturalists' Field Club.

SECOND FIELD MEETING, TUESDAY, JUNE 26TH, 1894.

THE members visited Cardiff, Llandaff Cathedral, and Penarth on Tuesday in last week, for the second Field Meeting of this year. The following attended:—The President (Mr. James Davies), Vice-presidents (Rev. J. O. Bevan, Rev. Preb. Wm. H. Lambert, and Rev. M. G. Watkins). Members: Count Lubienski-Bodenham, Revs. J. Barker, Sir George H. Cornewall, Preb. Wm. Elliot, E. R. Firmstone, J. E. Grasett, C. S. Hagreen, E. J. Holloway, Willis Lambert, M. Marshall, and F. W. Walwyn Trumper, Dr. C. T. Vachell, Major Doughty, Messrs. E. J. Baker, J. Carless, L. Davis, W. J. Grant, W. Hebb, T. C. Paris, J. H. Parry, W. Pilley, G. H. Piper, J. P. Sugden, H. C. Moore (Honorary Secretary), and James B. Pilley (Assistant Secretary); and the following visitors: Mr. Edwin Seward (President of the Cardiff Naturalists' Society), Mr. E. E. Bosley (Mayor of Hereford), Rev. A. C. Auchmuty, Captain Elliot, R.A., Messrs. Wm. Cornewall, Walter Cooke (Honorary Secretary of the Cardiff Naturalists' Society), W. S. Davis (from Grimsby), W. Froude, Lacon Lambe, J. M. Marshall, and E. O. Williams.

Mr. Edwin Seward met the members at the Castle Gates, and conducted them over the building and grounds. The Castle itself is very interesting as a work of art with gorgeous decorations rather than a correct restoration.

Some of the party examined the remains of the Roman wall which enclosed the Castle Green, forming a square enclosure, so frequently found in old Roman works. This wall is best seen from the North road. It was buried in an embankment which a former owner of the Castle had raised. A few years ago Lord Bute had headings driven through the bank, and having found that the wall existed practically continuously, he had a large portion of the bank along the North Road cleared away, at last exposing a considerable length of wall; besides the part exposed, it has been found in all the Castle, and in different places on all four sides of the enclosure, leaving no doubt that the work was carried completely round the enclosure. Those who have seen the Roman wall round Caerleon, will observe the exact similarity of design and construction of this wall with the wall at Caerleon, and they will notice the Bastions precisely similar in construction.

Mr. E. W. M. Corbett, writes from the Bute Estate Office:—"There is to my mind no doubt whatever that this wall is Roman, and as one piece of evidence in favour of this assumption, I may point out that the moat round the mound on which the Keep stands, was excavated some years ago by the present Lord Bute, it having been filled in by a predecessor, and in the mud at the bottom

numbers of Roman coins were found, proving very conclusively that at any rate the mound and moat were in existence during the Roman times."

Mr. Corbett further writes:—"You should pay a visit to the remains of the Black Friars Monastery to which the Lodge-keeper will direct you. This has been excavated a few years ago by Lord Bute and the lines of the foundations carried up above the ground; you will see the different materials with which this work has been done. It was conjectured that this Monastery, being so near the river, and the river being liable to severe floods, a good deal of the foundations have been completely obliterated." The limited time, however, at their disposal to-day did not permit of the Monastery remains being visited by the members.

Luncheon took place at the Angel Hotel, after which the President notified that the five gentlemen balloted for had all been elected. Three names were proposed to be balloted for at the next Field Meeting. Punctuality being the order of the day, seats in the carriages were resumed at 2 p.m., and the half-hour drive was taken over the river Taff to Llandaff. Of every minute of the limited time full advantage was taken.

Upon arrival at Llandaff Cathedral the members were met by the Rev. Minor Canon Downing, and by him were conducted over the sacred building. The Church on the Taff is of remote antiquity. The present diocese of Wales exactly represents the districts into which that portion of Britain was divided in the 6th century. Llandaff was the first see that was founded. There are stones in the foundations of the Cathedral placed there in the 5th century by British Christians. The names of Dubritius and Teilo are associated with the early Christian settlement, and their dust lies here commingled with the soil. The Norman work dates from the 11th century. The exterior scarcely gives promise of the view within. The western towers are interesting. That on the north has been elaborately restored; that on the south is of modern construction. Arrangements are made for building, at some future time, a *flèche* at the junction of certain lines on the roof, which will materially add to the outward appearance of the building. There are monuments of some interest, a well, a fine organ, and some altar pieces by Rossetti. The carved woodwork is mainly new. In the memory of men, scarcely past middle age, the roof of the Cathedral was insecure, the exterior decayed, and the Lady Chapel in ruins. From £30,000 to £40,000 have been spent in its restoration under successive Deans. Antiquaries and geologists were attracted by the tomb of Dean Conybeare. A fine cross in the burial ground marks the resting place of the late Bishop Ollivant. The Chapter House is square, with a central pillar, a somewhat novel combination. The Churchyard presents a quiet peaceful scene of great natural beauty. Within three miles is Castell Coch, elaborately restored by the Marquess of Bute.

At 3 p.m., the members were again in their carriages, and crossing the river Ely, with a full view of the Penarth Docks, arrived at Penarth Hotel about 4 p.m. From the garden grounds of the Penarth Hotel a phenomenal view is presented on a fine day, comprising Penarth, the busy town of Cardiff, with its many acres of docks, the Bristol Channel, the Somersetshire coast, the Steep Holm, the Flat Holm, and the Penarth coast to Lavernock Point, Sully, and Barry. The

atmosphere unfortunately this day was hazy. At 4.30 p.m. those members who were obliged to leave by the 5.5 p.m. train from Cardiff, after a hurried cup of tea, returned home.

Under the guidance of Mr. John Storrie, of the Cardiff Naturalists' Society, the remainder of the party walked along the beach under the cliffs examining the unrivalled section in Britain of the Rhætic beds, a transitional series between the Triassic and the overlying Jurrassic, and beneath them the New Red Marl, with its gypsum bands exhibited in its fibrous silky form, "satin spar," its white granular form, and also in its pink or salmon-coloured alabaster. The Rhæto-Triassic exposure, commencing at Penarth Head, extends southwards for three miles to Lavernock Point, gradually lessening in thickness. The strata are known under the name of the "Penarth Beds," or "avicula contorta beds." A fossiliferous stratum, from one to three inches thick, called the "bone bed," is deposited in an earthy limestone bed, which caps the Keuper marls and divides them from the black shales. At low tide the Lower Lias and the Rhætic Beds with the fish-bone bed are well exposed at Lavernock Point. See *Proc. Geol. Soc.*, 1867 and 1875. Also *Trans. Cardiff Nat. Soc.*, 1871; page 39; and *Fossils at Penarth*, by John Storrie, *Trans. Cardiff Nat. Soc.*, vol. xiv., 1882, page 100. The whole section is an instructive exposure of very great interest to the geologist.

The last of the party returned to Hereford by the train leaving Cardiff at 7.40 p.m.

The papers prepared for this meeting were:—

Stray Notes on Cardiff and its Castle, by Rev. J. O. Bevan.

Grayling in the River Monnow, by Rev. M. G. Watkins.

On the correlated variation of the larva of ARCTIA CAIA—in habit as to hibernation, in moulting and in plumage, and the probable existence of a digoneutic form—by Dr. T. A. Chapman.

STRAY NOTES ABOUT CARDIFF.

By the REV. J. O. BEVAN, M.A., F.G.S., Assoc. Inst. C.E., Vicar of Vowchurch.

THE history of Cardiff can be traced back to the first century of our era—to the time, indeed, of one Aulus Didius, a Roman leader, who, about 53 A.D., founded an encampment on the Via Maritima, on the banks of the adjacent river, at the broadest and shallowest—therefore most readily fordable—part. Hence, as some say, the name Cardiff (Caer Didii, Caerdydd). Other authorities incline to the opinion that it might be Caer Taff, or Camp on the Taff. Owing to the neighbourhood of the Bristol Channel, and the rivers adjacent running thereinto —the Ely, Taff, Rumney, and Usk—the county hereabouts was liable to sudden and frequent incursions. The margin at the base of the hills which intrude themselves into the plain was difficult of defence, hence the necessity arose for fortified camps, watch towers, and, eventually, castles, such as those at Cardiff, Castell Coch, Caerphilly, &c.

We have seen that Cardiff is a place of considerable antiquity. It was never of great size, but it had its fortified wall, its Cistercian Monastery, Dominican, or Black Friars' Monastery, and Church, as well as its Castle. The Roman wall, of which fragments have been unearthed in the castle grounds, was flanked with massive bastions. It bounded the precincts on the south. A Roman hypocaust has been discovered at the south-east corner of the Castle court. The foundations of the Blackfriars Church—the Monastery standing just outside the western gate —can be seen in the park not far distant. They have been dealt with in a very complete manner. The Castle may be supposed to occupy the site of the Roman fortified station. The Welsh recovered their position after the departure of the Romans, and for six centuries their princes reigned over the domain on which our eyes now rest, successfully repelling the incursions of the Saxons and Danes, though the latter effected a landing at Tenby, and other parts of the Glamorgan shore.

In 1080, Jestyn ap Gwrgan, the last of these, is said to have made considerable additions to this place; but, about ten years later, being engaged in conflict with Rhys ap Tewdwr, Lord of South Wales, he promised the hand of his daughter Nest to Einion, called the Traitor, if he would bring the Normans to his relief. This was done, and Sir Robert Fitzhamon, and his satellites, afterwards known as the twelve knights of Glamorgan, came to his aid. The battle was joined at Hirwain (12 miles N.E). Rhys was worsted, and suffered the loss of his head at Pen Rhys. The Normans were paid for their services, but, while preparing for their embarkation at Penarth, were persuaded to return by Einion, who professed to believe that his chieftain would refuse to carry out the compact, and reward him with the hand of the fair Nest. An engagement took place at the Heath, two miles distant. This was disastrous to Jestyn, who was compelled to seek safety across the water, Nest being given over to the traitor. Robert Fitzhamon became Lord of Glamorgan; his followers divided the county between them, but

still possessed lodgings within the Castle. Fitzhamon's only daughter married Robert Consul, the Earl of Gloucester, bastard son of Henry I., by Nest, daughter of Rhys ap Tewdwr. In 1108, Henry II. captured his brothe Robert in battle, cast him into the Black Tower near the gateway, where the legend runs that his eyes were put out, and he lingered here for six and twenty years until his death in 1134. His remains were carried to Gloucester, and interred with every show of respect under the pavement of the Church before the high altar. His effigy in wood is to be seen in the Cathedral to this day.

In 1158, the Welsh, under the conduct of Ivor Bach, founder of Morlais Castle and Castell Coch, raided these parts, took this fortress by storm, and carried the Earl, together with his Countess and son, to his mountain home.

Edward I. assumed the Lordship of Glamorgan for a time, and re-granted it with diminished powers. With the death of Gilbert de Clare, killed at Bannockburn, this Lordship passed, through the eldest sister, to the De Spencers, who founded the Castle of Caerphilly, a finer castle in a larger town. Isabel, an heiress of that family, married, as her second husband, Richard Beauchamp, Earl of Warwick, in the time of Henry VI. Then, it went again to the Crown through Lady Anne of Warwick, wife of Richard, Duke of Gloucester. Henry VII. granted it to Jasper, Duke of Bedford, but, upon his decease, it reverted to the Crown and descended to Henry VIII. Edward VI. sold it to Sir William Herbert, afterwards the Earl of Pembroke, after which family the Chapel in the north aisle of St. John's Church is named. Owen Glendower harried the town and its defences with fire and sword in 1404. The fortress was alternately occupied by both parties in the Civil Wars, and was well cannonaded by the Parliamentarians. In 1642, the Castle was surprised by the Marquis of Hertford, in command of a party of Cavaliers, who crossed over from Minehead in a coal vessel, but was retaken in the same year, and remained thereafter in the hands of the Parliament. Charles I. came here, whence he dated a letter to Prince Rupert in August, 1645. The Castle passed eventually, by marriage, to the family of the present owner, the Marquis of Bute.

The town has had a phenomenal growth. During the last century coal was brought down for shipment on the backs of mules. In 1790, an Act was obtained for the construction of a canal from Merthyr Tydvil (Tydvil the Martyr) to Cardiff, 25 miles distant. The difference of level was 560 feet, thus necessitating the construction of 50 locks in that comparatively short distance.

About 40 years later, the father of the present Marquis, a man of great foresight—whose statue formerly stood before the old Town Hall in High Street, but which was removed to St. Mary Street, near the Great Western Station, when that unsightly building was pulled down—purchased a large portion of the Moors and foreshore and constructed the docks which bear his name. They have been considerably extended since his death, thus laying the foundation of the prosperity of this town, which, as a port, ranks first in the world for its export of coals.

At the beginning of the present century, the population was about 1000; in 1835, it was 6500; at the present time it is over 150,000. It is thus the most

populous town in the Principality. Its growth has a parallel only in that of Barrow, Middlesborough, and a very few others in Great Britain. The amount of coals recently exported in one year was no less than 11 millions of tons, and the magnificent series of docks, including wharves and storage ground, now covers an area of no less than 600 acres. It must not be forgotten, too, that there are docks at Newport, Penarth, and Barry, all within a radius of 12 miles.

You see before you traces of the massive walls, 40 feet high, 11 feet thick, embattled, reared by Robert Consul, the Keep, the residential portion of the Castle, and the Black, or Duke Robert's, Tower. In this are two prisons, Stavell-y-oged and Stavell-wen. These were probably built by Sir Robert Fitzhamon in the early part of Henry the First's reign. The present gateway would be about the date of Henry VIII. The shell of the White Tower was reared by Robert Consul. The Gate Tower is due to Isabel Beauchamp and her husband of Warwick. Here, but in an older building, was the son of the Conqueror immured. On the face of the Gate Tower of the Keep, and of the Black Tower, are sections of the great curtain wall, which extended from one to the other. It was 30 feet high, and 7 feet thick, and was removed late in the last century. It had been constructed probably by an early de Clare after the invasion of Ivor Bach.

The lodgings are 145 feet long and 55 feet deep, all being built against the Norman wall. The Tower has been compared with Guy's Tower, Warwick. Its date is from 1425 to 1439, when it was erected by Richard, Earl of Warwick.

The two greater wings are the work of the first Stuart owner, near the date 1775. Under the advice of "Capability" Brown, they then pulled down the Herbert Buildings, cleared the great Court, filled up the moat of the Keep (then called the Magazine), constructed the two wings, modernised the interior of the lodgings, and left everything, in general, as it is now seen.

The following extracts are from Freeman:—"In speculating upon the age, absolute or otherwise, of the different parts of this castle, our only guide, down at least to the age of Elizabeth, is the internal evidence of its structure, and especially the plans of its basement and main stories. From these it may, I think, be safely inferred that the great west wall of the enclosure, the work of Robert Consul or his successor, was originally continued in an unbroken line, the Norman buildings having been in some other part of the court as well as upon the mound. The Castle of Robert Consul was probably a rectangular enclosure, two hundred and sixteen yards by eighty-four yards, contained within three very substantial walls, and possibly a wooden palisade, on the line of which stood the mound and its keep; and east of this enclosure was a second rectangular space, the outer ward, two hundred and sixteen yards by one hundred and sixteen yards, contained within three banks of earth, strengthened by a moat on the north, by a moat and the town-gate on the east, and by a moat and the town itself on the south, and perhaps further defended by a palisade of timber or a mere breast-wall along the crest of the bank. The entrance even then from the town was probably where it is now, by an archway in the curtain opening into the outer ward, and that from the outer into the middle ward was probably in the centre of the intervening defence; there was

certainly no tower at the south-west angle and probably none at the north-west, and the Black Tower also seems of rather later date. The Castle was, in fact, in two parts, the one a mere enclosure of strong walls and a palisade, with a circular mound, the other, and larger part, an enclosure within earthworks. Such seems to have been the Norman castle, calculated from its enormous passive strength to defy any military machines likely to be brought against it by the Welsh. The next additions were probably the Black Tower and the cross curtain wall; and the next, with a view to the occasional residence of the De Clares, the older part of the present lodgings, built within and against the western wall. The extent of this structure cannot now be determined, but it is probable that it included the present front or east wall of the centre of the building, the south or cross-wall connecting this with the great wall, and a corresponding north wall destroyed by the Herberts or Stuarts, and rebuilt by the latter. There would thus be a clear space of about sixty-one feet by eighteen feet for the hall, and no doubt there were besides kitchens at the northern, and some additional buildings at the southern end. This would give a moderate hall and lodgings, and with the Black Tower and Keep afford very fair accommodation for a baron and his train. The southern stair turret was probably an early addition to this work. Whether the great curtain-wall which divided the castle proper from the mere earthen enclosure be regarded as coeval with the outward walls or of later date, the gateway in it, with the drum-towers, of which a sketch remains, were evidently later, and probably De Clare insertions."

Mr. C. B. Fowler writing to Rev. J. O. Bevan from Douglas House, Cathedral Road, Cardiff, under date June 5th, 1894, says:—

"Five centuries ago two small houses were founded at Cardiff, one the Black Friars by Richard de Clare "without the west gate," the other the Grey Friars without the north gate by Gilbert de Clare, son of the nobleman already mentioned. The exact position of the Grey Friars was not known until last year, but it was assumed that the ruins were used to build the mansion (a part of which now remains) of the Herberts about 280 years ago. The domestic part of the Monastery as well as the Chapel has now been laid bare: the latter is of large dimensions and must have been able to accommodate at least 900 people;—portions of capitals, piers, arch moulds, &c., have been brought to light. We now await Lord Bute's order to go on with the work, as there are several greenhouses, trees, &c., on the site which must be removed ere the whole area is brought to light.*

The Black Friars excavations about 800 yards away from the White are completed and built up all through, and old tiles, glass, etc., were found here."

* Since that date excavations have exposed the foundations of a 14th century building with a nave 112 feet in length by 65 feet in width, including the aisles, and a chancel about 30 feet across. —EDIT., September 1st, 1896.

The subject of Ichthyology, a branch of natural history too rarely considered, was brought before the members. It is now more than forty years since the late Hewett Wheatley read at the Field Meeting at Eastnor in June, 1853, his paper on The Ichthyology of Herefordshire. Concerning the grayling he observes:—"Considering its beautiful shape, the sport it affords, its excellence as an edible, and its best season being in the autumn and winter, when the rest of its genus are out of condition, it is extraordinary it should not be more widely disseminated. In the Monnow, for instance, where, though trout are abundant, they are of poor quality, I imagine the grayling would flourish; for it delights in rivers with a gravelly bottom, and an alternation of gentle stream and pool, the smallness of all its fins, except the dorsal, depriving it of power to stem a heavy and rapid water."

We are now in 1894 able to publish the following paper, containing facts based upon the successful introduction of the fish into that river:—

GRAYLING IN THE MONNOW.

By the Rev. M. G. WATKINS.

WITHIN the last few years so considerable a change among the fish of the Monnow has been wrought by the acclimatization of grayling in the river, that it becomes the duty of the Woolhope Club to put the facts connected with it on record. Sixteen years ago the grayling was a fish entirely unknown in the Monnow. Last year, 1893, throughout summer and autumn, the river was full of grayling; so abundant in short was the fish that it was much easier to make a good bag of grayling than of trout, although the Monnow used to be considered among the best of English trout streams. As a proof of this I may mention that an angler on the Monnow near Kentchurch, in October, 1893, caught, (and that merely during the mid-day hours), on one day 39 grayling and 13 trout, and on the next day 35 grayling, 7 trout and 3 chub. Of course as it was the close season the trout were returned to the water. Much apprehension, however, is now felt whether the grayling will not in the future oust the trout and become the predominating fish of the stream, so that, as regards the trout, the Monnow would lose its pride of place among English rivers.

As the grayling has not, I believe, been treated in the *Transactions* of the Club, a few facts concerning it may prove a useful introduction to its appearance in the Monnow. It is a northern fish common in mountainous and glacial districts, and fond of limestone rivers, distinctly marked off from the rest of the family of salmonidæ to which it belongs by its pointed face and very large dorsal fin, and from the absence of teeth on its tongue. A distinguished member of this Club who has now passed away, Mr. Symonds, the geologist, states that in Great Britain it is always found in streams which have occupied the beds of ancient glaciers. It lives in the Clun, Dee, Derwent, Itchen, Test, Ure, Wharfe and Swale. In our own county the grayling is found in the Wye, Lugg, Arrow, Teme and other streams, and in them is in all probability indigenous.

There are no grayling in Ireland. They have now been introduced into the Clyde for some forty years, and may be caught between Crawford and Abington on that river, and are still flourishing. Trout anglers complain there that they lead to poaching of the trout late in the year by men who ostensibly are fishing for grayling. The Clyde is so full a stream, however, that, so far, no great mischief appears to have been done there by the acclimatization of these grayling. For a good deal of curious legendary matter concerning this fish reference may be made to Izaak Walton, pt. I., cap. VI. From the distribution of the fish on the Continent it is not the least likely that the Monks introduced it to Britain, but it is extremely probable that they often chose sites for their houses (as may be seen conspicuously in Yorkshire), by the side of rivers which already abounded with it. This meant that, as trout are in season from March to October, the grayling provided a pleasing substitute by coming in from October to February, so that these excellent members of the salmon family, trout and grayling, were on the tables all the year, no light matter when the difficulty of transport for salmon and sea fish in those days is borne in mind. Günther (in his *Introduction to the Study of Fishes*, 1880, p. 649), divides the grayling into five species, of which the best known is the *poisson bleu* of Canada *(Thymallus signifer)* and *T. tricolor* in Lake Michigan. The European grayling *(T. vulgaris)* is widely diffused through the north of the Eastern hemisphere. Two varieties of it are found, one in Lago Maggiore, the other in Dalmatia, viz., *T. œliani* and *T. microlepis*. Our grayling occurs in Eastern France and the Swiss Lakes, in Lombardy and Istria, and in the Russian rivers, which flow into the Arctic Ocean, as well as in the Cattegat and Baltic.

No one who is a scholarly fisherman is ignorant of the excellent book of Sir Humphrey Davy "Salmonia." In it he may claim the credit of being the first to introduce the grayling generally to the notice of fishermen. Of course they knew Ovid's description of the fishes' colour "tum corporis umbra Liventis" (Ov., Hal. 111) and the phrase of Ausonius, so true to the quick "rise" of the grayling. "Effugiensque oculis celeri levis umbra natatu" (*Idyll*, x., 90). They were aware too of its existence in England, but to Sir H. Davy is due the praise of having popularised it, and called attention to its peculiarities. Leintwardine and Downton in his eyes owned the best grayling waters in the kingdom, and so they still remain. He gives the life history of the fish as follows:—It is, he says, "to a certain extent gregarious, more so than the trout and less so than the perch. It spawns in May" (more often, we may affirm, in April) "and the ova hatch out in fourteen days," or seventeen as others (*e.g.* Pritt) say, "and are non-adhesive. In the end of July, or beginning of August, the little ones are the size of sprats, four or five inches long, and I conclude become in the same year in September or October nine to ten inches long, and weigh from five ounces to half a pound. In certain circumstances," he adds, "they grow very fast*." Speaking

*F. Day, *British Salmonidæ*, 1887, p. 278, *seq.*, says that grayling under half a pound in weight do not appear to spawn, rendering it probable they do no not attempt to do so till the third, or perhaps, the fourth season. At a little distance the eggs resemble toad-spawn, smaller than those of the trout, and transparent. Grayling are rapid growers, attaining four or five inches in length in a few months.

of the charge commonly made against them that they injure trout in a stream, he says that there are "few small trout in the Teme, and I suppose the grayling, which are most numerous, deprive the trout of their proper share of food, depending on larvæ and flies." He notes, too, "that the grayling is not an indigenous fish in the Test, for about 1820 a gentleman brought some from the Avon and put them in above Stockbridge, whence they gradually descended." We may add that, being more numerous than trout when they once establish themselves, and being in the pink of condition just when trout are spawning, they probably devour many of the trout ova, and work much devastation among them. They are, too, of a more active mercurial disposition than the trout, and their habits appear to repel trout and drive them away from the reaches of water which the grayling most frequent.

An excellent manual written in recent days, specially adapted to the fly-fisher, but still sufficiently general to be consulted with profit by the student of fish, Mr. T. E. Pritt's *Book of the Grayling*, ought to be mentioned here (Leeds: Goodall & Suddick, 1888). He, like Walton, connects the old name of the fish "umber" with the Latin "umbra," because of its extreme quickness in rising for flies, and deems that its ordinary name comes from its colouring, "gray-lines" as it were. It seems to me that "grayling" is merely a diminutive, like hireling, pigling, and the like. Pritt says the largest grayling on record was caught in the Camlad, Shropshire, and weighed 5¼lbs. Pennant, in the last century, regarded one taken near Ludlow as the largest known. It weighed 4lb. 6oz. While trout spawn in the small brooks which run into a river, grayling do so in the main stream, and when so occupied, though very timorous at other seasons, like the wood-pigeon among birds allow the fishermen to come quite close and observe their doings. They are so famished too that they will rise at almost anything like a fly at such times. Pritt does not regard them as mischievous to trout. His words are:—"Observations made in an aquarium in which salmon, trout, and grayling were together, went to show that while the spawn of grayling was apparently an irresistible dainty to the first two fish, grayling showed no particular liking for the spawn of the others." Besides which grayling do not leave the main streams when the trout are absent spawning; indeed, they do not ever leave them. This ought to be borne in mind when pressing the indictment of eating trout roe against them. Pritt concluded that grayling must be acquitted of any "tendency to diminish the number of trout if the food supply is fairly plentiful" (p. 27).

And now, to speak more particularly of the Monnow. Its bottom, sometimes rocky, sometimes full of gravel reaches, with muddy pools interspersed, seems favourable to the nature of the grayling. Mr. Eagles, a well-known clergyman, and most skilful angler, is said to have put in a few grayling about four miles above Pandy, in 1875 or 1877. They do not appear to have prospered, and were probably caught or eaten by large trout. But on 16th May, 1882, Mr. Matthews, of Pontrilas Court, placed 4,000 young fish, just free of the vesicle, in the Dore river. This flows into the Monnow near Pontrilas. Nothing more was seen of them till April, 1887, five years afterwards, when both he and I saw many

grayling spawning in the Dore. On September 15th, 1888, Mr. Matthews caught a good many "shotts" in the Monnow above Monmouth Cap, and believed that an odd "shott" or two had been captured in the Dore a year or two previously but no record has been kept of them. After 1888 they increased abundantly, and are now taken in all the reaches of the Monnow even below Skenfrith, and have ascended the Honddhu into the Black Mountains. Although a poor fisherman myself, my captures of this fish in the different years since its acclimatization will illustrate its increase. The first I caught was in 1886. In 1887 I took three; in 1888, 14; 1889, 22; 1890, 11; 1891, 19; 1892, 34; 1893, 40. In 1890 numbers were found near Kentchurch and Grosmont, and even at Skenfrith; yet Professor Seely *(History of European Fish)* says "The grayling is not easily naturalized anywhere." From one point of view, the introduction of a new and useful fish, both for amusement and for edible purposes, has answered in a dozen years beyond expectation. An enthusiastic fly-fisher can find occupation for his rod until Christmas, and, if he condescend to worms, throughout the year; inasmuch as the grayling does not spawn till April, and trout may be taken in March. There are many apprehensions, however, that grayling may ultimately increase to such an extent as seriously to injure the trout fishing in that beautiful river, the Monnow.

A careful angler thought in 1893 that grayling had done harm to the trout in this river, because so few small trout had of late been caught; one or two, say, where of old ten or fifteen might have been taken. Supposing the grayling to have decimated the trout, they might after all be only fulfilling the same good end as pike do in many of the Scotch lakes, where they kill off the weak and sickly trout. Curiously enough the same angler told me that he had never known the trout of the Monnow so large, taking the average, as they were in the same year, 1893. Early in May he caught four, which weighed 3¼lbs.; another day, seventeen, the smallest of which was ¼lb., and this is a high average for the Monnow.

Do grayling ever harm the trout in a stream? I am sorry to say that I know of an instance in Lincolnshire which shows conclusively that, under certain conditions, they do. This stream is known as the Claythorpe beck, and is a good-sized deep brook, from ten to sixteen or eighteen feet across in most places. It used to be famous for trout, but in February, 1867, forty-seven grayling were placed in it. They spawned the first year, and in about five years a mile of stream was quite full of good takeable fish, three miles of it well stocked and some portion over-stocked. In fifteen years they had become so large and numerous that they would not rise at artificial fly, and bait fishers had to be invited from Sheffield to catch them. "I would not have any small stream stocked with grayling," says one informant, "they give little or no sport, being so uncertain in feeding. They drive the trout out of the deep holes. When fishing for trout," he adds, "they float down before you and disturb the trout and your chance of them." (Mr. Mackinder, Belleau). Trout are not so numerous as before this beck was stocked with grayling; they have, to a certain extent, been interfered with by the grayling. Another informant thinks "that the grayling drive the trout away." Speaking of

the brook below Claythorpe, he says, "this part is eminently fitted for grayling, and these increase in it much more rapidly than trout. The trout, moreover, appear not to like the presence of grayling, but fly from them upwards to swifter waters and a more gravelly bottom, where they have not to lie in the sandy holes which grayling frequent." This gentleman, however (Rev. C. Mason, Bilsby Vicarage, Alford), thinks that the decrease in trout ten years ago was due to the interference of the Drainage Commissioners with the stream, the banks having been cut from time to time, the depth of the water in the holes lowered, shelter and places of refuge destroyed, and the river dammed, to say nothing of the lack of small streams, or feeders, where the trout can deposit their spawn. Were there no grayling, he thinks that from time to time it would be necessary to supply it with trout by artificial means. He complains also of the mischief done by herons. The fact is the whole question hinges on the supply of food. One of my informants seems to have hit upon the true answer to the question, "Do grayling destroy trout?" in his remark "I would not have any small stream stocked with them." Doubtless in such a case they increase in a larger ratio than do trout, consume the food which formerly sufficed for this latter fish, and in a little time largely thin the numbers of trout. In the Lincolnshire beck of which I have spoken, this process actually went on. But it seems probable that the Monnow is so large a stream, its food supplies so abundant, and its bed of so sufficiently varied a character as to admit of this addition of grayling to the native trout. The two fish co-exist amicably in the Wye. As for the scarcity of trout, not only in the Monnow but elsewhere as well, it should be borne in mind that anglers have enormously increased in the last twenty years. To them rather than to the innocent grayling must, I think, be ascribed the scarcity of trout. Old anglers asseverate that the stock of trout, not in the Monnow alone but in almost every river, has shown a steady decrease. They are quite right. More trout have been annually taken out of these streams, and no little ones put in their place. So the operation of the natural law results; fewer trout exist. A river cannot be depleted by constant fishing without certain damage to the supply of trout. The simple remedy is to place some artificially-bred trout in the water. Year by year this practice will become more common. Catching plenty of grayling and putting supplies of young artificially-bred trout into a stream ought soon to restore its fish. And then fishermen will rejoice in the acclimatization of the grayling. Its culinary properties are by no means contemptible, and it furnishes abundant amusement to country-dwellers. With proper supervision it need do no harm in a trout stream. Artificially-bred fish will always restore the balance, while the introduction of grayling will, more or less, ensure fly-fishing throughout the year. Personally I welcome rather than deprecate the presence of grayling in the Monnow.

ON THE LARVA OF ARCTIA CAIA,

With special reference to its correlated variations in Plumage, Moulting, and Hybernation.

By T. A. CHAPMAN, M.D., F.E.S.

A BATCH of eggs of *A. caia* came into my hands in the summer of 1890 almost accidently. A bred female was brought to me and I placed her outside on a leaf; looking next morning, she was still there and had laid a batch of eggs. This led me to the experiments, some results of which I here record, which I had for a number of years contemplated making when opportunity offered.

I may note that *caia* female usually remains where she emerges till she has paired; this takes place about midnight, the male leaves, and the female has usually laid a batch of eggs by morning. Being now less heavy and bulky, she is able the next night to take wing, and afterwards lays two or three more batches of eggs. The male certainly pairs again, and I think, from finding last batches of eggs less fertile, that the female usually does so also after laying one or two batches of eggs.

The observations I contemplated making on the larva of *caia* were to be directed to the number of moults which were said to vary much in that species, and were in continuation of those on *Orgyia antiqua*, presented to the Woolhope Club in 1882, and published in the *Entomologists' Monthly Magazine* in March, 1887, which elicited a valuable note from Prof. Riley in the May number. I have been so far fortunate that I have not only noted variations in the number of moults, but have also found variation both in plumage and habits to be associated with the variation in moulting in such a way as to give some hints as to the meaning underlying them. The subject is one that does not appear to have attracted much attention, and I do not recollect seeing any record of observations exactly similar to those which I have made on *A. caia.*

One reason why so little has been done in this direction is, no doubt, the tediousness and inherent difficulty of the investigation. The closest attention is neeessary to make sure of the moulting of any larva. It was the custom of Mr. Hellins, in order to secure an exact record of any particular species, to isolate an individual larva for special observation, but in this research we must have more than this, we must have an exact record of the moultings, &c. not of one larva only but of 50 or 100, or, if possible, of an entire brood; and so much has the difficulty of this been felt, that some of our best observers cannot say what is the number of moults in species of which they have reared large numbers; still less what, if any, variation occurs in connection therewith. I have, however, devised a tolerably simple method of achieving this result, and should hope to see the subject worked out in detail with a number of species, when it is applied by some of our enthusiastic students of larvæ. Until the number of observations is greater, such hypotheses as we may be tempted to form in explanation of the observed facts must be of a very tentative nature. My method is simply as follows:—As soon as some larvæ lay themselves up for moulting, the remainder are removed to

another jar, which becomes jar 1, the original being now jar 2, and as soon as any in jar 2 have moulted they are moved on to jar 3; so jar 1 contains larvæ in first skin, feeding; jar 2, in first skin, laid up for moult; jar 3, in second skin, feeding; jar 4, in second skin, laid up for moult, and so on. There may, of course, especially as the larvæ grow, or as varieties of habit appear, be several jars of the same number—thus jar 7, feeding, in fourth skin, may be repeated several times, or be jar 7, jar 7A, jar 7B, according to variation.

It may be well to begin by describing the larva and larval history of what we may take to be normal *caia* under ordinary circumstances.

The eggs are laid in regular hexagonal order in batches of 100 to 300 on any flat surface, the underside of a leaf being the usual site, and like the "Ermines" and many NOCTUÆ that lay their eggs in a similar way, the leaf of a tree or shrub many feet from the ground seems to be often selected, the young larvæ, of course, dropping to the ground amongst the low plants on which they feed. The eggs are nearly spherical, 1·00 mm. in diameter, creamy or, quite at first, greenish-white, changing colour to an orange creamy in a day or two, but not further till shortly before hatching when they get very dark chocolate and then black. They have a pearly lustre and a very delicate transparent appearance, but this is deceptive, as they are tolerably hard and solid and none of their contents can be seen at all, though their mirror-like surface reflects surrounding objects and for some time led me to think I was observing some interior structure, although I could not make out what. The surface is mapped out by a very fine network of raised lines, usually in hexagons.

In the first stage the newly-hatched larva is deep fuscous, but soon becomes black or nearly so, the hairs and tubercles being black and obscuring the fusco-rufous skin, till, after feeding, the tubercles separate from each other enough to expose it, and it contributes a larger element to the larval colouring as it grows. This change with growth is even more marked in the three following skins. The larva, at first densely hairy, and taking its general aspect from the colour of the hairs, gradually, with its growth, exposes the intermediate skin and the hairs become a less marked feature, till, when full-grown in each stage, the colouring of the skin, rather than of the tubercles and hairs, gives character to the larva. The length of the larva in the first stage is 2·3 mm., growing to 4 or 5 mm. The head is black, the 2nd segment has a black plate carrying eight hairs beneath its front angle, and in front of the spiracle is a tubercle carrying two hairs, and another lower down carrying one. On segments 3 and 4 are, on either side, a dorsal tubercle carrying two hairs and a sub-dorsal carrying one, these taken together seem to range with the dorsal plate of segment 2. Below, is a largish tubercle with one hair in line with the pre-spiracular on 2, and a lower one in same line with the lower on 2. On each of these three segments is a small tubercle without a hair immediately above and behind the pre-spiracular tubercle.

On the following segments 5-12, are a small anterior and a larger posterior trapezoidal tubercle, each with one hair, a large supra-spiracular with two hairs, and a post-spiracular with one. All these are angulated, with sides flattened against each other as if flattened by mutual pressure, precisely as I have noted in

Acronycta. There is also a sub-spiracular tubercule with one hair, and two lower ones less marked and without hairs. The base of the prolegs carries a large tubercle-like plate. The true legs have three chitinous joints as well as some basal plates, with a curved claw and battledore palpus at the end of the third joint.

The prolegs are of a circular shape, expanded at the end of a pedicle, with four hooks in the inner three-fifths of the edge; five hooks occur on 9 and 10, at least in some instances.

In one specimen the post-spiracular tubercle on 12 carried two hairs. The 13th segment has on either side a large square tubercle with four hairs, and a lower smaller one with one hair. The 14th segment carries an anal plate with six hairs, much shorter and smaller than the others, the general hairs being from once to twice the diameter of the larva in length, these on the anal plate about one-third of the diameter. The anal prolegs seem to be of the same structure as the ventral. The hairs are very finely spiculated.

In the second skin the length reaches 5 or 6 mm. The structure and appearance are much as in the previous skin. The tubercles have more hairs, except the anterior trapezoidal which retains one. The posterior trapezoidals have eight or nine; the supra-spiracular, five or six; the sub-spiracular, four; the marginal and ventral, each four; a plate on segment 2; two large and one smaller tubercles on each side of 13. The legs preserve the battledore palpus, and the prolegs are now more expanded and flange-shaped, *i.e.*, they have a flat fan-shaped surface directed towards the middle line; this carries four hooks on 7 and 8, five hooks on 9 and 10, placed on the middle portion of the fan, leaving a margin at each end, as if for more hooks that do not yet exist. Segment 12 has nearly lost the ventral tubercles. Three large eye-spots can be counted. When full fed there is a pale dorsal line and a pale lateral region; this is characteristic of the full-fed larva in the second, third, and fourth skins.

In the third skin the larva is of a similar character, the pale dorsal line and pale lateral region are more evident, and more distinct in tint from the intermediate darker region. The hairs are more numerous, the tubercles being large bosses carrying them stellate fashion, the posterior trapezoidal and supra-spiracular being very large, the others smaller, but each with many hairs; the ventral prolegs have six strong hooks, and an extended flange, as if for more, both before and behind them. The anal prolegs have the same structure. The true legs still carry a large battledore palpus, or pulvillus.

In the fourth skin the length extends to 12 mm., and the hairs and tubercles are disposed as in the last skin. The supra-spiracular tubercles and those below them tend to have white summits. This is so, more or less, in all the following skins, and full-grown larvæ often have tubercles with a white, silvery sheen. A few of the longer hairs are whitish and the white dorsal line is more distinct, but varies much in width. The prolegs have nine to eleven well developed hooks, and the extended flange beyond is now plainly marked by chitinous lines, clearly the rudiments of five or seven more at either side.

In the fifth skin the hairs are more crowded than previously, and though the

dorsal and lateral pale lines are plain enough, they are not (owing to the greater density of the hairs) so obvious as in previous skins. The prolegs have twelve and thirteen hooks, and places for seven or eight on either side, disposed precisely as in the previous skin.

It is in this fifth skin that hybernation takes place. As illustrating the difficulty of dealing with moults, I may say that two good observers both told me that with them the larvæ hybernated in the second skin, but, when shown the larva in the fifth skin, said, yes, that was the size in which they hybernated. After hybernation the larva moults three times more, but not unfrequently only twice, probably according to the successful hybernation as regards exhaustion or otherwise, whilst four moults may occur. In all these, however, the larva now has the plumage of the adult larva, that is, long flowing black hairs with whitish tips, paler lateral hairs, and red hairs in the front segments.

For my own convenience I have called this the *caia* plumage (Pl. I., fig. 4; Pl. II., fig. 5). That of the fifth skin, in which the hairs are very dense, of tolerably uniform length and also of a tolerably uniform tint, rarely much redder in front, I have called the *fuliginosa* plumage, as the larva resembles the full-grown larva of *A. fuliginosa* (Pl. I., figs. 2 and 6; Pl. II., fig. 4), and, as in it, the hairy clothing seems adapted for hybernation. The earlier skins, with fewer hairs and the larval skin more in evidence, I have called the *Spilosoma* plumage (Pl. 1., figs. 3 and 8; Pl. II., fig. 2).

Whether I was led to the names by the consideration of what these resemblances probably suggested, or whether the suggestiou originated with the names, I have not been able to avoid theorising that, in habit, as regards the hybernation of the larva, we begin with *Spilosoma (menthastri)*, which has a delicate larva, and hybernates as a pupa. A similar delicate larva in *fuliginosa* becomes very hairy and robust in its last skin for hybernation; whilst *caia* goes a step further, and assumes a further and different plumage after hybernation.

Of every brood of *caia* which I have reared, a certain small proportion, generally not far from five per cent., feed up rapidly in the 4th skin, becoming larger in that skin than the normal larva in the fifth, and moult in the fifth skin into *caia* plumage; of these some become full-grown in the next (the 6th) skin; others take a further moult into the 7th as the adult stage, and this seems the more usual course for this set of larvæ. These emerge as moths in from 11 to 13 weeks from the date of the eggs being laid.

The great mass follow the habit I have just described as the normal one, becoming moths nearly 12 months after the eggs are laid; whilst there are usually a very few, sometimes none, that progress very slowly and moult a number of times before assuming *fuliginosa* or *caia* plumage.

In each of these groups there are several subsidiary varieties, and there are even groups that appear doubtful as to which of these lines they are following.

For convenience in my notes I have called these three forms the Forward, the Normal and the Laggard types, and the names if not elegant, are at least expressive.

Having met with these types and some subsidiary ones in my original brood

of *caia*, I proposed to continue rearing them pedigree fashion, with a view to discovering how far each of these forms was hereditary, and what circumstances determined the appearance of each form. Limitations of time and space led me, however, to follow only the Forward group, chiefly because it was the most easy to do. Of these several broods could be raised in a year, whilst of the others, besides the difficulties attendant on hybernation, only one brood a year was available. My observations were made, therefore, on six or seven consecutive broods (generations) of the Forward type—that is, the Forward specimens in each brood were used as the parents of the next brood observed, though I also bred several broods from Normal hybernating larvæ, both after hybernation and after forcing.

The presumption of course, is (and my observations, so far as they went, confirm it) that, so far as the points to which I directed my attention are concerned, pedigree breeding of the Normal type will always produce just such a brood as may be obtained from eggs laid by a wild moth. Still one would suppose that there is, in the wild state, occasional crossing both of Forwards and Laggards with the Normal form, and prolonged pedigree breeding of the Normal form to the elimination of the others might produce some interesting results. I fear no one is likely to take this up for its own sake, as the labour and patience required are much in excess of the apparent value of the result; but some one, with the perhaps more attractive object of raising varieties of the imago of *caia*, would find it add little to his trouble and much to the value of his results, if he combined therewith pedigree breeding of Normal (larvæ of) *caia*.

Pedigree breeding of Laggards would be even more tedious, and probably also more difficult, but might be expected to present many interesting points. I hardly tried to follow this up, and did not succeed at all.

The Forward group of larvæ that I more particularly followed out, are, or appear to be (perhaps because I did follow them out and think I understand them) the simplest in their subsidiary varieties and in the circumstances governing the assumption of this form rather than of the others.

It appears to be entirely a matter of temperature; my broods were reared at a temperature rarely far from 60°-65°, and after six generations continually raised from Forwards, the proportion of this form remained at about 5 per cent. of the larvæ raised. In this number of generations selection had produced no effect whatever in the direction of securing a form consisting entirely of Forwards.

Mr. Edmonds of Windsor, whose experiments with this species were conducted for several years with a view to obtaining varieties and were not specially noted from my standpoint, nevertheless gives me some interesting information. It appears that if he obtained the larvæ small enough (probably about 3rd skin) about 35 per cent. were Forwards. He attributes this result to his method of feeding; but I think there is no doubt that, whatever the feeding may have to do with the variation of the moth, this proportion of Forwards is due to his rearing the larvæ at a higher temperature than I did in my experiment.

The crucial experiment in this matter was undertaken by Mr. Merrifield, who reared a portion of a brood at a temperature of 80°. This portion presented

150 Forwards to 50 of other forms, whilst my portion only yielded the ordinary 5 per cent.

My Forwards completed a cycle in about three months, Mr. Merrifields at 80° did so in two months, so that whilst mine yielded nearly four broods in a year, Mr. Merrifield's would have given six.

These forwards then are clearly a response to a higher temperature, and may be taken as an attempt to produce a summer brood should the summer be warm enough. Here we are met with the question—are these Forwards to be found at large? Well, many persons, including so acute an observer as Mr Barrett, tell me that they have never seen them and doubt their existence. On the other hand, since I have made enquiries I have heard of several having been seen; I have met with one myself, and several instances have been recorded in the magazines. It is also to be remembered that *caia*, though a common larva, does not present itself, unless specially looked for, in anything like the number that actually exists. It is no doubt probable also that the Forwards naturally are much fewer than even in my experiments, as they have the low night temperature to affect them.

I have mentioned that there are at least two varieties of Forwards, those that attain their full growth in the 6th skin, and those that do not do so until the 7th. It so happened, that in my first brood, which was apparently a very normal one, there was quite a sharp line dividing the Forwards from the Normal larvæ; six larvæ altogether were Forwards, and I noted that these, in the 4th skin, lacked the dorsal and lateral pale lines. In later broods this was not always the case, but in the 4th skin the Forwards were if anything paler than the Normals at that stage, and at the same time distinctly larger than Normals in 5th skin.

In after broods there were frequently some larvæ that appeared in doubt as to whether they would be Forwards or Normals, assuming to a slight extent the *caia* plumage in the 5th skin, without being larger than the usual hybernating form in that skin; others, passing through a normal 5th skin, nevertheless went on slowly into the sixth skin, with some amount of *caia* plumage, without hybernating. All these completed their transformations without hybernation, but were always a very long way behind the genuine Forwards in point of time. I have since met with these forms, though very sparingly, in broods from wild eggs.

In this first normal brood the whole of the Normals acquired *fuliginosa* plumage in the 5th skin, and there occurred only one decided but also important variety, represented by four larvæ which grew rather larger than the others, appeared to have denser hair than the usual form, had fewer of the long hairs that exist freely, though not conspicuously (usually two on each tubercle), in that form, and were all four of a uniform rich ruddy hue, very like the brightest form of *fuliginosa*; probably these, more than the normal hybernators, suggested this name for the plumage of that stage. These four larvæ were found to differ also in another important respect from the ordinary Normals. It was recognised on September 11th that they had all ceased feeding and desired to hybernate, and they were accordingly placed in a cool cellar. On November 23rd a number of Normals together with these four special larvæ were brought up into a warm room. At the end of a week all the Normals had commenced to feed, but it was fourteen

days before these red larvæ did so. It appeared therefore as if these larvæ were not only better nourished and more warmly clad than their neighbours, but had also entered into a more profound winter sleep, and it seemed natural to conclude that they were specially prepared to stand a longer and more severe winter than their brethern.

It is curious that, among the many hundreds of larvæ which I reared after this, I never met with one that presented precisely this combination of characters, not even among the progeny of these very individuals. It may perhaps be going too far to suggest that, as I was breeding exclusively from Forwards, the idea of a warmer climate was sufficiently impressed on the race to prevent such a preparation for unusual cold being made, and that the tendency to make such preparation was eliminated even from the offspring of these larvæ themselves (I only reared one brood), by the forcing process to which the parents were subjected; inasmuch, however, as similar conclusions are pointed to by other results, the suggestion is, perhaps, not inadmissible.

I did not get a figure of either of these four larvæ, the nearest approach to them in appearance, and it was very close, is represented in Plate I., fig. 2. The larva there figured was hybernating in this form in its 6th skin, and was one of the varieties in the hybernating forms that occurred in later broods but were unrepresented in the first, in which all hybernators assumed *fuliginosa* plumage in the 5th skin, and then hybernated.

It may shorten the description of the further results observed, if I say at once that the subsequent broods I reared differed from the first by showing an increase in the number of Laggards and much variety as to habit and plumage of the Normals; they also presented very varied forms, intermediate both between Forwards and Normals and between Normals and Laggards, and this multiplication of forms was, on the whole, more marked in each successive brood. So much was this the case, that though I began to arrange in a tabular form the different varieties that occurred, and had reached about fifteen headings; yet after raising another brood or two, I found that each of these headings would have to be subdivided four or five times, and that several additional headings would have to be supplied, so that I concluded that a tabular arrangement in any detail would make my results less, instead of more intelligible.

The first and largest variation among the Normals was that a large section reached the *fuliginosa* (hybernating) stage only in the 6th instead of in the 5th skin, and there were some that did not do so till the 7th skin. Then of these some would tend towards being Forwards; that is, though passing through a *fuliginosa* stage they would go on, after a very short and formal hybernation, to *caia* plumage and maturity; others, tending towards Laggards, would do much the same, but very slowly.

The greatest interest attaches, however, I think to the Laggards; various types of these were numerous in the later broods, but only a few appeared in the first brood or in any brood from wild ova. By the time Laggards were sufficiently numerous to be studied, they, like the Normals, had assumed a variety of different types.

In all cases they fed more slowly and made less growth at each moult than the Normals, so that a Laggard would be only in its 3rd skin, when a Normal was already prepared to hybernate in its 5th skin; the former also would in its 5th skin be no further advanced as regards size and plumage than a Normal in its 3rd or 4th skin (see Pl. ii., fig 1, 2, 3). In one case a Laggard did not reach its last skin until after 13 moults. Others would pass on to *caia* plumage, and progress more rapidly after reaching a certain stage. Though they all seemed willing to perform a modified hybernation at any stage (that is, to eat very rarely and grow very slowly), they were unable fully to hybernate, if taken so to speak unawares, even when they had reached *fuliginosa* plumage. But many individuals would begin hybernation at very uncertain stages, some in *spilosoma*, some in *fuliginosa*, and some in *caia* plumage, but were usually easily forced. It also happened that some aberrant Normals in the later broods prepared to hybernate in distinctly *caia* plumage.

Some figures showing the proportions of different forms may be interesting. Thus, of the second brood; at a particular date there were 4 Forwards in pupa; 4 Intermediates in 6th skin and *caia* plumage; 8 Intermediates in 6th skin, but apparently hybernators; (three jars) say 120 Normals hybernating in 5th skin; 30 Laggards with 4th plumage but in 5th skin; one Laggard in 6th skin with 4th plumage. Twenty-five days later these 30 Laggards were thus accounted for; 10 still feeding in 6th skin, 5 laid up for 6th moult, 14 in 7th skin; of these 14, 1 was still in 4th plumage, 3 in ordinary 5th skin plumage, while 10 were similar but tended to be ruddy in front, and 4 of them were almost in adult plumage.

Third generation :—Brood A was composed of 19 Forwards, 547 Normals, and 130 Laggards. Brood B contained, in the portion which I reared myself, 4 Forwards, 7 Doubtfuls, and 136 Normals; the other portion, which I sent to Mr. Merrifield, and which he reared, as already noted, at a temperature of 80°, yielded 150 Forwards, and 50 Normals. It ought perhaps to be stated that Mr. Merrifield expressed his inability to say whether the 50 that were not Forwards were Normals or Laggards, as they became very unhealthy owing to the high temperature, and to their monotonous diet of cabbage.

A second brood raised from eggs laid by the moths produced from the four larvæ of the first brood, to which allusion has already been made (the grand *fuliginosa* form), yielded 1 Forward, several Doubtfuls, 530 Normals, but no Laggards.

A fourth brood, raised in June, was the only one that formed any exception to the rule that Forwards were as rare as in earlier broods. When the brood was four weeks old, a census showed that it was then composed of 76 Forwards: 12 in 5th, 51 in 6th, and 13 in 7th skin; 85 Normals: 35 in 4th, 46 in 5th, and four in 6th skin; 49 Laggards: 3 in 2nd, 2 in 3rd, and 44 in 4th skin. In this brood it was very difficult to divide the larvæ into groups, for there was a regular gradation of forms between the 3 Laggards in 2nd skin at one extreme, and the 13 Forwards in adult plumage at the other. The brood no doubt had the benefit of a slightly higher temperature.

Of a sixth brood, some were kept warmer than the rest and yielded

15 Forwards and 34 Normals; of which 14 were larger and 20 smaller hybernators; the remainder, 232 in number, presented 15 Forwards, 79 Intermediates, 44 larger and 85 smaller Normals, and 9 Laggards. Many of them became unhealthy, either from inbreeding, domestication, or want of care, and the experiment was allowed to terminate. The differentiation of the hybernators into a larger and a smaller form was very marked in the later broods, and was usually, but not always, associated with the hybernation of the larger form in 6th skin.

Although a tabulation of forms is, owing to their great number, and to their frequently passing into one another, difficult to make either complete or intelligible, yet a tabulation of the principal and most distinct forms may be useful.

Forwards.—1. Passes from 4th *(Spilosoma)* to 5th *(caia)*, omitting *fuliginosa* plumage, feeds up rapidly, and does not hybernate.

a. Adult in 6th skin.

b. Adult in 7th skin.

Normals.—2. *Fuliginosa* plumage in 5th skin, in which it hybernates *caia* plumage in 6th skin.

a. Adult in 7th skin.

b. Adult in 8th skin.

3. Larger Form; more profound hybernation.

4. Assumes *fuliginosa* plumage in sixth skin after hybernation; adult in 8th and 9th skins.

5. Assumes *fuliginosa* plumage and hybernates in 6th skin.

Laggards.—6. Feeds slowly, never assumes distinct *fuliginosa* plumage; reaches *caia* plumage in 8th and 9th skins.

7. Many variations, in which hybernation takes place in 6th, 7th, 8th, or 9th skins, and either in *fuliginosa* or in *caia* plumage.

I have several times taken "Laggards" at large; *i.e.*, larvæ apparently in the plumage of the 3rd or 4th skin, found in September or October, and that feed on slowly and do not go into *fuliginosa* plumage, nor attempt to hybernate. It is therefore certain that, though in England the great mass of *caia* larvæ is of what I have called the Normal form, that is, the form which is specially well clothed in the 5th skin, in which skin the larvæ hybernate, nevertheless, both the Forward and Laggard forms do occur not uncommonly, and it is not perhaps unfair to assume that the various intermediate forms met with in my experiments also occur, though very rarely.

In considering the relations which these variations in plumage, moulting and hybernation, bear to one another and to the history and habits of the species, some very interesting conclusions present themselves, not indeed as proved but as highly probable.

In the first place, it is very interesting to find that of a single brood of larvæ treated identically, some should reach maturity in five moults, whilst others take thirteen, and this is a matter of simple variation, and quite apart from any disease. Such a great range of variation may, probably does, exist in other

hybernating *Arctiae*, but not in no other hybernating larvæ, that I have reared or heard of, is it met with. Mr. Hellins records frequent and continuous moulting in some few instances, but these were always, in his opinion, pathological.

As to the use of these variations to the species; we find in the first place that the Forward forms are decidedly favoured, if not caused, by a high temperature. Now, if only the Normal form existed, it is evident that in a very warm and early season these would be ready to hybernate at midsummer, and would probably largely, if not entirely, perish in consequence; whilst a second brood from the Forward moths would reach the hybernating stage at a fairly favourable date. In an ordinary English summer, no doubt the Forwards themselves or their progeny would perish; hence, no doubt also, the rarity of Forwards in England. It is obvious again, that the fine large hybernating form of larva, noted as appearing in Brood I., from its larger store of nutriment, its denser clothing, and greater resistance to change of temperature, was well adapted for carrying the species through a long and severe winter, that might be fatal to the ordinary hybernating form.

Then the Laggards may be supposed to take up precisely the opposite role, and to be suitable to a very mild winter, in which hybernating would be very difficult, although feeding up would be impossible.

These four forms obviously exist, freely commingled, in our English race of *caia*, but with the Normals largely predominating, though ready to give way to the Forwards under the influence of a high temperature.

My experiments amounted to an attempt to produce a race which should be entirely Forwards, but in this, broadly stated in this form, they entirely failed. They did appear, however, to produce a certain effect on the form assumed by the larvæ. They did, most especially, produce an increase of the Laggards, and not only an increase in their numbers, but an increase in their variety, and in their constitutional stamina. I deduced from this, that there was a closer relationship between the Forwards and the Laggards, than between either of them and the Normals, probably to be explained by the supposition that a warm summer, favouring the production of Forwards, belonged to a climate where the winter was also warm, which would favour Laggards; so that the existence of a race of *caia* consisting entirely of Laggards or entirely of Forwards, was extremely unlikely; one that alternated between Forwards and Laggards was probably not infrequent, and may indeed very conceivably have existed at some time or place as a pure race, and would have been quite parallel to the many instances with which we are familiar, of winter and summer (or spring and autumn) broods.

This conclusion is assisted by the further fact, that the later broods showed great variation in the Normals, as though they were so crossed with Laggards and Forwards, that there were comparatively few that did not partake more or less of the characters of one or other of these forms, whilst the converse of this is strikingly illustrated in the brood reared from profound hybernators, in which there appeared among 530 larvæ, only one Forward and no Laggards.

Pedigree breeding of *caia* obtained from the extreme northern limits of its

distribution, as well as from the southern, to put this conclusion to a further test, would be of much interest, and might throw considerable light on the action of climate. Espeically it might in some degree elucidate such facts as that *caia*, through many successive Normal broods, can perpetuate the capacity to take on a double brooded habit, with a rapid feeding summer brood and a winter brood hybernating as larvæ.

The conclusions actually ascertained or suggested by the experiments which are the subject of this paper, appear to be :—1. That the larva of *caia* presents three types, each with subsidiary varieties. 2. That each of these types, and indeed each subsidiary variety, is characterised by a series of moults, a succession of plumage, and habits as to hybernation, in which it differs from the others. 3. That *caia*, as we meet with it, may be regarded as a mongrel race, consisting of these three types closely mixed and intercrossed, but capable of separation by appropriate breeding and selection, or more probably of two races, one with hybernating larvæ and a single brood annually, the other, consisting of an alternating summer and winter form. 4. That though these two races may conceivably, under certain climatic conditions, have existed as separate and pure races, (they may do so now in some parts of the world for aught I know), yet that at present in England, the hybernating form is most largely represented, with a small intermixture of the digoneutic form which persists, as it enables the species to be continued in exceptional seasons that would be destructive to the dominant monogoneutic type.

DESCRIPTION OF PLATE I.

All Figures amplified × 2.

Fig. 1. Hybernating form in 5th skin ; resembles Laggards.
Fig. 2. Hybernating form in 6th skin ; plumage resembles red form met with in Brood 1.
Fig. 3. Laggard in 5th skin.
Fig. 4. Ordinary form, 6th skin ; *caia* plumage.
Fig. 5. Hybernating form, 6th skin, long whitish hairs ; *caia*-like plumage.
Fig. 6. Laggard in 6th skin.
Fig. 7. Forward, 4th skin.
Fig. 8. Normal, 4th skin.

NOTES ON PLATE I.

I may remark, in connection with the plates, that perhaps of all larvæ, that of *caia* is the most difficult to figure satisfactorily. Buckler's attempts to do so were far from successful ; these, however, were made in the earlier years of his work on larvæ, and he would, no doubt, had he attempted it, have been more successful later. In view of this difficulty, acknowledged by such a master as Buckler, and of the further fact, that what have to be shown on my plates are variations in length, colour and density of plumage without any structural difference, I think Mr. Knight is to be congratulated on his successful delineations and on their reproductions in the plates, which are not so far behind the original

drawings as sometimes happens. Fig. 8 represents a Normal larva in the 4th skin, *i.e.*, the last stage with *Spilosoma* plumage ; whilst fig. 7 represents the same stage, 4th skin, of a Forward larva, but an unusually dark form, in which the lateral yellow line is reduced to one set only of the diagonal dashes, of which in its most definite development it consists ; frequently in this stage the Forward is even paler than the Normal form. These two are from larvæ of the 4th brood. Fig. 4 is a Normal in 6th skin, that in which it assumes *caia* plumage.

Figs, 1, 2 and 5 (with fig. 4, Plate II.) represent various forms of hybernating larvæ (Normals) ; I have already commented on fig. 2. Fig. 1 is in 5th skin, and is a variety that, by its smaller size, shorter hairs, and very definite lateral line, more resembles some forms of Laggards than Normal hybernators. Fig. 5, on the other hand, has various long white hairs, and is of a darker colour ; it makes a distinct approach to *caia* plumage, and is in 6th skin. Fig. 4, Plate II, except that it is rather dark, or rather that the dark skin is too distinctly represented in the drawing, and overpowers the effect of the paler plumage, is a Normal hybernating larva in 5th skin.

Fig. 3 is a Laggard in 5th skin ; compare for size with Normal in 4th skin (Fig. 8).

Fig. 6 is a Laggard in 6th skin, smaller than a normal hybernator in 5th skin ; it is rather larger and darker than most Laggards at this stage, and has no lateral line.

DESCRIPTION OF PLATE II.

(All Figures of Larvæ are amplified two diameters).

Fig. 1. Laggard of 2nd brood, hybernating in 8th skin.
Fig. 2. Laggard of 4th brood, in 4th skin.
Fig. 3. Laggard of 2nd brood, hybernating in 7th skin.
Fig. 4. Normal, hybernating in 5th skin.
Fig. 5. Normal, hybernating in 6th skin ; large *caia*-like form.
Fig. 6. Dorsal view of anal armature of *caia* pupa, × 6 diameters.
Fig. 7. Lateral view of anal armature of *caia* pupa, × 6 diameters.

NOTES ON PLATE II.

In Plate II., Fig. 1, we have a form that is very much the same as a Normal hybernator, and the figure gives, perhaps, a better idea of a Normal hybernator than does fig. 4 taken from a Normal hybernating specimen. Fig. 1 is, however, a hybernating form, assumed by a Laggard at the 8th skin. Fig. 2 is a Laggard in 4th skin ; compare with Normal in 4th skin (Plate I, fig. 8). Fig. 3 is a Laggard hybernating in 7th skin.

Figs. 5 is a hybernating form that is rather rare, and is remarkable for its large size and *caia*-like plumage ; several of these occurred in later broods : the one figured was in its 6th skin, and was descended from the large red hybernating larvæ already referred to, as the only definite variety of hybernation that occurred in the first brood.

Figs. 6 and 7 represent the anal armature of *caia* pupa; beyond the opportunity afforded for having the drawings made, they have no connection with the subject of this paper, but they interested me as having, more than any other pupa that I have met with, certain features very similar to those of *Acronycta* pupæ. The two definite dorsal spines and the numerous ventral set, being of the same pattern as prevails amongst the *Cuspidiae*, whilst the texture of the pupa reminds one a good deal of *Viminia*. These facts make one suspect that the resemblance of the larvæ of *Viminia* to those of *Arctia* may indicate relationship, extending as it does to an identity of the lateral stripe in *menyanthidis* and *rumicis* with that found in some varieties of young *caia* larvæ.

H.K. del. West Newman, Chromo.

Varieties of Larvæ of Arctia Caia

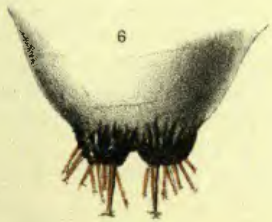
1

2

3

4

5



6

7

H.K. del.

West, Newman, Chromo.

Varieties of Larvæ of Arctia Caia.

Woolhope Naturalists' Field Club.

THIRD FIELD MEETING (LADIES DAY), THURSDAY, JULY 26th, 1894.

ON the occasion of this, their sixth, visit to Church Stretton on Thursday in last week, the Woolhope Club was fortunately favoured, not only with fine weather, but with a cloudy morning which rendered the ascent of the Longmynd Hills more agreeable. It was the ladies' lady, and the party mustered more than one hundred in number. They were met at Church Stretton by Mr. E. S. Cobbold, Honorary Secretary of the Caradoc and Severn Valley Field Club, without whose untiring physical exertions and ready helping hands in case of need, we may safely say that some of the party would have abandoned in despair all hope of ever reaching the summit. The entire route, as drawn out in the programme, was long, and covered seven miles. Some few, familiar with the ordinary beaten track, were found collected and cool at the place of bivouac on the summit, when the van of the party who had made the longer détour of ascent by the Ashes Valley, in accordance with the programme, arrived there.

Upon arrival at Church Stretton, the Church of St. Lawrence in the centre of the town was first visited. A few carriages were ordered, these, however, did not arrive until too late, as was afterwards discovered, for, by the time the horses were harnessed, the party was well advanced towards "The World's End," on its route to the site of Brockhurst Castle. Permission to visit the elevated Knoll, which was formerly occupied by this ancient castle, had been kindly given by the proprietor, and loth as the members were to pass through mowing grass they formed single file and rigidly adhered to one single path. The contour of the little encampment, its inner court separated by a ditch from its outer court, and the long covered way of its north western side, were all distinctly visible to those who followed Mr. Cobbold's demonstration.

From Brockhurst Castle the walk was continued to the village of Little Stretton, from which a lane on the right conducted to "Ashes Valley," a valley which, perhaps a century ago, was filled with numerous common, not mountain, ash trees, of which only one patriarch now remains. Judging from the large number of heavy cylindrical shot in the brook at the bottom of the valley, this would evidently be a dangerous spot when the artillery are practising from the Artillery Camp above Church Stretton.

Leaving the heights of Ashlet and Yearlet upon the right hand, the latter having in the Ordnance Map a contour marked 1,500 feet near its summit, and the Round Hill, very closely of a similar attitude upon the left, the ascent was made up the contracted valley, taking care always to keep the brooklet upon the left hand: it was continued for a total distance from Little Stretton village of about

two miles, the latter half being by a path along the southern and western slopes of the Long Synalds, until at about half-past one o'clock the place of bivouac, the main road near a spring of water, was reached by the most active members of the party. Mr. Cobbold—here, there, and everywhere—having assured himself that the vanguard of the party were safely on the proper beaten pathway, ran back to bring up the rear guard whom he conducted by a more direct and shorter, although steeper, route over the mountain slopes.

Mr. Cobbold pointed out certain geological features on the way—such as the unconformable overlap of Llandovery Rocks, shortly after leaving Little Stretton, seen by a short deviation to the right; the locality in the slates of Long Synalds for the annelide markings sometimes to be found there; and how the Conglomerate Beds of the Upper or Grit Series, grouped by Dr. Callaway under the general term, Longmyndian, were to be seen on the western side of the Pole Bank.

The place of bivouac was well selected, being favourably near what was apparently a perpetual spring of water close to the main road from Church Stretton, about half-a-mile before reaching the Ordnance Survey Pole on the highest elevation of the Longmynds. In *Transactions*, 1880, page 246, this is given as 1,674 feet, but the Ordnance Map, No. 166, dated 1889, of the New Series on the scale of one inch to a mile represents an elevation of 1,696 feet.

After luncheon the business of the day was transacted. Three members were elected, and four gentlemen were proposed for election.

Some of the party walked along the main road half a mile westwards, crossing the ancient Portway, thence for a few hundred yards over the heather to The Pole. A walk southwards along the range would bring the pedestrian to Plowden, where he would find a railway station to the junction at Craven Arms; or he might walk from Plowden by road (six miles) to Craven Arms. In clear weather the extensive view from The Pole embraces the Malvern Hills, the Sugar Loaf at Abergavenny, the Black Mountains, parts of the South Wales coal fields, Clun Forest, the Breconshire Beacons, the Breidden Hills on the border of Montgomeryshire, the hills of Central and of North Wales, and upon the east the nearer Shropshire hills—such as the whale-back Wrekin, the undulated ridge of Lawley, the Archæan and Pre-Cambrian rocks of Caradoc, Ragleth, Hazlar, and Hope Bowdler, and the basaltic Titterstone Clee. It is reported that, in a very clear atmosphere, Arran Fowddy, The Arenigs, Cader Idris, and Snowdon can be distinguished by those to whom the outlines of these heights on the skyline are known. This view embraces all the older rocks from the carboniferous downwards.

The geology may be rougly called that of the Longmyndian rocks with occasional fossil markings, no true fossils having hitherto been discovered. There are dykes intrusive in the slates. In the *Transactions* the geology is treated of in 1870, pages 121 to 128; 1880, pages 246, 247; and 1888, page 241. The Rev. J. D. La Touche writes:—"I have little or nothing to add to the observations made in my paper of 1870 on the geology of the Longmynd Hills. Their exact position in the geological series is still a problem difficult of determination. At

the time that paper was written it was generally supposed that they belonged to the Cambrian formation. The recent discovery of Cambrian fossils in a section at Comley to the north-east of Caradoc, has thrown doubt on this assumption, and it is thought safer to call them simply Longmyndian, at least provisionally. They have been the subject of a lively discussion between Professor Blake and Dr. Callaway, the former endeavouring to show that they form part of a system which he calls Monian, as chiefly developed in Anglesea."

The Geologists' Association are at the present time assembling at Shrewsbury as their temporary headquarters, and purpose visiting this district on Tuesday, July 31st. The report of these proceedings must be looked for in their Journal, when published.*

The ancient Portway traverses longitudinally the ridge of the Longmynds from north to south, and numerous tumuli exist on both sides of it. One tumulus was within a stone's throw of the place of bivouac of the Club. There are stone circles at Bodbury Ring and at Castle Ring. The small British encampment on Bodbury Ring follows the contour of the top of the hill in the form of the letter D; where the approach is more easy, namely, on the north and east sides, a ditch and mound can be easily traced, and on the south, south-east, and west sides there is a rampart twelve feet in width. The situation is half a mile north of the Carding Mill, being the hill on the left as you descend the valley from the Light Spout. There are other encampments in the neighbourhood, as, for instance, at Castle Ring, two miles further north, and at Robury Ring, two miles south-west of The Pole.

At three o'clock, the party broke up for their homeward descent. Some preferred to keep to the main road over the hills leading to Church Stretton, certainly a charming walk on a clear day. Others more active walked direct over the moorland, except where their course was interrupted by treacherous bogs, to the summit of the Light Spout Waterfall, about one mile distant. The descent to its base was down a steep declivity which was very trying to the nerves of some of the party. Here a photograph was taken of the members grouped promiscuously in the foreground of the pleasing cascade. From this spot the pathway is good and fairly broad, and conducts down Carding Mill Glen to a road at the Carding Mill. On the way Mr. Cobbold pointed out some ripple marks on the right of the pathway, and informed us that we were traversing the principal division of the Lower or Slate Series of the Longmynds, generally considered as of pre-Cambrian age.

The Carding Mill may be considered a half-way house between the Light Spout Waterfall and the railway station at Church Stretton, being about a mile and a half distant from each. The information gathered that refreshments can be obtained there may prove useful to any of us when projecting a future visit to this locality.

The botany of this district is a hill flora, which used to comprise more rarities before their habitats got too well-known, and they were exterminated by visitors.

*The Geology of South Shropshire, by C. Lapworth and W. W. Watts, with two plates, maps, and numerous other illustrations, has been since published. It occupies pages 297 to 355 of the Geologists' Association Reports for July, 1894.—EDIT.

It is reported that £400 to £500 are annually made by the sale of bilberries gathered here by families during the months of August and September. This year (1894) they are scarce, and only a few ripe fruits were gathered and relished. The favourite plants found upon the boggy lands were Sundew (Drosera rotundifolia), Butterwort (Pinguicula), and the Bone-Breaking Asphodel (Narthecium ossifragum). Mr. William Phillips has furnished the following list of plants which may be found:—Euonymus europæus, Dianthus deltoides, Sedum telephium, Mentha rotundifolia, Marrubium vulgare, Geranium lucidum, Corydalis claviculata, Cerasus avium, Viburnum opulus, Cardamine impatiens, Montia fontana, Saxifragra tridactylites, Stellaria umbrosa, Pinguicula vulgaris, Chenopodium bonus-Henricus, and others. See also *Transactions* 1870, pages 148 to 157.

For general observations on Church Stretton and the neighbourhood, see *Transactions* 1874, page 1, and 1880, pages 246 to 248.

A list, so far as it could be made, of the large party present is appended:—Mr. James Davies (President), Mr. E. S. Cobbold (Honorary Secretary of the Caradoc and Severn Valley Field Club), who acted as director, Sir Herbert Croft, Count Louis Lubienski-Bodenham, and the following members:—Messrs. C. D. Andrews, F. Bainbridge, C. G. Blathwayt, T. Davies Burlton, G. Davies, Luther Davies, G. H. Hadfield, T. Hutchinson, C. G. J. Trevor-James, F. R. Kempson, R. Lewis, H. J. Parker, S. Phillips, H. Southall, H. G. Sugden, J. P. Sugden, H. A. Wadworth, and Alfred Watkins, Colonel J. C. Little, Surgeon-General Perry, Major Campbell, Revs. C. Burrough, C. E. Craigie, R. Harington, E. J. Holloway, A. G. Jones, H. North, W. R. Shepherd, and R. Wood.

Ladies: The Misses Boycott (2), Mrs. Burlton, Mrs. Burrough, Miss Burrough, Miss Burgess, Mrs. Campbell, Miss Carless, the Misses Chapman (2), Mrs. Chave, Miss Clarke-Jervoise, Miss Croft, Mrs. James Davies, Miss G. S. Davies, Miss Edwards, Mrs. Fitzsimons, Mrs. Hall, Miss Horsfall, Mrs. Hutchinson, the Misses Jones (2), Miss Frederica Jones, Miss Johnstone, Miss Kempson, Mrs. Lang, Miss A. Lloyd, Mrs. Little, Miss Macpherson, Miss Marshall, Miss Mason, Mrs. H. C. Moore, Mrs. North, the Misses Parker (2), Mrs. Perry, Mrs. Phillips, Miss Phillips, Miss Pilley, Mrs. Probert, the Misses Sale (2), Miss Shepherd, Mrs. H. J. Sugden, Mrs. J. P. Sugden, Miss Wadworth, Mrs. Alfred Watkins, Miss Webb, and Miss Young.

Gentlemen visitors: Rev. E. Salbé, Messrs. A. E. Boycott, Blathwayt, Burgess, R.A., C. J. Burrough, Campbell, W. Carless, Croft, E. G. Davies, H. Douglas, Edwards, Hall, Marshall, J. Probert, Salbé, E. Sandys, and Mons. H. Dévin.

NOTICE.

It was announced at this meeting, that, as the Committee had found the proposed visit to Rhayader impracticable (for inspection of the works of the Water Supply Scheme from Wales for Birmingham in the Elan Valley) the next field meeting would be held on Tuesday, August 28th, at Caerleon, in union with the Cardiff Naturalists' Society.

THE LIGHT SPOUT WATERFALL.

BROCKHURST CASTLE.

By Mr. Wm. Phillips.

The site of this Castle is on the south end of a ridge of rock, which extends about half a mile along the narrowest part of the Stretton Valley, and consists now of nothing more than the earthworks and a few fragments of hidden masonry. The approach to it is by a narrow road, partly cut through the rock, entering the enclosure at the north-west angle. Its general outline is oval, surrounded by a ditch and rampart in a fairly perfect condition throughout, saving what they have suffered by the weathering of many centuries; the ditch was, probably, at one time filled with water from a spring in the north-east corner, where now it is nearly always wet. Outside the entrenchment the ground descends on the south and west sides precipitately, some 70 or 80 feet to the plain below, where was formerly a large sheet of water extending nearly to Little Stretton, drained by the order of the Sheriff of Shropshire, in the 13th century. On the north and east sides the declivity is less abrupt. The area within the ditch is divided into two parts by a transverse ditch, thus forming an inner and outer court, the inner one with its keep being at the south end, access to which from the outer, or base court, would be by a drawbridge across the transverse ditch. Here, in the inner court, would reside the Lord of the Castle and his more trusty retainers, with such arms and valuables as they possessed. This, being 190 feet long, by 165 feet in its widest part, may appear a small space on which to build a castle, but we must not measure the accommodation required by those early possessors of ancient manors, by the requirements of modern life. Men in the middle rank of life now possess more comforts and conveniences than the barons of old. Sufficient evidence exists in the form of stones and mortar, coupled with the fact stated by Eyton, the great Shropshire antiquary, that persons living in his time "remember a fragment of a wall with an arch," to prove that the Castle and defences were of stone. The area of the outer court is much less than the inner, measuring only 185 feet by 105 feet. This differs from the common arrangements in other border castles of the same date, which usually have a large outer court.

Before proceeding to detail the few facts known of the history of the Castle, a word must be said about its position in regard to the surrounding country.

The beautiful Stretton Valley or Stretton Dale, as it was called in ancient documents, a name I could wish were revived, extends from Leebotwood southward to Marsh Brook, a distance of some seven miles, the narrowest part—the gorge—being where the Castle and the picturesque town of Church Stretton stand. It is bordered on the east by the Lawley, Caradoc, Ragleth and other hills, presenting a bold, broken outline; and by the Longmynd, with its numerous charming ravines, on the west. That this valley has been an important pass from ancient British to modern times, is almost self-evident to any one who considers the subject; hence there is found a succession of camps, castles, and moated dwellings of various dates on either side of the road passing through it. The

British trackway, contemporaneous with the remarkable encampment that crowns the summit of the Caradoc, which road was afterwards adopted by the Roman engineers for the passage of their legions, now called the "Watling" street, leading from Uriconium to Bravinium (Leintwardine), runs within a stone's throw from where we stand, and was guarded by the forces stationed at Norton Camp, near Craven Arms. This pass, important to the Romans, was not less important to the Saxons and the Normans, and so the forces of each have in turn marched along the ancient road now almost disused. The selection of this site on which to build a castle was not, therefore, a matter of caprice, but was governed by the strict rules of military tactics.

And now a few words on the history of the Castle. The earliest mention we have of the Manor of Stretton is in Domesday Book, in the following words:— "The Earl himself holds Stretton. Edwin the Earl held it with four berewicks. There are there eight hides. In the demesne there are three ox-teams, and six serfs, and two maid-serfs, and eighteen villans and eight bordarii, with a priest having twelve ox-teams. There are a mill and a Church, and in the wood five haiæ, and there may be six ox-teams more. In the time of King Edward it was worth thirteen pounds, now a hundred shillings." This invaluable survey was completed in 1086, just twenty years after the Norman Conquest, and in this brief, but comprehensive, description, we possess the first chapter of the history of Stretton. We learn that it was a demesne manor of the Earls of Mercia, the last of whom was Earl Edwin, who held it with four bailiwicks; that after the Conquest it was bestowed upon Earl Roger de Montgomery, who, at the time of the record, was in possession. There were a Church, a priest, a mill, and 34 persons of various social degrees representing the population. And further, to convey a notion of the extent of cultivated land, it is stated that there were 15 ox-teams to do the work of ploughing; not omitting five parks inclosed in the surrounding woods.

It will be observed that no Castle is mentioned as attached to Stretton, but we are not warranted in drawing the inference that the manor possessed no Castle. The survey was dealing with the fiscal value, and, as in other instances where castles are known to have existed, the record is silent. The probability is that a Castle existed here on the same site as Brockhurst, because it is difficult to believe the Saxon owners of the manor would not require one in such a position, where either the Earl himself would dwell, or his tenant, as guardians of the land. There is also further evidence in favour of this view in the size and arrangement of the earthworks, agreeing as they do so well with other sites of Saxon castles on the Welsh border. We will not, however, insist upon these considerations alone, having indubitable evidence that a royal castle was here as early as the first year of Henry II., which fact, taken in conjunction with what we have already said, forms as strong a case in favour of one having existed at the time of Domesday as could be wished. "Here," says Eyton, "was a royal castle which Henry II. in the first year of reign, deputed to the custody of Engelard de Pitchford, to whom also £4 per annum (being the reputed revenue of the manor) were assigned as a salary." Engelard de Stretton, as he came to be called, held this trust till the

summer of 1177; and afterwards a succession of castellans were appointed, some of whose names occur in the accounts of successive sheriffs for a long period, but into the history of whose lives we cannot on this occasion weary you by entering.

Suffice it to say, in conclusion, that in the year 1255 a jury was impounded to give an account of the manor, by the report of which it appears that the sheriff of Shropshire had ordered four men to dry the king's *vivary*, and to sell the fish, which realised nine merks. To a question about the state of royal castles, they replied that there was no castle at Stretton, so that at this early period it had become an uninhabited ruin. What circumstances had led to this result no documents exist to tell us, and the only other reference to it which I have been able to discover is that of Camden, who published his "Britannia" in the reign of Queen Elizabeth, in which he alludes to a vale where "are still remaining the ruins of an ancient castle called Brocard's Castle, surrounded by verdant meads, which anciently were fishponds." But this castle, and others, which he did not think it necessary to enumerate, he tells us "do for the most part owe their destruction not to the rage of war, but to the security of peace and length of time."

SCIENTIFIC REFLECTIONS ON THE NEIGHBOURHOOD OF CHURCH STRETTON.

By Mr. James Davies, President.

The affix of the name "Stretton," denoting the Street-town, in the nomenclature of Church Stretton and the adjoining villages of Long Stretton and All Stretton, points to the circumstance that they were hamlets situated on or near the site of an old road or trackway; and the preservation of the name has greatly assisted the antiquary in the identification of places connected with the early history of the country in Ancient British and Romano-British periods. The territory of the Ordovices comprised the country north of the river Teme, extending westward to the mouth of the River Rheidol, at Aberystwyth, and bounded northward by the river Mawddach, near Barmouth, and thence north-easterly to the river Dee, near Chester. The Ordovician District was bounded on the south by that of the Silures, whose country extended over Herefordshire, Monmouthshire, and Glamorgan, or thereabouts, for it is impossible to define the precise line of demarcation between those early tribal districts. They appear to have been two distinct peoples; for while the Silures were of an earlier Celtic stock, the Ordovices were of the Brython or later Celtic settlers, and are said to have been a more powerful state. They were more civilized, but not so indomitable as their Silurian neighbours, over whom Caradoc ruled, who resisted for so many years the Roman forces, until he was ultimately driven into the Ordovician territory, where the last struggle for native freedom occurred.

Various places have been named as the site of the final conflict, but the evidence appears to be in favour of a hill called the Gaerdykes, not far distant from the town of Clun.

Amongst other localities which have been named by older antiquaries was the hill above Church Stretton, known as Caer Caradoc, or the Camp, or Fort, of Caractacus. And here may be noted an interesting observation by Professor John Rhys (Professor of Celtic in the University of Oxford) in his "Celtic Britain" upon the name of this Tribal Ruler. Originally it was Carata-*cos;* but the Romans wrote Caratac*us*, which subsequent writers turned into *Caractacus*. "Carat," he says, represents the passive participle of the Welsh word "caru" to love, and the affix "ac" is frequently used in proper names. Professor Rhys adds that the name is very common in modern Welsh as *Caradog*, and in Irish as *Carthach*, perpetuated in an anglicised form by the Irish families who call themselves *MacCarthy*.

An incident in connection with the language of the Ordovices, as stated by Professor Rhys, is that the Cymry were a somewhat mixed people, consisting of the ancient Goidelic element, with a mixture of Brythonic blood, introduced mostly by the Ordovices. And as to Welsh he says, it is, roughly speaking, the Brythonic language as spoken by the Ordovices, and as learned by the Goidelic

peoples they overshadowed in the Principality of Wales. To this, he adds, its four chief dialects still correspond, being those of Powys, Gwent or Siluria, Dyfed or Dimetia (South Wales), and Gwynedd or Venedotia (North Wales).

A correspondent of the *Archæologia Cambrensis*, Vol. vi. of 4th Series, p. 384, makes some interesting remarks upon the characteristics of the Welsh dialects. Upon the testimony of Iolo Morganawg, he states that of the Welsh vernacular dialects, *that* of Cardiganshire, or South Wales, comes nearest to the modern literary dialect of which the Bible is esteemed the standard; the dialect of Glamorgan is the nearest of all others to that of the ancient MSS., whether in prose or verse. The dialect of North Wales is certainly the most remote from either the modern or ancient literary dialects, notwithstanding the opinion that prevails to the contrary, which is owing to the North Cymry so greatly arrogating to themselves all philological excellence; but, after all, the expressions in the various dialects would be recognised by the Welsh scholar, as being simply the result of a language very copious in words which have become separately adopted in the several localities of their vernacular usage.

Much may be said in commendation of the Welsh language as an aid to antiquarian study. Its affinity with Latin and Greek, as kindred Celtic tongues, is very marked; whilst its grammatical resemblance to Hebrew may be perceived upon a slight comparison.

But in the last language the affinity is more in grammatical and idiomatic correspondence, and in consequence in Welsh there is a more correct rendering of the text in the Old Testament Scriptures.

A few words will suffice to illustrate in the following languages what is stated.

In Latin.—Scribo	...	Ysgrifenu	...	To write.
Amnis	...	Avon	...	River.
Nox	...	Nos	...	Night.
Dies	...	Dydd	...	Day.
Luna	...	Llun	...	Moon.
Mare	..	Mor	...	Sea.
Cano	...	Canu	...	To sing.
Terra	...	Daear	..	Earth.
Fructus	...	Ffrwyth	...	Fruit.
In Greek.—Βαιος	...	Bach	...	Small.
Βορα	...	Bara	...	Food.
Βιος	...	Byw	...	Life.
Θυρα	...	Drws	...	Door.
Ειπω	...	Ebu	...	To say.
Λιμνη	...	Llyn	...	Lake.
Μεθη	...	Meddw	...	Drink.
Μειλισσω	...	Melysu	...	To sweeten.
Μονος	...	Mon	...	Alone.
Νεος	...	Newydd	...	New.
Ταυρος	...	Taru	...	Bull.

In Hebrew.—*Aish*	... Oes	...	An age.
Det	... Deddf	..	Law.
Dal	... Dal	...	Leaf.
Shal	... Sail	..	Foundation.
Pet	... Peth	.	A small quantity.
Pur	... Bwrw	—	To cast.
Sharph	... Sarf	..	Serpent.
Ter	... Troi	...	To turn.
Kern	... Corn	...	Horn.

The originality of the Welsh tongue is shown by the large number of elementary words which it contains. In an essay by the late Dr. Owen Pughe on the comparison of languages, he shows that there are a larger number of elementary words expressive of abstract ideas than in many other tongues. In his tabular list he gives as follows :—

Welsh,	223,	Greek,	44
Arabic,	148,	French,	39
Hebrew,	65,	English,	38
Latin,	45,	German,	31

Such words are—Ym (reflection), ca (a hold), yb (expulsion), da (good), du (black), ta (that extends), pa (what), ty (a house).

The vowel *a* has the force of motion, and is used as an expletive between the nominative and verb, and also corresponds with the words *and*, *that*, *with*, &c., in English. The vowel *e* denotes that which is past, and the letter *i* has regard to the future, corresponding with *to*. The letter *o* indicates the past, implying *of* and *from*. The letter *y* is the English article *the*, and *w* and *u* are inflections of the other vowels.

It is somewhat strange that the language should have so long continued as the vernacular over such a comparatively limited area as that of the Welsh-speaking population, and with the intercourse of English immigration and commerce.

To those who are interested in the subject of the Welsh language in relation to the present inhabitants of the Principality, a work recently published by Mr. John E. Southall, of Newport, entitled *Wales and her Language*, is well worthy of a perusal.

From a commercial point of view it would be advantageous to the inhabitants of the Principality to adopt the English language, rather than continue in a bilingual state; but the domestic hearth, and the loyal spirit in favour of the Old Land of the Fathers, will preserve it for many years to come, notwithstanding the existence of English schools and the circulation of English literature.

Upon reference to the Ordnance map it will be seen that the Welsh language still lingers in the names of places near Church Stretton. The Longmynd mountain itself has a Welsh affix, which is evidently derived from "Mynydd," a mountain, as also may be said of the parish of Mindtown, which has a similar prefix. There are, too, many places of a purely Welsh character, such as Pentre (a village), Trefnant Cwn (the town of the Dogs' Brook), Cardon (the wide camp), Colomendy (the dove cot), Ynys Gate (the island gate), Pwll-y-Pant (the pool in

the dingle), and many others, but they are all westward of Church Stretton, and are evidence that they were border districts upon the English boundary.

The Roman historian Tacitus informs us that Caradoc—or Caractacus, as the Latinized form—chose the country of the Ordovices, on account of its strength and difficult nature, to oppose there the Roman General Ostorius, but the precise locality of the final defeat has been assigned to many mountainous heights, and left the British warrior's name assigned to many a stronghold. The lofty hill of Caer-Caradoc, near Church Stretton, if not the scene of the final struggle, was in all probability a defence of the British chief, whose name it bears; and an important settlement in these parts, similar to *oppida* of Cæsar with respect to our Continental Gaulish neighbours.

The town of Church Stretton appears to lie near the site of the Roman-road which was the XII. Iter of Antoninus, mentioned by Sir Richard Colt Hoare in his edition of *Giraldus Cambrensis* as the *Via Orientalis*, which connected Caerleon-upon-Usk — or Isca Silurum — with Uriconium at Wroxeter, near Shrewsbury. The line of road ran from Caerleon to Burrium (near Usk), Gobannium (near Abergavenny), Magna Castra (at Kenchester), Bravinium (near Leintwardine), and thence to Uriconium, which was a much more important station than the others upon the Iter, except that of Isca Silurum.

Uriconium was evidently a town of much importance, and, like most of those bordering on Wales, was formed during the wars with the Silures, and was connected with the mining operations which were carried on in the mountains of Wales and Shropshire. The Rev. Prebendary Scarth, in his work on *Roman Britain* states that the mines in the Stiperstone Hills in the neighbourhood have traces of Roman workings; and that pigs of lead of the date of Vespasian (A.D. 76) have been found which have the stamp *De Ceang*, which would fix them to the country of the Cangi, extending along the extreme border of North Wales and part of Cheshire, whilst others have been found to the north of Bishop's Castle—at Snead, More, Shelve, apparently from the mines in Shelve Hill, with the stamp of the Emperor Hadrian, about A.D. 120. This shows that these mines were in work at an early period of Roman occupation, and that Uriconium was the most important city in these parts, and became a centre of commerce and civilisation to the surrounding Romanised districts. Church Stretton in all probability was a small station on the main road between the two cities of Uriconium and Isca Silurum. The ancient boundary of Cambria—the rivers Severn and Dee—although subject to frequent incursions, was not materially altered as a frontier by the English until the reign of Offa, towards the end of the eighth century. He reigned over Mercia, and made it the first power in England; and, besides his extensions in the other English States, he waged war with the Cymry west of the Severn, and added a very considerable tract of country to his growing dominions, including a large portion of Powysland with the town of Pengwern, the royal residence, which afterwards became Anglicised under the name of Shrewsbury.

Mr. Grant Allen, in his *Anglo-Saxon Britain*, in allusion to Offa, states that he ruled over the subject princes with rigour, and seems to have made his power

felt. He drove the Prince of Powys from Shrewsbury, and carried his ravages into the heart of Wales. He conquered the land between the Severn and the Wye, and his dyke, from the Dee to the Severn and the Wye, marked the new limits of the Welsh and English borders; while his laws codified the customs of Mercia, as those of Æthelberht and Ina had done with the customs of Kent and Wessex.

With the conquests of Offa there followed a change of language from the Celtic to the Teutonic, and in consequence the names of places assumed an English form—or more properly speaking Anglo-Saxon, for the latter tongue is only the former in its earliest stage. The language of the people became Anglo-Saxon which is truly English, not only in its structure and grammar, but also in the whole of its vocabulary, although the subsequent introduction of Latin and Greek elements extended the number of words, particularly of scientific terms; and the gradual development into the English of the present day may be traced in the writings of Chaucer, Shakespeare, Macaulay, and Tennyson, and the various other authors of modern literature.

In the town of Church Stretton itself there are objects of interest. In the year 1881 the Cambrian Archæological Association selected it as the place for holding the annual meeting, and in the report of the proceedings the parish Church was especially mentioned. It consists of a nave and chancel, with transept and a tower surmounted by a spire rising from the centre, and presents features of various dates from the Norman Conquest. One thing then particularly noticed, outside the Church, was the rude representation of a female, about two feet in length, which some of the members present conjectured was connected with a Roman Pagan Cult, as it was considered as ancient as the later Roman period.

The Town Hall is said to have been a successor of one of those interesting timber buildings, some of which still remain in Salop and Herefordshire, and is illustrated amongst the old castles and mansions of Shropshire by the late Mrs. Stackhouse Acton. It was not on so grand a scale as some of the others, but sufficient for the requirements of Church Stretton. According to Mrs. Acton, it was built in 1617, when, on the petition of one Bonham Norton and others, they were allowed to establish a market every Thursday. However, it appears that there was a grant in 1337 (10 Edward III.) for holding a market on Thursday, and a fair on the day before and the day after the Exaltation of the Cross, September 14th.

The Manor House is an excellent specimen of domestic architecture, which appears to have been originally built as it now stands, and was doubtless an important edifice at the time, but little is known of its history. There is a very good illustration of it by Mr. S. Worthington Smith in the *Archæologia Cambrensis* of 1882. It is to be hoped that any street improvement will not require the removal of so interesting an object of antiquity, and, it may be justly added ornament to the little town of Church Stretton.

The present "Ladies' Day," as it is styled, has not been the only meeting of the Club at Church Stretton.

The first was on the 18th of September, 1862. The next was on the 19th of August, 1870, and is entered on the records of the Woolhope Naturalists' Field

Club as "The Longmynd Hills," upon which occasion our Club met the Caradoc Field Club, and a very interesting paper on the geology of the Longmynd Hills was read by that eminent geologist, the Rev. J. D. La Touche, in which he very graphically described the geology of the district. This paper appears in the *Transactions* of the Woolhope Naturalists' Field Club for that year, and fully details the geology of the surrounding country—both hill and dale—from the well-known Stiperstones on the west to the bold Caer Caradoc on the east, with the Stretton Valley and neighbouring lines of hills. Another meeting at Church Stretton was held on the 15th of May, 1874, when, according to the *Transactions*, the principal feature appears to have been the examination of the Camp on Caer Caradoc, which was to the party an object of great interest, and which is described as one of the rudest and simplest specimens of castrametation in the district, and could not have been maintained for any length of time against the Roman forces. The geological section on that occasion was small, but it is stated that they regarded with interest the highly suggestive view. A fourth meeting at Church Stretton took place on the 24th of August, 1880; when, after a pleasant ramble over the hills and certain creature comforts at the hostelrie, there was a contribution of a very interesting and instructive nature by the late Mr. Timothy Curley, upon "Extinct animals and British fossil oxen discovered in Herefordshire," in which, after noticing the Fauna of England and Ireland, as well as the Continent, and the results of discovery during his own professional pursuits, he urged that both to the philosopher and the theologian it was of the highest importance to examine the evidence of the consistency of the universe, to see the wondrous whole which science teaches us. A fifth meeting at Church Stretton was held on the 17th of July, 1888, as a "Ladies' Day," when the Caer Caradoc was ascended, and geological and archæological remarks were given by the Rev. J. D. La Touche and Professor Lapworth.

The flora of the district presented some interesting specimens in the existence of the yellow violet, the bilberry or whortleberry, locally called whinberry; and a few birds which are rarely seen in Herefordshire were observed, such as the curlew, ring ouzel, wheat ear, and red grouse.

Here, then, we are for the sixth visit of the Club in the neighbourhood of Church Stretton, so highly favoured by nature. The associations, whether of antiquity or scientific discovery, afford a pleasing reverie to the contemplative man, and will amply repay the labour of renewed visits to such a charming locality. The hills surrounding Church Stretton present a varied field. From the height of the Longmynd the astronomer may nightly study the starry firmament. The geologist and the antiquary may in this neighbourhood indulge in the researches of remote historic and prehistoric periods. The botanist may here find pleasure in his flora; the poet and the painter may discover subjects for the pen and the pencil, and the novelist find ample means to indulge his imaginative faculties in the romance of fancied existence in ancient or modern social life. But it is time to draw these remarks to a close. What interesting reflections and speculations do the discoveries of science present to the contemplative mind! To the Astronomer the telescope reveals myriads of worlds at

distances of immeasurable mileage, and opens to view the expanded horizon of a boundless space. To the Microscopist the lens, as it increases in magnifying power, brings within the field of vision the most minute atom—suggesting that there is nothing so small that there cannot be smaller, and leading on, *ad infinitum*, to an illimitable diminutiveness. With the Geologist the superpositional stratifications in the Earth's crust can only be reckoned by successive periods of indefinite duration, resolving themselves into the problem of an incalculable time. The Linguist, in the study of ancient language, recognises the correct limit of two verbal tenses in their application to the current of the perpetual continuity of a never beginning past and a never ending future. The Latin Roman coined the word "Æternitas" (from "Æviternus," extended from "Ævum" an age)—hence Cicero, "Fatum est ex omni Æternitate fluens veritas sempiterna," to represent that which never had a beginning and would never have an end. The Greek invented *αει ων*, *αει on* (always existing) and the Hebrew the monosyllable *od*, a word which primarily corresponds with the English synonym "beyond," as well as the more expressive *olam*, which means that which is not within the conception of man. Our early British ancestry, following in the steps of the Hebrew, represented the idea by the word "tragywydd," which, upon analysis, may be interpreted as that which is beyond our knowledge. Indulging, apparently, in such intellectual reveries as these, the patriarchal scientist of antiquity endeavoured to trace the source. In his astronomical survey he perceived one "who made Arcturus, Orion, and Pleiades, and the chambers of the south," and in his geological research that "there is a vein for the silver, and a place for gold where they fine it." "Iron is taken out of the earth, and brass is molten out of the stone." "The stones of it are the place of sapphires, and it hath dust of gold." And he soliloquised the inquiry "where shall wisdom be found, and where is the place of understanding?" He searched the book of nature in the mineral, animal, and vegetable creation, and failed in the discovery. He repeated the question, and finding a limit to human knowledge, he abandoned the philosophical and metaphysical, and was constrained to embrace the moral and practical; whereupon he introduces the Divine Author Himself as giving to man the all-sufficient reply, "Behold the fear of the Lord, that is wisdom; and to depart from evil is understanding."

TWO NEW BRITISH RUBI.

By the Rev. Augustin Ley, M.A.

Rubus acutifrons, n. sp.—*References:* Botanical Exchange Club Reports, 1890, p. 294; 1891. pp. 331, 332: sub nomine *R. Lintoni* Focke.—Stem, when growing in open woods, forming a low arch, angular throughout, striate, reddish or brownish green in exposure; not pruinose, slightly hairy, with few or many stalked glands, and many short, tubercular-based acicles. Prickles many, the larger nearly equal, mostly but not always confined to the angles, deflexed, from long compressed dilated bases. Leaves flat, quinate-pedate, occasionally ternate, opaque, thin, nearly naked above, green and thinly hairy, not felted beneath. Leaflets not imbricate, the basal oval, intermediate obovate-acuminate, terminal broadly elliptic or subrotund, often irregularly but deeply incise-lobate in the upper half, with long acuminate point. Ordinary serrations rather shallow, nearly simple, with acute forward-pointing teeth. Petioles with many slender acicles and stalked glands, few slender declining prickles, and short hair. Stipules short, linear, fringed with stalked glands. Panicle long, compound, very lax but with the flowers remarkably aggregated; lower branches racemose-corymbose, intermediate cymose or pseudo-umbellate; corymbose above. Rachis wavy, with many slender deflexed prickles, stalked glands and patent hairs, especially in the upper part; slightly felted, but not grey with felt. Sepals ovate cuspidate-acuminate, clothed and coloured like the rachis, dark, with pale margins, strongly ascending after the petals fall. Petals rather small, obovate, pinkish; stamens white, exceeding the green styles. Fruit well formed, round, acid.

Habitat.—Woods. Not noticed in hedges, or in the open country. *Localities*—Rigg's Wood, Sellack; Coldborough Park Wood, Yatton; Haugh Wood, Mordiford; Belmont Woods, Hereford. All these localities are in Herefordshire, and lie within a radius of ten or twelve miles; the plant is abundant, and retains its characters well in each of them. I have had it under observation now for five seasons.

From the above description it will be seen that this plant approaches *R. Lintoni* Focke, especially in the shape of the leaves, and the glandular clothing of the rachis. I considered it to be *R. Lintoni* when I found it; and a reference to the Exchange Club Reports will show that Prof. Babington partly concurred in this opinion. The resemblance, however, is mainly superficial, and the essential differences, especially in the glandular clothing of the stem, the quinate leaves, and the uniformly much more largely developed panicle, justify the adoption of a new name.

A series of this plant, submitted to Dr. Focke in the autumn of 1892, elicited from him the following remarks, which he has kindly allowed me to make public:—

"The *Rubus* sent agrees very well indeed with a plant I have known for twenty-five years. Besides the difference of colour in the petals, I see not the least appreciable difference. I think, therefore, that I know the plant, but I know no name . . . In my *Synopsis Rub Germ.*, published in 1877, I mentioned it (p. 361) under *R. Betckei;* but as that is a very local and little known form, which has not been identified with any more constant species, it will not be advisable to make use of this name."

The Rev. W. M. Rogers suggests an affinity in our plant to *R. viridis* Kalt.; and in this suggestion Dr. Focke concurs.

Rubus ochrodermis, n. sp.—*References:* Botanical Exchange Club Reports, 1889, pp. 257, 258; 1890, p. 294; 1891, p. 330.—Stem extensively creeping when unsupported, thick at the base, often branching, ochreous, becoming dark brown-red in exposure, bluntly angular, striate, hairless, or nearly so. Prickles many, unequal, not confined to the angles, the largest ¼ inch long, declining, slightly deflexed towards the end of the stem, from rather broad bases, rather blunt, soon losing their points, and appearing on the old stems as pointless tubercles; passing into unequal, mostly eglandular acicles and minute bristles; all these organs being of an ochreous yellow. Leaves nearly always ternate, very rarely quinate-pedate; lateral leaflets roundly obovate-mucronate, gibbous below, and occasionally lobed, their petiolules very short, nearly patent, or rarely even divaricate; terminal rather long-petioled, roundly obovate-mucronate. All the leaflets nearly equal in size, flat, green on both sides, veins prominent below. Upper surface with a few scattered hairs; under with thin, harsh, curling hair; serration nearly simple, irregular, the larger teeth inclining backwards. Petioles bearing deflexed slender prickles, mixed with a few acicles, stalked glands and hairs. Stipules short, linear-lanceolate, fringed with hair and stalked glands. Panicle elongate, racemose or sub-racemose above, with more or less ascending peduncles in the ultra-axillary part, and long ascending racemose branches below. Leaves ternate or single, much like those of the stem but more coarsely serrate. Rachis and peduncles slender, felted, with short hairs, crowded stalked glands mostly no longer than the hairs, and very slender aciculate prickles and unequal acicles, which are nearly patent above, but lower down become strongly declining as well as stouter, and occasionally even deflexed. Sepals reflexed in flower and fruit, ovate, shortly pointed, green externally, bearing a few acicles and plentiful stalked glands, conspicuously grey-felted internally. Petals white or pinkish, narrow, small. Stamens white, at length red-based, longer than the greenish white styles.

Habitat.—Woods; not observed in hedges or in the open country. *Localites.*—Woods near Dinmore station; Haugh Wood, Mordiford; Wareham Wood, near Hereford. These stations all lie in Herefordshire, and within a radius of ten miles. Wood border at Llowes, Radnorshire. This station lies some eighteen miles to the west of the Herefordshire stations. In foliage and inflorescence bearing some resemblance to *R. mucronatus* Blox., but distinct and peculiar in the armature of its stem, in which it comes nearest to *R. scabrosus* Müll. I have not noticed this armature to be subject to any variation. Queried by Dr. Focke

in 1885 *(in lit.)*, "*mucronatus* Blox., I think"; but upon insufficient and too advanced specimens. Upon a series of specimens submitted to him in the autumn of 1892, he notes, "A remarkable form unknown to me."

Other opinions upon our plant can be seen at the places referred to above; but after watching it in the growing state for seven or eight seasons, I can say with some confidence that it cannot without violence be brought under any of the plants whose names have been as yet suggested for it.

I wish, in conclusion, to acknowledge the great assistance which I have received from the Rev. W. Moyle Rogers in drawing up the above descriptions.

THREE NEW BRAMBLE FORMS.

By the Rev. Augustin Ley, M.A.

Rubus nemoralis Müll., var. Silurum, n. var. Stem moderately strong, arching, angular, with flat or slightly concave faces, glabrous or nearly so. Prickles usually confined to the angles, declining from a compressed and dilated base, short or of medium length. Leaves quinate, *flat*, the leaflets not imbricate, basal elliptic, intermediate obovate-elliptic, *terminal broadly ovate-elliptic, rather shortly acuminate*, green on both sides, upper surface with very few scattered hairs, under with stiff short hair; veins impressed above, prominent below. Edges waved; serration rather coarse, teeth pointing forward, triangular, acute, the sinus rounded. Panicle with ternate or simple leaves, pyramidal, with 2-3 ascending branches, *disposed so as to form a flat open pyramid*; ultra-axillary part cylindrical, with 1—4-flowered branches. Rachis wavy below, straight above, with short declining prickles, no acicles or glands; upper part with short hair, scarcely felted. Sepals reflexed in flower and fruit, broadly ovate, with a short point, felted. Petals broadly ovate, contiguous, light pink; stamens white, exceeding green styles. Flowers always cup-shaped, never flat. Fruit freely formed, orbicular.

The flat leaves, and flat, often broadly pyramidal panicle, the bright green of the whole plant, and the impressed veins of the nearly glabrous not shining upper surface of the leaves are marked features. In distinction to typical *R. nemoralis* Müll. should be also noticed the terminal leaflet broader below, more acuminate, with coarser toothing; the lower branches of the panicle not lengthening, so that the panicle remains pyramidal throughout the season, and the rachis less hairy and not felted.

Woods and thickets in hilly, heathy situations. Lyonshall Park Wood; Shobdon; woods near Presteign; and Dorstone, Herefordshire; all these stations are in the north and west of the county. Aberedw, Rhayader, and Boughrood, Radnorshire; also between Llandrindod and Llanhir, Radnorshire, *Rev. W. H. Purchas!* Llanwrtyd and Abergwessin; Aberelan; and near Brecon, Breconshire. Head of Llwchwr Valley, Carmarthenshire. Tylwch and Llangurig, Montgomery. Dyffryn Castle and Tregaron, Cardigan. Bettws-y-Coed, Carnarvonshire. Shapwick Moor, North Somerset, *Rev. R. P. Murray!*

The plant above described has been under observation for a series of years, and has had various names suggested for it. It is due to the suggestion of the Rev. W. Moyle Roberts that it is now subordinated to *R. nemoralis* Müll. as a variety, a suggestion in which I heartily concur.

Rubus curvidens, n. sp. Stem tall, arching, angular, hairy; prickles not confined to the angles, stout, declining from compressed dilated base, with few acicles and stalked glands. Leaves large, quinate-digitate or pedate; stalks strongly armed with falcate prickles and a few acicles. Leaflets long-elliptic-obovate, *often with nearly parallel sides*, green on both sides, with scattered hairs above, more hairy on the veins beneath. Serration *coarsely crenate-serrate, with the larger teeth conspicuously recurved;* petiolule of the terminal leaflet one-third

to one-fourth of its length; basal leaflets nearly sessile, not imbricate; all the leaflets of nearly the same shape. Panicle often very large, cylindrical, blunt-topped, sometimes leafy to top, but often with long ultra axillary part, compound, branches ascending, the uppermost sometimes becoming patent, with ternate or simple leaves. Rachis *straight, usually strongly armed with declining prickles*, the upper part hairy and grey-felted, *with many slender acicles and unequal stalked glands*. Sepals grey-felted, aciculate and setose, ovate-acuminate, reflexed after flowering. Petals large, pink; stamens greenish white, connivent, exceeding styles.

The large and long, often nearly parallel-sided leaflets, with coarse serration, and backward curved principal teeth; the large and long panicle, with armature variable, but often abundant in prickles, acicles, and stalked glands, are characteristic points in this plant. It seems to stand best near to *R. Borœanus* and *R. anglosaxonicus*.

Abundant in several districts of Herefordshire, in woods and thickets. Castle-meadow Wood, Sellack. Near Athelstane's Wood, Little Dewchurch. Belmont, near Hereford. Dinmore Woods; and near Wormesley. All these stations are in Herefordshire. Thicket by the Cennen river, near Carreg Cennen, Carmarthenshire; clearly the same plant.

I have had this plant under observation since about 1880, and have received varying but always unsatisfactory suggestions from the authorities. Hence a name and description appear requisite.

Rubus Borreri Bell-Salt., var. virgultorum, n. var. Stem rather low, arching, bluntly angled, glabrous or nearly so, with tubercles bearing acicles, *sometimes numerous, at other times few;* stalked glands very few. Prickles short, stout, declining or deflexed, *usually far less numerous than in the type*, from a compressed dilated base. Leaves usually quinate; leaflets *green on both sides*, smooth above, with scattered hairs below, all roundly elliptic, very shortly acuminate, the serration of the edges rather coarse, *nearly simple*, teeth all pointing forward; petioles and petiolules *short, especially those of the basal leaflets, giving to the leaves a crowded growth*. Panicle-rachis with a dense clothing of stalked glands and acicles, its larger prickles usually very few, declining; sepals spreading in flower, reflexed in fruit; petals pinkish, stamens white, exceeding pale green styles.

Remarkable for the very variable clothing of prickles, acicles and stalked glands both on stem and rachis, in this character resembling *R. Drejeri* Jensen; and for its closely-set, roundish leaflets, contrasting in this point with the var. *dentatifolius* Briggs. The rachis at times resembles that of *R. infestus* W., in its numerous strong deflexed prickles. Related to *R. infestus* W., but clearly nearer to *R. Borreri* Bell-Salt, under which it is best placed as a variety.

Open rough pastures and coppices. The spots in which this bramble delights are termed "leasows" in this part of Herefordshire, that is, rough pastures, interspersed with pollard ash, and other trees. Hence the name "virgultorum" is not deemed inappropriate.

Localities. Scattered over several square miles in the country lying to the east of Leominster; Far Heath Coppice, Kimbolton; Tomlinshill and Yell's Wood; Thornbury; Pedwardine Wood, Brampton Bryan; all these stations in Herefordshire. Harley Heath, Worcestershire.

Woolhope Naturalists' Field Club.

FOURTH FIELD MEETING, TUESDAY, AUGUST 28TH, 1894.

THIS day had been originally fixed for the visit to the Works of the proposed Water Supply from the Elan Valley to Birmingham, but as this was found impracticable, a visit to Usk and Caerleon was substituted, in union with the Cardiff Naturalists' Society, under their President, Mr. Edwin Seward.

The members, leaving Hereford at 9.15, arrived at Pontypool Road at 10.27. The half-hour interval at this station was occupied in transacting the business of the Club, which included the election of three members, and the nomination of three Candidates. Estimates were presented for illustration of the water-shed of the rivers Elan and Claerwen for the water supply of Birmingham. The Honorary Secretary gave notice of a communication from Mrs. Baldwyn-Childe, kindly offering hospitality to any member who would assist in overlooking the excavations to be carried out very shortly at Garmsley Camp, near Kyre Park, under the superintendence of General Pitt Rivers.

Pontypool Road is one of the three railway stations belonging to the Great Western Railway Company, at that industrial centre of ironmakers, Pontypool. Of these, "the first was a family of the name of Grant, who were succeeded in the year 1565 by Mr. Richard Hanbury, citizen and goldsmith, of London." Mr. F. J. Mitchell, in a paper which he read at the meeting of the Cambrian Archæological Association at Newport in 1885, informs us that "at that time, in the reign of Elizabeth, the iron ore was smelted with charcoal, and to prevent the destruction of timber in making it, a statute was passed prohibiting the erection of ironworks, except in certain districts; of these Monmouthshire was one. In 1740, coal was successfully employed in iron-smelting, but the iron industries of this country developed at first very slowly, and the famous Nantyglo works were at first unsuccessful."

Leaving Pontypool Road railway station, the members trained to Usk, where at 11.22 they were met by the vicar (the Rev. P. L. C. Nash), who at once conducted them through the town to the church, the only delay *en route* being an inspection by the botanists of the rare *Hibiscus Syriacus*, syn: *Althœa frutex*, in blossom, adorning the walls of a house on the left; this plant belongs to the order Malvaceæ, it was introduced from Syria about 1596. Mr. J. H. Clark, Portreeve, of Usk, whose absence was very much regretted, had kindly furnished the Honorary Secretary with copious papers and memoranda containing information from numerous sources appertaining to the history of Usk. These are all recorded in detail in a work by Mr. J. H. Clark, under the title of "Usk, past and Present," published at the *County Observer* Office, Usk.

After an inspection of the church and the reading by the Honorary Secretary of a paper on Usk Church by Mr. Stephen Williams, of Rhayader, followed by critical remarks on its architectural details by Mr. F. R. Kempson, the members walked to, and inspected, the Castle. Here a paper was read by the President, Mr. James Davies, on "The Roman Station of Burrium and Usk Castle." From the summit of the Keep a commanding view is obtained. Visitors often leave the Castle in ignorance of the position of the old entrance gateway. Such would have been the fate of the visitors now had it not been for the timely appearance upon the scene of Mrs. Attwood Mathews, who, in company with Lady Barnard, intimated an invitation from the latter to visit her residence, separated from the Castle walls by her garden. Here was seen the entrance gateway, position of the gates, portcullis, and other parts of the original building, with walls of enormous thickness, now incorporated with the dwelling house, known as The Castle House, occupied by Sir Charles Barnard. A short sylvan walk through the private grounds, crossing the original moat, conducted to the station where, after inspecting the Tamarisk tree in the station grounds, the train was taken at 1.18 for Pontypool Road. *Tamarisk Gallica*, *Indica* (common Tamarisk).—This is a hardy shrub, it ranges from India to Europe. The manna of Mount Sinai, which consists of mucilaginous sugar, is produced by a variety of Tamarisk Gallica.

At Pontypool Road Station there was another interval of half-an-hour, which was usefully spent in partaking of refreshments, no less than thirty being accommodated, by pre-arrangement with the manageress, with seats and provisions in the refreshment room.

On arrival at Caerleon at 2.20, a remarkable punctuality of train service having been maintained, the members were met by Mr. F. J. Mitchell, of Llanfrechfa Grange, who kindly acted as director of the large party over the ancient Roman City. Caerleon was a place of importance before the advent of the Romans. In a paper by Mr. Robert F. Woollett, read before the Cambrian Archæological Association at Newport on August 26th, 1885, we read that "when the Romans came, Caerleon was presided over by an Arch-Flamen, of which there were three in Britain; the sees of these Arch-Flamens being three of the most noble cities in Britain, which were London, Everwick, and the "City of Legions," on the river Usk, in the County of Monmouth; which "is a place delicious, and passing in riches all other cities," as we are told by an old French writer. And it was here that Caractacus held his court some two or three centuries before King Arthur's time." In fact, Mr. Woollett writes that Caerleon may be said to date from about B.C. 300. Caerleon, originally Caer-lleon, a corruption of "Caer-llengoed," the camp of legions, is the British city here referred to.

For the remainder of the day the mind was being constantly reminded of the former glories of this seat of learning, of its Archbishop's see, and of its increasing importance under the Roman sway. Mr. Mitchell pointed out the principal points of interest, first directing attention to the square-shaped form of the fortress, the moat still visible on the south side, the amphitheatre outside the south wall—

the Roman walls *in situ* (their facings only having been removed), at the south angle of the city, exposing the pounded brick in the mortar hardened by age as well as by skill in its manufacture. Proceeding along the eastern side the party was halted to observe the remains of two mediæval round towers commanding the ford or the bridge over the Usk, and the ruins of abutments of the wooden bridge. Upon the banks of this tidal river the botanists here discovered specimens of *Aster Tripolium*, the parent of our Michaelmas daisy. The Hanbury Arms,* which has traces of Tudor-framed windows, was entered, and examination was made of a turnspit dog-wheel in the kitchen, a wooden wheel in perfect condition, about 30 inches in diameter, and the pulleys in the chimney breast still *in situ*. The next place visited was the grounds of Mr. Alfred Williams, on whose premises an ancient Roman villa had been discovered near the base of an elevated earthern mound. The way of ascent of this lofty artificial work in the Castle grounds is by a spiral walk. The work is *post* Roman, being thrown up over a ruined Roman villa, but it is *ante* Norman. Formerly it was surmounted with walls, and must be "the tower of prodigious size" to which Giraldus Cambrensis refers when he wrote between seven and eight hundred years after the Romans left it. Generation after generation has contributed to its superstructure. Mr. Williams informed us that his predecessor had added his contribution by elevating the *enceinte* of earthern embankment on its summit.

The company was joined on the mound by the members of the Cardiff Naturalists' Society. Mr. Thomas Hutchinson read a paper on *The Wolf in Britain*, in which he proved that wolves existed in England and Wales until the latter end of the 15th century, and were not exterminated—as stated by Hume—in the time of Edgar, 958 A.D. to 975 A.D., that they existed in Scotland till 1680, and in Ireland to 1710. The President read a paper on *Caerleon and Caerwent.* The remainder of the time at the disposal of the visitors was most pleasantly occupied in examining the many relics of Roman art and labour in the Museum, being a collection chiefly of discoveries in the locality and its vicinity. Rather than attempt to describe them, we shall at present only refer our readers to *Transactions* of the Woolhope Club, 1875, page 114, to articles in *The Antiquary* for March, April, and May, 1894, by Mr. John Ward, F.S.A., now curator of the Museum at Cardiff, and best of all authorities, to the excellent illustrated catalogue by the late J. E. Lee, F.S.A., F.G.S.

The members of the Club are much indebted to Mr. F. J. Mitchell for devoting so much of his time and his abilities to pointing out so many objects of historical and archæological interest, and they have pleasant recollections of the hospitality of the Vicar, and the refreshing tea under his roof just before leaving Caerleon at 5.42.

The following attended this the fourth Field Meeting of the Club:—The President (Mr. James Davies); members—Messrs. Charles D. Andrews, B. St. John Attwood-Mathews, Rev. Joseph Barker, H. C. Beddoe, Rev. H. Bennett,

*At the Hanbury Arms is exhibited the chair chiefly occupied by Tennyson in his apartment overlooking the Usk. In 1850 the result of his sojourn at Caerleon was seen when he produced his *Idylls of the King*.

Rev. J. O. Bevan, C. G. Blathwayt, Rev. C. Burrough, Major J. E. R. Campbell, S. Carrington, R. Clarke, Rev. W. S. Clarke, E. Conder, Rev. Sir G. H. Cornewall, Sir Herbert Croft, Luther Davis, Rev. E. R. Firmstone, W. J. Grant, Rev. J. E. Grasett, Rev. C. S. Hagreen, Rev. Charles Harington, T. Hutchinson, F. R. Kempson, Rev. Preb. W. H. Lambert, Peyton Levason, James W. Lloyd, Surgeon-General Perry, Rev. F. O. Philpott, Walter Pilley, H. Southall, W. H. Steward, Rev. F. S. Stooke Vaughan, Hatton G. Sugden, J. P. Sugden, Rev. M. G. Watkins, Rev. H. Trevor Williamson, and the Hon. Secretary (H. C. Moore), and Assistant Secretary (James B. Pilley). Visitors: Rev. John Barker, Mr. Bartlett, Mr. J. Burrough, Mr. Davis, sen., Colonel W. M. Ducat (R.E.), Messrs. Lacon Lambe, John Lloyd, T. D. Morgan, James Nott, John Probert, H. E. Wood.

THE ROMAN STATION OF BURRIUM, AND USK CASTLE.

By Mr. James Davies, President.

According to the earliest evidence which we possess regarding the town and castle of Usk (which is that of the Itinera of Antoninus), the Roman Station of Burrium was situated in the immediate neighbourhood. The Roman road forming the XII. Iter, which connected Isca Silurum (Caerleon) with Uriconium (at Wroxeter), passed by Burrium, and, according to Iter XIII., another road connected Burrium with Glevum (at Gloucester), passing Blestium (at Monmouth) and Ariconium (at Weston-under-Penyard). In a commentary on the Itineraries of Antoninus by William Burton, published in 1658, in his remarks upon the XIIth Iter, under the head "Burrium," he states that it stands where the stream of Birthin is mingled with the Isca. He also states "The Britons at this day transposing the letters call it Brubege for Burenbege, and by Giraldus it is called Castrum Oscoe, but by the English Uske." He adds, "It now only possesses the ground or room of a large and fortified Castle, which most pleasantly lies between the Rivers Isca and Olway, the stream which passeth by the neat dwelling of the Earl of Worcester, as it were under a castle on the east."

Mr. Coxe, in his *Historical Tour of Monmouthshire*, published in 1801, informs us that although no Roman antiquities have ever been discovered at Usk, or its vicinity, yet it has always been allowed to be the ancient Burrium, an opinion confirmed by its central position between Isca Silurum, Gobannium, and Blestium, and by the exact coincidence of its distance from those places with that recorded in the Itineraries. Many authors, he adds, have also drawn other proofs from its square form, its situation at the confluence of two rivers, a supposed resemblance between the Roman name of Burrium and the British appellation Bryn Byga. It was most probably a British town, and derived its Roman name from "Bwr," which means an entrenchment or fortified enclosure, in accordance with the villages of the Ancient Britons. It appears to have been occupied by the Romans as a small station, guarded by a garrison, which probably occupied a fort supposed to be situated where the ruins of the Castle now stand. Mr Coxe mentions that remains had been discovered in the shape of pavements, and that in a field to the south of the town, between the Church and the turnpike road, a paved road was discovered, which was nine feet broad and formed of hewn stones placed edgeways.

The ruins of the Castle stand on an eminence to the east of the river, and follow the circular bend of the hill; at the extremity of the south wall is a gateway, with a groove for a portcullis. A full description is unnecessary when it is seen *in situ*. Mr. Coxe states that no Castle in Monmouthshire had been subjected to more serious assaults. It suffered from the ravages of Owen Glyndwr, who, after committing the most merciless depredations, was defeated at the battle of Usk by the Royal troops, and driven back in disgrace to his native mountains.

The founder of this Castle is unknown. The earliest account of it is that it belonged to Richard de Clare, Earl of Gloucester and Hereford, who lived in the reign of Henry III., and on whose death in 1262 his widow, Maud, had an assignment of the Castle and Manor of Usk, as part of her dower. In all probability, therefore, it came into the Clare family from his ancestors, who conquered Netherwent. The first of these was Walter de Clare, and then Gilbert de Clare, who flourished in the reign of Henry I.; and the general character of the building would intimate that it was built during the Norman era, and under the advancing conquests of the Lords Marchers into Wales under their Royal grants from the English Crown. On the death of Gilbert de Clare in 1314, his sister Elizabeth conveyed the Castle of Usk to her husband, John de Burgh, son of Richard, Earl of Ulster. Their son William left an only daughter, Elizabeth, who married Lionel, Duke of Clarence, third son of Edward III., and united by this marriage the estates of the families of De Burgh and Clare. His only daughter, Philippa, married Edmund Mortimer, Earl of March, a great grandson of Roger de Mortimer, who in 1330 was attainted and executed for the murder of Edward II. In 1369 Edmund Mortimer had livery (as it was called) of all his castles and lands from the Crown, and became a peer, bearing the titles of Earl of March and Ulster, Lord of Wigmore, Clare, and Connaught, and Marshall of England; and in 1379 was constituted Lord Lieutenant of Ireland. He died prematurely at Cork in 1381, in the 29th year of his age.

Edmund Mortimer had issue three sons and two daughters. His second son, Sir Edmund Mortimer, Knight, was taken prisoner by Owen Glyndwr in 1403. The youngest son, John, was imprisoned in the Tower, and executed in 1424 under the charge of attempting to escape and raise an insurrection in Wales. Roger, the eldest son, was born at Usk in 1374, and baptized by William Courtenay, Bishop of Hereford; and in the Parliament held in 1386, by virtue of his descent from Lionel, Duke of Clarence, he was declared heir apparent to the Crown. After doing homage and receiving livery of all his lands, he followed in 1396 the King into Ireland, and in 1399, being then Lord Lieutenant, as he was incautiously advancing before his army in an Irish habit, was slain. His eldest son, Edmund, then only six years old, who was the rightful heir to the throne, was detained in custody at Windsor by the jealousy of Henry IV. His uncle, Sir Edmund Mortimer, after his capture, having entered into a league with Owen Glyndwr and Henry Percy to dethrone the King and raise his nephew to the Crown, the young Earl was secretly conveyed away, but retaken in his journey to Wales, and detained in still closer custody. Through the clemency of Henry V., who was well aware of his right to the throne, he was released from confinement and treated with great kindness.

Influenced by this treatment the Earl of March served his sovereign with much fidelity, and repeatedly followed him at the head of his numerous retainers. He died shortly after the death of Henry V., and leaving no issue, his possessions were assigned to his nephew Richard, Duke of York. The Castle of Usk was a favourite residence, and it was distinguished by the birth of his two sons, who afterwards became Edward IV. and Richard III., but not without doubt as to the latter. On the death of Richard III. the Castle of Usk came into the

possession of Henry VII. by his marriage with the daughter of Edward IV. Henry VII., it is stated, granted the Castle to his son, Prince Arthur, and after his death it was granted to Katherine Parr. Before her decease Edward VI. granted it to Sir William Herbert, afterwards Earl of Pembroke. It thus got into the possession of William, Earl of Pembroke, of the second branch of the Herbert family. During the reigns of Henry VII. and VIII. the Castle was allowed to fall into decay, and ultimately by marriage of the daughter and heiress of Philip Herbert, it passed to Thomas, Viscount Windsor. The Castle was purchased from their grandson, Herbert, Viscount Windsor, with other property by Valentine Morris, of Piercefield, who sold it to Lord Clive, of whom it was bought by the late Duke of Beaufort at the close of the last century. It will be perceived that the history of Usk Castle is, to a certain extent, interwoven with that of the succession to the English throne in the houses of Plantagenet, Lancaster, York, and Tudor.

It has been stated that Richard III. was born in Usk Castle, upon the authority of Churchyard's *Worthines of Wales*, printed in 1587. Richard III. is said to have been born in 1452, and died in 1485. The lines of Churchyard are—

"A Castle there in Oske doth yet remain
A Seate where kings and princes have been born."

Then there is a marginal note "King Edward IV. and his children, as some affirme, and King Richard III. were borne here." According to Speed's Map, however, 1611, it is stated that Richard III., son of Richard, Duke of York, was born at Fotheringay Castle, in the county of Northampton. Sandford (Lancaster Herald at Arms), 1683, in his *Genealogical History of the Kings of England*, states, "Among the sons of Richard, Duke of York, and Cecilly Nevill his wife, this Richard was the eighth and youngest son, born at Fotheringay Castle, in the county of Northampton, his father's Manor House."

The following are notes from the *Calendar of State Papers*, appearing in the *Archæologia Cambrensis* for the year 1876, in the report of the visit of the Cambrian Archæological Association to Usk Castle, and to which we are indebted for some of the information in this paper. They refer to the reign of Henry VIII. "18th May 1509, Thomas ap Robert to be Receiver General in Chief of the Lordships or Manors of Uske, Kaerleon, and Trillick, in Wales; Constable of Tregrake, Bedell, and Coroner of Edlogan." "5 September, 1509, John ap Morgan to be Keeper of Carlion Park in the Lordship of Uske, parcell of the Earldom of March." "1 Feb. 1510, William Edwardes to be approver of the Lordships of Uske, Caleon, and Trellek, and Beadle of Usk during pleasure." "12 March, 1511, Thomas Roberts and John Pergent to be auditors of the lands of William, late Earl of Huntingdon, in Somerset and Dorset, the Barony of Kemes, and the Manors of Uske, Carlion, and Narbath." "10 Oct. 1511, Thomas Palmer to be Coroner of the Lordships of Usk, Llybenyth, and Trelek, Constable of Caerleon Castle, Approver, Beadle, Castle Reeve, and Court Clerk of the Lordship of Usk." "6 May 1514, Grant to Charles, Earl of Worcester, and Henry Somerset, Lord Herbert his heir, in survivorship, of the offices of Steward of the Lordship of Uske, Kaerleon, and Trillek, in Wales, and of the Constable of the Castle of Usk, on the death or surrender of Sir William Morgan."

CAERLLEON-UPON-USK (ISCA SILURUM).

By Mr. James Davies, President.

The scraps of information and extracts presented in this paper are the result of a sort of recreative rummaging over certain old authors, with the view of endeavouring to throw some light on the early history of the ancient city of Caerlleon-upon-Usk, one of the oldest places of importance in this kingdom, and a former capital, not only of the Roman Provincial Rule under the title of Britannia Secunda, but also of early British Dominion, as well before the arrival as after the departure of the Imperial Arms.

In a work entitled *A Commentary on Antoninus' Itinerary so far as it concerneth Britain*, by William Burton, published in 1658, there is a reference to the station of "Isca." It appears that Ptolemy, in error, placed the Isca of the 2nd Legion of Augustus at Exeter, which was Isca Damnoniorum, whereas this Legion was at Isca Silurum, which was also called Caerlleon-ar-Wysg, or Caerleon-upon-Usk.

The author from whom we quote, in the geographical description of Iter XII. of Antoninus, under the head of Isca Leg. II. Ang. states: "Although Ptolomie places this Legion quite among a distinct people, yet the same Legion may be understood where he hath Ισκα Λεγεων δευτερα Σεβαστη, Isca Sebasta altera Legio," "I will briefly, in a Welsh antiquary's words, describe this city unto you, and that at full." He then quotes briefly in Latin from the Itinerary of Archbishop Baldwyn through Wales in 1188, as recorded by Giraldus de Barri, Archdeacon of Brecon, who accompanied him as interpreter; but I will, in a more extended form, give the reference from the English edition by the late Sir Richard Colt Hoare. "Giraldus states this city was of undoubted antiquity, and handsomely built of brick* by the Romans, and many vestiges of its former splendour may yet be seen. Immense palaces, ornamented with gilded roofs in imitation of Roman magnificence, a tower of prodigious size,† remarkable hot baths, relics of temples and theatres enclosed within fine walls, parts of which remain standing. You will find on all sides, both within and without the circuit of the walls, subterraneous vaults and aqueducts; and, what I think worthy of notice, stoves contrived with wonderful art to transmit the heat insensibly through narrow tubes."

The author of the *Commentary on the Antoninus' Itinerary* then proceeds to notice that there were discovered stones with Roman inscriptions, and amongst them one which mentioned the effigies of Diana, witnessing that a temple dedicated to her was restored by Titus Flavius Postumius Veteranus, perhaps one of the body of the Cohorts of the second Legion.

"T. Flavius Posthumius Varus
V. C. Leg. Templ. Dianæ
Restituit."

*The opinion has been expressed that the red stone of the district, of which the residences were built, was mistaken for bricks by the writer.

†The present Tump?

Our author adds that this legion, instituted by Augustus, was taken into Britain by Claudius Cæsar, and planted here; where, under the command of Julius Frontinus, it was stationed against the Silures, of whom Tacitus speaks; and the station was hence called Isca Silurum, becoming the chief city of the Roman Province of Britannia Secunda.

As respects the derivation of the name of this ancient city there has been a difference of opinion amongst Welsh antiquaries. One author (Mr. Owen) contended that it should be written Caer-Llion, *i.e.*, the City of Waters, from the circumstance that it was situated upon the river Usk, which latter word is the English form of the Welsh "Wysg,' meaning a stream of water, and this circumstance caused Ptolemy to confuse this Roman station with another—now Anglicised into "Exeter." In fact there were two Iscas, the Latinized form of "Wysg"—Isca Silurum, the Capital of Britannia Secunda, and Isca Damnoniorum, the Isca of the Damnonii in Britannia Prima, which was situated upon another river, "Wysg," now called "Exe," and hence the name of Exeter. Another derivation is that it obtained the name from Lleon, an ancient British King, who was supposed to have been the founder, and that it was called "Caerlleon ar Wysg," to distinguish it from the more important city of "Caerlleon ar Dyfrdwy," or Chester, which was built upon the river Dee, and which was also known as Deva. Legendary tradition attributes the building of this city to Beli Mawr, a King of the Britons, who lived about 350 years before the Christian era, and states that the Romans changed its name to "The City of the Legions," when they placed their troops there; so that whether it be called "The City of the Legions," "The City of Lleon," or "The City of Waters" must remain an open question. Ross of Warwick, as quoted by Sir R. C. Hoare, says that Beli built the City of the Legions in Cambria, and that it (Caerlleon-upon-Usk) was the metropolis of Demetia or South Wales, as the other City of the Legions (Chester) was the metropolis of Venedotia, or North Wales; and Sir R. C. Hoare gives the preference to the Latin nomenclature of Ross of Warwick, and "Giraldus Cambrensis," because, as he states, it was the second Legion that was stationed at Caerlleon-upon-Usk, and a distinct Legion, the twentieth, that was stationed at the other Caerlleon, or Deva.

The Hebrew scholar will readily recognize in the prefix "Caer" the synonym of the Hebrew word "Kir" (a wall) which occurs as a similar prefix in the names of many cities of antiquity, such as "Kirjath-Arba" and "Kirjath-Jearim"; and from the circumstance of towns being fortified came to denote a city, or place of defence, similar to the Welsh word "Caer"—hence the famous Carthage had its ancient name of Carthada from a Semitic source, as many of our towns in England and Wales, such as Carlisle, Carnarvon, Cardiff, Carmarthen, and others, had their nomenclature from a Celtic origin.

As a necesssary consequence the city of Caerlleon upon Usk was connected with the other Roman stations or towns by two important roads, which are mentioned in the Itinera of Antoninus. One of these highways was the road which led from Aquæ Solis, at Bath, across the river Severn, via Caerwent and Caerlleon, and several other stations, to Menapia, at St. David's: which appears

to have been constructed upon the site of a more ancient British trackway, called "The Akeman Street," and which Sir R. C. Hoare distinguished by the name of "Via Julia Maritima."

The other Roman road ran northwards, and connected Caerlleon with Uriconium, near Shrewsbury, as well as other intermediate stations, and is denoted by Sir R. C. Hoare as "Via Orientalis."

In connection with the Ecclesiastical history of the early British, and the later Cambro-British Church, the City of Isca Silurum, or Caerlleon upon Usk, is associated with many important events. In addition to its being the seat of one of the Archbishoprics represented at the early general councils of the Church, here Julius and Aaron, under the Diocletian persecution at the end of the third or the beginning of the fourth century, consequent upon the threatened spread of Christianity, suffered martyrdom, and are reckoned amongst the first martyrs of Britain. Giraldus states that they were both buried in this city, and had each a Church dedicated to him. He says "In ancient times there were three fine Churches in this city: one dedicated to Julius, the martyr, graced with a choir of nuns; another to Aaron, his associate, and ennobled with an Order of Canons; and the third distinguished as the Metropolitan See of Wales. Amphibalus, the instructor of Albanus in the true faith," he adds, "was born in this place." Albanus, it will be remembered, was the proto-martyr of Britain, and suffered death at the Roman city of Verulam, in memory of whom it was afterwards called St. Alban's. Amphibalus appears to have escaped, and fled to Caerlleon upon Usk, where he was afterwards captured, taken back to Verulam, and there executed, like his friend, for the simple offence (if such it can be styled) of the profession of Christianity. Giraldus describes this city as well situated on the river Usk, navigable to the sea, and adorned with woods and meadows. The Roman ambassadors, he adds, here received their audience at the Court of the great King Arthur, and here also the Archbishop Dubricius ceded his honours to David of Menevia, the Metropolitan See being translated from this place to Menevia, according to the prophecy of Merlin Ambrosius—"*Menevia pallio Urbis Legionum induetur*," "Menevia shall be invested with the pall of the City of Legions." It must be noted that the latter remarks of Giraldus must refer to a period when the Romans had left Britain, because the time of Arthur, Dubricius, and David would be towards the middle and close of the 6th century. At the meeting of the Cambro-British Bishops with Augustine, upon his attempt to reduce the native Church of Western Britain under his rule, the former stated that they acknowledged no other jurisdiction than that of the Archbishop of Caerlleon upon Usk, which shows that, although about that time the Archiepiscopal See was transferred to St. David's, the titular name of Caerlleon was preserved as the name given by the seven Cambro-British Bishops at the noted Synod of Augustine, which he convened for the interview. A more modern writer, the author of *Horæ Britannicæ*, published in 1819, informs us that this city was celebrated as being the seat of King Arthur and the Silurian Princes, and the Lords of Gwent, who made a valiant stand against the growing power of the Anglo-Saxons. He states that in a field, without the walls, may be observed a large oval concavity,

known by the name of "Arthur's Round Table" which, in all probability, was the site of the Roman amphitheatre; of the gigantic tower spoken of by older writers, the trace is to be seen in the fine eminence called "The Tump." He identified a house which had been a Cistercian abbey, and one of the religious houses mentioned by Giraldus Cambrensis, and adds that there was an old mansion which was once occupied by that singular character Lord Herbert, of Chirbury. A long history of this extraordinary man may be seen in Mr. Coxe's *Historical Tour in Monmouthshire*, published in 1801. After the departure of the Romans from Britain legendary romance ascribed to Caerlleon the important position of being the metropolis of the British empire, and the favourite residence of the renowned King Arthur and the Knights of the Round Table. Arthur is said to have reigned at some period during the sixth century, and has been recognised as the fourth of the Armorican line of Kings. The accounts given of Arthur are of a somewhat uncertain character, and simply testify to his existence. The name of Arthur's round table given to the remains of the Roman amphitheatre at Caerlleon has raised a supposition that a military order was instituted. Arthur and his Knights are alleged to have held their feasts within this area, seated at a round table, for the usual purposes of social enjoyment; but it is said that this legend has not been founded upon true history, and is based upon the fabulous traditions of early ages.

The number of these heroes has been varied. Some limit the number to twelve, as Dryden—

> Who bear the bow were Knights in Arthur's reign;
> Twelve they, and twelve the knights of Charlemagne.

Another ballad on the acts of King Arthur makes them fifty—

> Then into Britain straight he came,
> Where fifty good and able
> Knights then repairéd unto him,
> Which were of the round table.

Another speaks thus—

> Who has in prison threescore Knights
> And four that he had wound,
> Knights of King Arthur's Court they be,
> And of his table round.

On the death of Arthur the order was supposed to be extinguished. The order fell into disrepute among the Anglo Saxons, but abroad there arose a revival in the twelve peers of Charlemagne. After the Norman Conquest Arthur's memory was much cherished, and the idea of the round table again gained ground in the Royal tournaments which were afterwards instituted; and Edward I., on the conquest of Wales, with the view to conciliate the affections of his new subjects, who respected the memory of Arthur, and believed that he was not dead, but that he would re-appear and re-establish the seat of his empire at Caerlleon, held a rouud table, and celebrated it with a tournament at Carnarvon. We must now pass on to consider briefly the neighbouring Roman city of Caerwent.

CAERWENT (VENTA SILURUM).

In the Itinerary of Antoninus three stations are mentioned under the name of Venta:

1. Venta Belgarum, at Winchester, on the Iter vii., which led from Clausentum, near Southampton, to Londinium—London;

2. Venta Icenorum (Caster, Norfolk), on Iter ix., which led from thence passing Sitomagus, near Retford, to Londinium—London;

3. Venta Silurum (Caerwent) on Iter xiv., which led from Isca Silurum (Caerlleon), passing Venta Silurum (Caerwent), Abone, on the north of the River Severn, near Chepstow, Trajectus, on the south side, thence to Aquæ Solis at Bath, thence to Verlucio, near Warminster—Cunetio, near Marlborough, Spinæ, near Spene, and to Calleva Attrebatum, near Wallingford, where it appears to have united with Iter vii., connecting Clausentum, near Southampton, with Londinium.

Venta Silurum, as the name implies, was situated in the territory of the Silures, who have always been described as a fierce nation, which could not be influenced by clemency, but would only be subdued by war.

In the year 1885, the members of the Cambrian Archæological Association, during their annual meeting at Newport, visited Caerwent, and the company who attended had an opportunity of examining the remains of this ancient city, which consist principally of the walls which could be traced the whole way round the city. They formed a somewhat irregular parallelogram, the north and south walls being about five hundred yards in length, and the east and west about three hundred and ninety. There was a tradition that Caerwent was once a seaport, and that the Nedern, a small rivulet flowing in an adjoining field, was once a tidal river, and that vessels came up even to the walls of the city. Some of the old inhabitants had it on tradition that there were iron rings in the walls to which the ships were fastened, and some asserted that they had seen them, and described them as being about ten inches or a foot in diameter, but very much corroded.

It is recorded in the account of this visit in the Archæologia Cambrensis, Vol. 2nd of fifth series, that in the year 1786 Sayer, the historian of Bristol, visited this place, and stayed some time making careful notes. He found in the south-west angle remains of cross walls, which occupied considerable space, and that at that time limekilns were in active work, and that much of the walls was remaining. The cross walls were being taken down at the time he wrote, and being burnt for lime. Many tesselated pavements have been found—three in 1689, another in 1777 in the south-east angle, and another in 1830.

In 1855 the Monmouthshire and Caerleon Antiquarian Society, it is said, made some interesting discoveries, an account of which was contributed to the 36th volume of the Archæologia.

In addition to pavements, pottery and coins have been discovered, and a large number were exhibited in the temporary museum at Newport during the meeting of the Cambrian Archæological Association in 1885.

In the Archæologia Cambrensis for 1851, Vol. 2, new series, there is a record of a large discovery of Roman Coins at Caerwent, near the Churchyard, and

between the roads leading to Newport and Usk. They were said to be of debased metal, and of the reigns of Gordian III. and Philip the Arabian, about A.D. 240.

In the life of St. Beuno, by the Rev. W. J. Rees, there is a reference to Caerwent. Beuno lived in the sixth century, and was placed for education with St. Tangusius, who lived at Caerwent. Here he obtained a knowledge of the Holy Scriptures, and of the rules and services of the Church; and Ynyr Gwent, who was king of that country, observing that he was humble, chaste, and generous, and keeping the commandments of God, became a disciple of Beuno, and granted him three estates in Ewyas in Herefordshire, where Beuno erected a church, which at the present day can be identified under the name of the parish of Llanveyno.

With respect to the origin and derivation of the word "Venta," various opinions are current. One speculation is that it may have been derived from the Veneti of Armorica, consequent upon the Armorican invasions in parts of Britain. The name of Venta was the origin of the English Winchester, the Venta Belgarum of the Romans, as also of the Welsh Caer Gwent, or Caer Went. And these two names were similar to the English "Ceaster," or "Chester" being synonymous with the Welsh "Caer." The same similarity exists in the two names of Leicester and Caerleon—both signifying "Civitas Legionum."

There is another theoretical speculation which has suggested itself. At the recent Congress at Manchester, of the British Archæological Association, Dr. Phenè, in a paper upon the Roads of Pre-Roman origin, endeavoured to show that the roads of Britain were of Pre-Roman formation, and that the occupation of Britain was for commercial purposes, and that the Pre-Roman roads of ancient Italy bore exactly the same peculiar features as the early roads of Britain. There was evidence of two distinct Italian tribes—the Venones and the Senones—located in Britain long prior to the Roman Conquest, sufficient to prove Italian occupation at a very early date. These Italian Colonists, the Venones, had their meeting places for commerce at the intersection of the ancient roads, as at Winchester and other places. One stronghold of the Venones was in the Forest of Arden, and that name followed the course of this people through the Continent to Rome. It was applied to vast woods, by which they were located, and was the old Italian word "Ardente" (burning), which showed their traffic by smelting, and near those places crucibles for such purposes had been found. The prefix of "Venta" may have had its origin in the lingering remembrance of the Venones.

During the Roman Government of Britain Isca Silurum (Caerleon) and Venta Silurum (Caerwent) were evidently important cities in the province of Britannia Secunda. It is probable that the former was the military centre, and the latter the commercial city for the trade of the locality; and if, as tradition hands down, there was a tidal river, or estuary, Caerwent must have been a place of considerable enterprise with the busy merchants of Rome and Britain. Here we leave our subject for the present. Centuries have rolled away since the various events and epochs to which reference has been made, and the sites and names alone remain as the silent records of past history.

The association of the present with the past involves many pleasant intellectual reveries, whilst the decayed walls, the dismantled towers, the remains of earthwork and other antiquarian relics, should remind us that knowledge and enterprise are not confined to our own days, but that there is evidence that there existed with generations long since mouldering in the dust a scientific advancement which may well command our greatest admiration and respect; and which, while we appreciate the progressive development of the present age, should incline us to venerate and preserve the existing monuments of our ancestors, so far as they have been handed down to us under the sparing leniency of the plough and time.

THE WOLF IN BRITAIN.

By Thomas Hutchinson.

It is not so long ago, as some of us may have been led to suppose, since the cry of "Wolf" had a very real meaning for the people of England, and since it, together with the bear and the wild boar, swarmed throughout the country from north to south and from east to west. To go back to pre-historic evidence of the existence of the wolf in these islands, the bones of wolves have been found in several caves in England and Wales. At Paviland, in Glamorganshire, in a cave called the Goats' Hole were found the remains of the mammoth, rhinoceros, hyena, and a species of canis, the size of a wolf.

Hume, in his History of England, asserts that wolves were all destroyed by the Saxon King Edgar; he says "Another remarkable incident of this (Edgar's) reign was the extirpation of wolves from England. This advantage was obtained by the industrious policy of Edgar. He took great pains in hunting and pursuing those ravenous animals, and when he found that all that escaped him had taken shelter in the mountains and forests of Wales, he changed the tribute money imposed on the Welsh Princes by Athelstan, his predecessor, into an annual tribute of three hundred heads of wolves, which produced such diligence in hunting them that the animal has been no more seen in this land."

Other historians seem to have taken this statement from Hume, and followed him in the mistake he made, and so it has become a generally accepted fact that wolves were not to be found in England at the date of the Conquest, or at any rate shortly afterwards, but I shall be able to show that they swarmed both in England and Wales for several centuries after the reign of Edgar, which only lasted for 17 years, from 958—975, and they continued to exist until quite the latter end of the 15th century.

In the reign of Athelstan, 925—940 they so abounded in the neighbourhood of Flixton, in Yorkshire, that a place of retreat was erected to protect travellers from their attacks.

The Abbey of Fors, in Wensleydale, Yorkshire, was founded in 1145, and the monks had the privilege granted to them of taking the remains of the deer killed and partly devoured by the wolves in the forest of Wensleydale.

In 1199, King John granted a licence to William Briwere to hunt, amongst other animals, the wolf throughout all Devonshire.

In 1281, the 9th year of Edward I., more than 300 years after the reign of Edgar, wolves existed in such numbers in several parts of England that the following Royal Commission was issued, which, as it is of local interest, I will give in full:—

"A.D. 1281, An. 9, Edwd. I. Pat. 9, Edw. I. M. 20, in Turr. Lond.

"Rex omnibus Ballivis etc. Sciatis quod injunximus dilecto et fideli nostro Petro Corbet, quod in omnibus forestis, et parcis, et aliis locis, infra comitatos nostros Gloucestr' Wygorn' Hereford' Salop' et Stafford' in quibus lupi poterunt

inveniri, lupos, cum hominibus, canibus et ingeniis suis, capiat, et destruat, modis omnibus quibus viderit expedire.

"Et ideo vobis mandamus quod eidem Petro in omnibus, quæ ad captionem luporum in comitatibus prædictis, pertinent, intendentes sitis et auxiliantes, quoties opus fuerit, et prædictus Petrus vobis scire faciet ex parte nostrâ.

"In cujus &c duratur' quamdiu nobis placuerit. Teste
Rege apud Westm' decimo quarto die Maii."

Translation.

The King to all Bailiffs, &c. Know ye that we have enjoined our dear and faithful Peter Corbet, that in all forests, parks, and other places, within our counties of Gloucester, Worcester, Hereford, Salop, and Stafford, in which wolves may be found, that he take and destroy wolves with his men, dogs, and engines, in all ways, in which he shall deem it expedient; and we command you therefore that you be aiding and assisting the said Peter, in all things that relate to the capture of wolves, in the aforesaid counties, as often as occasion may require, and the said Peter may make known to you on our part.

In witness &c., so long as it shall be our pleasure. Witness the King, at Westminster the 14th day of May.

In 1296. 25 Edward 1st, John de Engaine, Lord of Blatherwic, died seized of land in Pightesse or Pytesse, Northamptonshire, which he held of the King by service of hunting the wolf, fox, and badger.

In 1320. 16 Edward 2nd, John le Wolfhunt, or Wolfhurt, held lands at Wormhill, Derbyshire, by service of chasing and taking wolves that the King might come into the forest of the Peak in that county.

In 1336. 11 Edward 3rd, John Lord Roos, of Hamlake, had a charter granted him of free warren in lands in Nottinghamshire and Oxfordshire, and also to hunt amongst other animals the wolf throughout the King's forest of Nottinghamshire.

In 1358. 33 Edward 3rd, Vitalis Engaine died seized of part of the lordships of Laxton and Pichesse, Northamptonshire, held by petit sergeanty to hunt the wolf whensoever the King should command.

In 1366. 41 Edward 3rd, another member of the same family died seized of lands in the same lordship of Pightesse held of a service to kill amongst other animals the wolf, in the counties of Northampton, Rutland, Oxford, Essex, and Buckingham.

In 1474. 14 Edward 4th, it is stated in Baker's Chronicles that King Louis 11th of France presented Edward with a wolf and wild boar, beasts at that time rare in England. Diprose, in his Book of Dates, states that wolves were finally exterminated in England in 1485.

The above extracts, which are mostly taken from a volume entitled "Visits to Fields of Battle in England of the Fifteenth Century, to which are added some miscellaneous tracts and papers upon archæological subjects by Richard Brooke, Esq., F.S.A.," prove conclusively that wolves were abundant in England and Wales long after the reign of Edgar, and that they existed here until about 400 years ago. The same author also states that he has read somewhere that it

is traditionally stated that they were to be found either in the Forest of Dean or the Forest of Dartmoor as late as in the time of Queen Elizabeth.

Wolves existed in Scotland till 1680, the last having fallen, it is said by the hands of Sir Ewen Cameron, of Lochiel, and they continued in Ireland so late as 1710, some writers stating that they existed in the Wicklow mountains many years after that date.

The other day I came across in Vol. II. of *Once A Week*—a magazine now defunct—a poem called "The last Wolf in Gwentland," by C. H. Williams, giving an interesting and graphic account of the destruction of what was said to be the last wolf in the neighbourhood in which we now are, and if it will not be tiring you all I will read it.

There's thunder on the Blorenge,
Hark! echoing far it sounds
O'er fair Llanover's sloping sides,
And Goytrey's woody bounds;
Again it peals—then comes a pause—
And then it peals more nigh,
But in that pause did you not mark
A clear, far-ringing cry?
A hollow, wailing, long-drawn cry,
The Gwentians know the tone:
The last old wolf, his race all slain,
Howls on the hills alone,
Howls and then listens—but in vain,
There comes no answering cry;
The last of all the wolves is he,
And 'tis his turn to die.
O'er Brecon's hills, for years he roamed
A terror to the land,
The kine were killed, the lambs were torn,
Even from the shepherd's hand.
Young boys in fear approached the hills,
With caution crossed the plain,
For there were mothers who still wrung
Their hands for children slain.
A gaunt, grim, savage beast was he,
Who man himself would dare;
Was he not monarch of the woods,
Throned in his mountain lair?
His monstrous paws, his broadened jaws,
The wild fire in his eye;
Beware, beware! there's danger there
When 'tis his turn to die.
His shaggy hide of dusky gray
Is bloodied, seamed, and torn,
By hunter's spear, by gripping trap,
By crag, and stake, and thorn.
His jaws are working till the foam
Is churned like ocean spray,
His lurid eyes have gleams within
Unlike all light of day.
But yestermorn he sallied forth,
He and his mate, to seize
Some ragged bone or sucking babe,
His ravenous brood t'appease.
The she-wolf slain, he fled amain
To hunger and despair,
And strewed the limbs of his torn cubs
Last night about his lair.

Ho! bring the wolf-staves from the wall,
See that your knives are keen;
Come men of hearts and sinews strong,
No child's play this, I ween.
Send through the land and make them come,
This touches great and small,
And bid the good old squires of Gwent
To meet at Goytrey Hall.
Rides Williams from Llangibby,
Rides Lewis from St. Pierre;
And Morgan, for the nobler game,
Quits his ancestral deer.
The Herbert race of fiery souls
Could not be absent then,
And Cliffords feel their Norman blood
Rush through their hearts again.
The wolf dog's bay was heard that day
Through many a wood and glen;
Three times they swam the flooded Usk
Three times they topped Garnwen.
Mamhilod sees them reckless ride
Her sloping sides along,
Up Trefthyn hill the gray wolf still
Swings onward fierce and strong,
Till mad to find that still behind
The rout and turmoil swell,
Through brake and flood to Goytrey wood
He rushes fierce and fell:
Scraping his paws, grinding his jaws,
Fresh lightning in his eye,
Both hound and man shall shrewdly know
When comes his turn to die.
With glistening teeth and blazing eyes,
And with a panther's spring.
The foremost hunter sees him leap
Within his wolf-staff's swing.
A shout, a blow, and writhing low,
The monster's spun around;
But darting up he grips his foe,
And both are on the ground.
Man, dogs, and beast in thicket dense
Struck, wrestled, bit and tore,
Till rolled against a jutting crag
The panting hunter bore
The wolf's head back, and brake his neck,
Dead the last robber lay;
But Herbert went from the gray wolf's grip
Lame to his dying day.
Now hang the wolf-staves on the wall,
To take them down no more,
Save when our sons would tell their sons
Of stalwart deeds of yore.
Shut out the storm, we've had enough,
Heap logs upon the flame;
Spread loads of venison on the board,
Well flanked with piles of game.
This night we'll have a merry night,
If there is worth in wine,
And if to-morrow's sun looks in,
Why let him look and shine.
The wolves are dead—even so, alack!
No pleasure without pain;
The last wolf's dead, and never comes
Such sport, brave hearts, again.

Thomas Herbert, the hero of this poem, was called Gloff, *i.e.* The Lame. He was a son of William Herbert, first Earl of Pembroke, who was the eldest son of Sir William Herbert ap Thomas of Raglan Castle. The Earl was a staunch adherent of the House of York, but falling into the hands of the Lancastrians after the battle of Danes-Moore,* 26th July, 1469, was beheaded the next day at Banbury. He had been created Earl of Pembroke on the 27th of May previous. So if the lameness of Thomas Herbert was due to the grip of the wolf, as described in the poem, it would appear that the wolf was hunted in the hills around us as late as the latter end of the 15th century.

Goytre Hall, the residence of Thomas Herbert and his descendants, is situated in the parish of Goytre, in the county of Monmouth. It still remains, and is now occupied as a farm-house. A tradition says that the family who lived there paid their taxes with the heads of wolves.

We passed this morning in the train near to, if not through, the parishes of Goytre, Mamhilod, Trevetham (*i.e.* Trefthyn), and Llanover, places mentioned in the poem. They are situated north of Pontypool Road Station. While on the subject of names I may also mention that there is in Monmouthshire a parish called Wolves Newton, eight miles north-west of Chepstow, and there is a hill near Llanvair Discoed called Allt-y-Arfaid (*i.e.* Wolves Cliff). I ought also to mention that there is a plant called Wolfsbane *(Aconitum Napellus)* which was used for killing wolves, foxes, and other animals.

I have been told that during the making of the Hereford, Hay, and Brecon Railway in 1862-64 a large number, amounting to hundreds, of skulls of wolves were found in the cutting near Clifford Castle; but I have not been able to get any further information on the subject. Clifford Castle is not an unlikely place for the tax of 300 wolves' heads imposed on the Welsh by Edgar to have been paid. I give the statement for what it is worth, and if anyone can furnish me with further information on the subject I shall be glad, as it is an occurrence which, if it took place, certainly deserves to be recorded.

The Rev. Joseph Barker has just informed me that Professor Skeat (Professor of Anglo-Saxon, Univ. Cambridge) says the meaning of Eardisland is "the land of the wolf's home," and if you refer to Mr. Barker's paper in *Transactions* of the Woolhope Club, 1890, page 51, you will find the subject fully expounded. Eardisley would have a similar meaning.

*Burke's Peerage gives Danes-Moore. The battle took place at Edgecote near Banbury. It is generally called the battle of Banbury.—EDIT.

Woolhope Naturalists' Field Club.

ANNUAL MEETING, THURSDAY, OCTOBER 25TH, 1894.

THE Annual Meeting for the election of President and Officers of Committee for the year 1895, was held in the Woolhope Club Room, on Thursday, October 25th.

The Rev. M. G. Watkins was elected President. The four Vice-Presidents elected were Mr. Attwood-Mathews, Mr. W. H. Banks, Mr. James Davies, and Mr. Thomas Hutchinson. Mr. Robert Clarke was elected on the Central Committee in the place of the late Mr. C. G. Martin. The remainder of the Committee were re-elected.

Mr. Thomas Blashill was again chosen delegate to the Society of Antiquaries, London. Rev. J. O. Bevan was re-elected delegate to the British Association for the Advancement of Science, and Dr. T. A. Chapman re-appointed corresponding member to the same Association.

Mr. W. C. Ashdown, F.Z.S., gave a list (published below) of rare birds visiting Herefordshire in 1894. He exhibited a Ruff which had been shot by Mr. Smith near Garnstone Castle, Weobley, and brought in for preservation under the belief that it was a large snipe. It was a male bird in its winter plumage. Mr. Ashdown exhibited two other male specimens of the same species in their handsome summer plumage, also a third bird in its winter plumage. He showed how the male bird developed its handsome shield-like erectile ruff in the month of May, lasting through June, and how, after moulting, the male resembled the female in plumage, but was about one-third larger.

The following were present:—Mr. James Davies (President), Mr. James Rankin, M.P., Surgeon-Genl. W. Perry, Capt. R. H. de Winton, Revs. H. Bennett, Preb. W. Elliot, M. Marshall, and M. G. Watkins, Messrs. W. C. Ashdown, J. Carless, T. Hutchinson, G. H. Piper, H. Sugden, J. P. Sugden, M. Wheeler, H. C. Moore (Honorary Secretary), and James B. Pilley (Assistant Secretary).

ORNITHOLOGY IN HEREFORDSHIRE

FROM JANUARY TO DECEMBER, 1894,

By W. C. Ashdown, F.Z.S.

My last report on the Ornithology in this County, from 1889 to 1893, is published in the last volume of *Transactions*, 1890 to 1892, p. 381. The present list treats of the occurrences of rare birds in 1894.

Scaup (Fuligula marila).—On the 8th January, Mr. R. Wyndham Smith, Aramstone, near Ross, forwarded an adult female.

Scoter (Œdemia nigra).—A male specimen of this almost strictly sea duck, was shot and brought to me on the 13th January.

Tufted Duck (Fuligula cristata).—One in the curious immature stage killed by Mr. R. W. Smith, at Holme Lacy, on January 18th.

Pheasant, Hybrid English, and Reeves.—A very noble example of the above was killed by a shooting party in the grounds of Mr. W. Smith, Garnstone, Weobley, on the 25th January.

Song Thrush (Turdus musicus).—A buff variety shot on the Rev. A. W. Foster's land at Brockhampton, near Ross, on the 14th February.

Pintail (Dafila acuta).—Mr. Turner, of Lugwardine, shot at a pair, killing one, a beautiful male, sent in for preservation on the 2nd of March. It has been stated that this species was noticed hanging in a fishmonger's shop in 1878, and reported to have been killed on the Wye at Whitney; this may be possible, but it is hardly a sufficient guarantee for a record in any list.—On the 2nd of February, I purchased a most perfect example of the Bernacle Goose (Bernicla leucopsis), which might with equal propriety have been palmed off as a local bird, but which (after close questioning) proved to be one of a consignment of game, &c., from Leadenhall.

Heron (Ardea cinerea).—A very interesting specimen was sent in by Mr. T. H. Matthews, "Man of Ross House," on the 30th April, which had a black breast with little or no white feathering.

Black Headed Gull (Larus ridibundus).—As reported in my list last year, this species is found here occasionally during the winter.—On the 19th July, a flock followed the plough track at Eaton Bishop, near Hereford. Mr. Morgan killed one for identification, which had of course its black head (summer plumage).

Green Sandpiper (Totanus ochropus).—Mr. R. D. Harley, Brampton Brian, shot a female on the 29th of August.

Ruff (Machetes pugnax).—This rare bird was taken on the Garnstone estate, and handed in to me for preservation by Mr. Smith, on the 31st of August; there is no other instance of the Ruff having visited the county, although it may have been unrecognised in years gone by. Mr. Smith's bird was beautifully marked with bars of dark brown and fawn colour, but altogether devoid of the singular collar worn by the male in summer: and would be passing through the change, or

rather, assuming the winter plumage. It has been placed in a case with another supplied by Mr. W. E. de Winton, and a Reeve; the three form a very interesting group, and are now at Garnstone Castle.

Buzzard (Buteo vulgaris).—A female sent from Dr. Walker, J.P., Weobley, on the 28th October.

Black Grouse (Tetrao tetrix).—On the 22nd November, the Rev. G. H. Davenport forwarded a gray hen from Foxley, taken there.

Wigeon (Mareca penelope).—Mr. J. H. Arkwright, of Hampton Park, sent a very handsome pair shot on his estate December 10th.

The Hawfinch has been pretty plentiful during the winter season.

Several examples of the Kittiwake Gull, in immature plumage, have appeared during the year.

In Breconshire.—Capt. Sandeman shot a very good adult pair of the Golden-eye Duck on the 9th January; also a Dunlin.

In South Shropshire.—A very excellent specimen of the Black Tern (Hydrochelidon nigra) was shot on the large pool, close to Lord Powis's mansion (Walcot), near Craven Arms. This was a female.

THE FIRST FIELD MEETING OF THE WOOLHOPE CLUB.

THE late Mr. M. J. Scobie, F.G.S., was one of the founders of the Woolhope Naturalists' Field Club in the winter months of 1851, and its earliest Honorary Secretary. His son, Col. M. J. G. Scobie, has presented to the Club an unpublished manuscript of the paper prepared by his father for the first Field Meeting of the Club in the Woolhope Valley on May 18th, 1852.

It is considered that the publication of this manuscript forty-two years after the inauguration of the Field Meetings which have proved so successful a feature of our Club will prove interesting to our members.

THE WOOLHOPE NATURALISTS' FIELD CLUB.

GEOLOGICAL REPORT OF THE EXCURSION TO THE WOOLHOPE "VALLEY OF ELEVATION," 18TH MAY, 1852.

By M. J. SCOBIE, F.G.S.

Read 20th July, 1852.

THE morning of the 18th of May, the day fixed for the first Field Meeting of our Club, opened with every indication of proving unfavourable to our contemplated excursion. The heavens gradually assumed a more threatening appearance, and, upon the arrival of the members at Tarrington at 9 a.m. the rain descended in torrents. The attendance was consequently not so numerous as could have been desired. The important preliminary of breakfast having been satisfactorily despatched, the Rev. Wm. S. Symonds, of Pendock, was, in the unavoidable absence of our excellent President (Mr. R. M. Lingwood) unanimously called to the chair. The minutes of the last meeting having been read, and other routine business disposed of, the Chairman delivered an address with reference chiefly to the management of the Club, and concluded by recommending that gentlemen who had anything to communicate should then do so, in the hope that the weather would in the interval clear up so as to enable the members to carry out their proposed investigations. Accordingly, the Rev. Reginald P. Hill, of Cradley, exhibited a specimen of Caradoc Sandstone containing the characteristic fossils curiously altered by heat: this specimen was from the Malvern Hills where the Caradoc formations are at various points associated with trappean rocks which at a very early period must have been erupted in a state of fusion, altering the strata through which the volcanic matter had forced a passage. Here it may not be unworthy of remark that there is no instance throughout the district of a similar metamorphosis having taken place from contact with Syenite, the foundation rock of the Malvern range. We may hence justly infer that the latter was consolidated previously to the deposition of the superincumbent sedimentary strata under the pressure of an ocean of considerable depth.

A collection of Mammalian remains discovered by Mr. Ballard of Hereford, during the formation of the Herefordshire canal, in gravels of various kinds, was then submitted for examination. It has been a subject of remark that our superficial deposits are peculiarly destitute of Fossil Mammalian remains, and it is therefore gratifying that our first meeting should have been instrumental in throwing some light upon a subject which has hitherto remained in obscurity. The elucidation of these gravels presents an ample field for the researches of an intelligent geologist, and it is to be hoped they will receive that amount of attention at the hands of the Club which their importance demands. It is only by a careful examination of their constituents, fossil contents, manner of distribution, and relative elevations, that the periods of their depositions and origin can be ascertained.

Sir Rodk. Murchison divides the gravels of England into two classes. The *first* includes all those coarse and sometimes far transported fragments to which some geologists apply the word "diluvium," but which to avoid misconstruction he designates *drift*, and this drift he subdivides into three distinct varieties, two of which he terms local, the third foreign. "The drift of the high lands of Siluria" (to quote from *Sil. Syst.*, p. 510), "is of the earliest date and was produced by the elevation of the older rocks. The next in age arose from the upcasts of the various coal measures, and the third or most modern drift is that which covers large portions of the central counties and contains boulders of northern granite, all which detritus was accumulated beneath the sea during successive epochs. The *second* class of alluvia includes all the deposits formed in lakes and river courses since the final elevation of the districts from beneath the sea; also the masses of travertine formed by calcareous springs and the various results of atmospheric action." As we have no evidence in the district west of the Malvern Hills of the deposition of any rocks more modern than those of the palæozoic ages, it is evident that some of our gravels may be of very high antiquity.

But to return to our fossils. Bones and teeth referable to the mammoth and the deer were distinguishable from others, which upon closer examination may prove to belong to the ox, the bos urus, or bison, and the hog. Important and suggestive facts! Has the climatal system of the earth undergone a change since those dry bones lived and moved, the denizens of this land? The representatives of some of those mammals are in our day confined to the swamps and borders of certain tropical rivers, or, at least, to countries within the torrid zone.

From the wonderful adaptation to particular spheres of enjoyment which characterises the various families of the animal kingdom, it seems just to argue that when those extinct creatures were indigenous, and roamed the forests and sported in the waters of this northern latitude, the conditions under which they lived were analogous to those in which similar families exist in the present day. But this is not the conclusion at which our most eminent geologists have arrived. Huge pachyderms are known to have existed during the glacial epoch, and Sir Charles Lyell and Professor Owen have explained the capabilities of these animals to sustain the hardships of a cold climate equal in intensity to a Siberian winter.

The weather having partially cleared up towards one o'clock the investigations of the day commenced on the interesting grounds of Lady Emily Foley, where our party divided, geologists and botanists taking separate routes.

Near Tarrington were observed some samples of Downton Sandstones at the base of the Old Red system, but not in actual contact with it, the junction beds being there obscured by superficial accumulations.

In ascending the hill at Stoke Edith our party crossed the upper Ludlow shale, and upon attaining the summit recognised a ridge of Aymestrey rock—a formation one step *lower* in the Silurian series. In ascending the hill, however paradoxical it may sound, we had, geologically speaking, penetrated deeper into the earth's crust. Palæontologically we had receded to a period when, ere the fiat had gone forth calling a higher order of beings into existence, invertebrata appear to have been the sole inhabitants of the deep.

We had now arrived within view of the Woolhope "Valley of Elevation." So great has been the labour bestowed on this remarkable region by Sir Roderick Murchison, Professor John Phillips, and other eminent geologists, and so copious is the information already before the public, that our object in visiting it was rather to launch our bark and proceed on our voyage from a port of such world-wide celebrity than to entertain much hope of making any fresh discoveries.

The Woolhope Valley of Elevation, admitted to be the most symmetrical of its type in Great Britain, is described by Mr. Strickland as "an elevation crater in which we see the ineffectual struggles of a focus of volcanic energy to burst through the incumbent strata." That this energy was directed towards a single point is evident, for we find an unbroken succession of Silurian strata from the Caradoc to the Old Red sandstone, dipping on all sides from a common centre at angles of from 15° to 70°. The area occupied by the upcast Silurian strata extends from Dormington on the N.W. to Gorstley Common on the S.E., a distance of about ten miles; and from Fownhope on the S.W. to Putley on the N.E., about four miles. A semicircle described from Fownhope to Putley, through the villages of Mordiford, Dormington, and Tarrington, with convergent lines from the extremities of the arc meeting at Gorstley Common, would embrace the whole district, the general outline of which resembles a boy's kite, or a pear, tapering towards Gorstley Common, which part Sir Rodk. Murchison designates "the stem."

The manner of upheaval and the denudation to which the district has been subjected are strikingly manifest in the physical character of the country. We perceive a central elliptically-shaped dome encircled by two narrow ridges of hills attaining their greatest altitude towards the north; Seager Hill in the exterior circle being 892 feet above the sea, while the elevation of a nearly corresponding point of the inner circle at Devereux Park is about 650 feet, or something lower than the central dome. In the memoirs of the *Geological Survey*, Professor Phillips gives the following graphic description of the upcast region :—

"The internal structure corresponds most accurately with the external configuration. The central dome is composed of the lowest strata, viz.:—Caradoc sandstone, overlaid by Woolhope limestone; the concavity around it is sunk in the Wenlock shales; the inner ring of hills is formed by the outcrop of Wenlock limestone; the hollow which encircles it of the lower Ludlow shales, and the outer

chain of high ground which borders and overlooks the whole of this singular district is a ridge of Aymestrey rocks and upper Ludlow flags and shales dipping everywhere from the centre towards a wide area of the Old Red Sandstone."

There can be no doubt that previous to the convulsive movement of which I have spoken the whole country was continuously overlaid with Old Red Sandstone, and that, again, by Carboniferous strata, but, during long ages of submergence the wreck of those systems has been swept away along with immense masses of the upcast Silurian formations.

So complete was the work of denudation that not a fragment of Old Red or drift of any description can be detected in the valley. The faults which here occur deserve attention, not being the least interesting phenomena which present themselves to puzzle young geologists; the most considerable of these which runs from Mordiford for some distance in the line of the Pentelow Brook, to near Tarrington, cuts off a portion of the Woolhope Limestone and Caradoc Sandstone from the Central Dome, and, as it has the effect of depressing the strata towards the north, brings these formations into contact with Wenlock Shale; and, at the Gorge near Mordiford, places the Ludlow rocks in opposition to Old Red Sandstone. Another fault, which runs in a northerly direction east of Old Sutton and Priors Frome, depresses the strata to the east, and produces in its course a double ridge of Aymestrey rock.

The gradual percolation of water through the Ludlow rocks, which are much interlaminated with argillaceous bands, and which occupy elevated situations to the north and north-east, has occasioned landslips of considerable magnitude. That near Dormington, which took place in the year 1843 was visited by our botanical party. "Adam's rocks" on the southern slope of Backbury hill and "The Wonder" near Putley are also interesting examples of similar displacements.

Descending the southern slope of Stoke hill our party crossed the excavated trench of lower Ludlow shale, already alluded to, to the quarried escarpments of Wenlock limestone at Dormington wood. The scene presented at this interesting spot is of a character calculated to strike the commonest observer with awe and astonishment. Buried and embalmed in the solid rock, of which they may be said to form the mass, are seen the remains of millions of the early invertebrate inhabitants of our planet. Not to speak of myriads of encrinital, molluscous, and conchiferous remains: the beautiful corals of the formation are in such vast abundance that, to the mind's eye, a modern tropical reef seems realized; imagination pictures its millions of polypi spreading forth their tiny arms in their native element, revelling in the enjoyment of that peculiar and beautiful principle of life which, animating individually, and vibrating through the mass, associated them together in a common bond of unity.

After leaving Dormington wood our party were subjected to a terrific and uninterrupted storm of thunder, lightning and rain. Our progress consequently being hastened along the line of fault through the romantic glen of the Pentelow brook, and from thence to the Scutwardine quarries of Woolhope limestone, we arrived at Fownhope at 4 o'clock; there the members dined together according to appointment, and separated late in the day after expressing many hearty wishes for the prosperity of the Woolhope Club.

DISCOVERY OF FOUNDATIONS OF AN OLD PIGEON-HOUSE AT INSTONE, NEAR BROMYARD.

By E. L. Cave.

In making excavations for the new railway from Bromyard to Leominster, the contractors have uncarthed, at a depth of only a few inches below the ground level, the foundations of a circular Pigeon-house or dovecote. The site of the discovery is close to Instone Bridge, in a meadow known as far back as the beginning of the century as "The Pigeon-house-meadow." Only about one-half of the circle exists, with two rows of nests, of somewhat irregular build, and not quite rectangular in shape. The diameter is 15 feet, the thickness of the walls 3 feet 3 inches, the alighting ledge 3 inches. The openings of the nest holes are 5 to 6 inches wide by about 7 inches high, and the nests vary in depth from about 12 to 18 inches, by about 12 to 15 inches wide at the back. The lower tier is about 12 inches from the ground, and there is a distance of about 11 inches between the tiers. In the lower tier the nest holes widen to the right, and to the left in the upper tier. The measurements can only be given approximately, because, in most cases, the openings appear to have been made to fit the stones rather than the reverse, the widenings at the back being very irregular, extending backwards sometimes as much as 20 inches.

According to Mr. Watkins' paper on Herefordshire Pigeon-houses on page 9 of *Transactions* of the Woolhope Club for 1890, of the 74 still existing eleven are circular, and ten of these are built of stone. One existed at Rowden Abbey near where Mr. Bailey's house now stands. It was unfortunately pulled down as useless some 35 years ago.

By the way, is not Rowden *Abbey* a misnomer? I have never been able to find any traces of a religious house there, and an *Abbey* was far too important a place not to have left some trace of its existence behind. The place itself seems to betoken a moated grange or manor house, similar to, though larger than, that of Lower Brockhampton, rather than an Abbey, and it apparently lacked what Brockhampton has, a chapel of its own. My own impression is that Rowden Abbey is merely a corruption of Rowden d'Abitot. The d'Abitots held property near the house at Upper Munderfield being formerly known as d'Abitots (Debiters) barn, and there are other places in the neigbourhood bearing the name of d'Abitot.

But to return to our dovecote. A note in the *Hereford Diocesan Calendar* for 1891, states that according to a document dated 840 (the oldest preserved in Hereford Cathedral), Bishop Cuthwulf granted land to a Monastery near Bromyard. It may be that the Porthouse land is that referred to. If a Monastery did exist here, it must have ceased to exist at a comparatively early period, for there seems to be no other mention of it, nor any account of its suppression, though the three sinecure Rectories, or Prebends of Bromyard, may be part of its revenues.

There is some traditional lore connected with Instone about two Knights fighting a duel, and the countryfolk connect the effigies at Edwin Ralph with one of the Instone families, but the details of the tradition differ and are confused.

From a Photograph by Mr. H. Purser.

By Permission of The "Bromyard News."

THE ARCHÆOLOGICAL DISCOVERY AT INSTONE.

Mr. James Nott, of Malvern, states that there always has been a legend that it was the place of a Castle, and that some have gone so far as to say that the former owner was a "Lord Instone," but he adds that he can find nothing certain about the history of the place. He has a list of Hereford castles in the reign of Henry III., but there is no mention of one at Bromyard, but there is a record (A.D. 1321) of Roger de Mortimer, of Wigmore, having raised a number of armed men, (horse and foot) marching in warlike array from the border. When they came to Bromyard, where they stayed one night, they robbed and plundered divers inhabitants of the town and neighbourhood of goods and money to the amount of £40 (equal to £500 of present money.)

The surface of the ground at the lower corner of the Porthouse meadow adjoining Instone Weir is very uneven. It is possible a manor house may have existed here; it is also possible to imagine the traces of a moat in what is known as the Black Pool, and in the small pool which, till quite recently, existed under the willow trees opposite the yard buildings of the present Instone House. The necessity for digging a large pool like the Black Pool for cattle cannot be seen when the brook is close by. There do not appear sufficient grounds upon which to base the probability of any building worthy of the designation of a Castle.

———

With reference to the legend above referred to Mr. James Nott, of Priory Place, Malvern, has sent to the *Bromyard News* of November 29th, 1894, the following informations:—In the Tesla de Neville Survey compiled in the reign of Edward II. there occurs this passage:—

Rāds de Yedefin tenet in Yedefin êt Buterl' de veti feoff feodū unius militis de Epis. Hereford; sed nesciunt de quo idem Epis. tenet feodū illud in capite"; which has been translated Ralf Yedefin held Yedefin and Butterley by an ancient feofment of feudal service of one knight to the Bishop of Hereford; but they did not know of what tenure the said Bishop acquired that feudal right.

This may have been the identical knight immortalized by the Yedvin legend, and there is the greater probability of this when it is remembered the parish which was anciently always called "Yedefin" or "Gedefin," became in later times Edvin Ralph, or Yedvin Ralph, as it is still vulgarly pronounced.

At Domesday survey, the parish bore the name of "Gede-fin," and it is also called "Yede-fin"—both of which terms mean the same thing viz., *to yield a fine.*

The legends connected with the two knights were familiar enough when I was a lad, and the meadow always shown me as the one in which the fight took place was near to the "Black Venn," close to the old bridge leading up to the back of Buckenhill. The following version exists, done in quaint rhyme.

"THE SAD AND MOURNFUL BALLAD OF BARON RALPH AND LORD YEDVIN."

Through his castle gate rode Baron Ralph,
A haughty scorn had he,
In steel yeclad, with axe and sword,
And a lordly dignitee,
He loved a ladye of great beautie
A dark brunette to view,—
And his anger was great for Lord Yedvin
Did love that ladye too.

A man of might was Lord Yedvin
And many a fair countrie
His valour had known, in Palestine
The infidel fought he,
To revenge their wrongs in single fight
These lordlings had agreed,
With none to see, but Heaven above,
By a brook in a flow'ry mead.

The hour had come, and swords were drawn,
And flash'd in the sunlight fair,
And steed toward steed impetuously,
They urged,—that haughty pair!
Again and again in dreadful charge,
They met,—and hack'd away,
Till in the fray both valourous knights
Unhorsed in the meadow lay.

They rose again with swords in hand
And at each on foot they flew,
Now parrying blow—now forward—back!
And blood for blood they drew.
The ladie saw all, from her Castle wall,
And swift as lover can,
Without a thought of her own dear life
To rescue from death she ran.

Without a thought, she between them stood
They fought unheeding the maid,
Till by wild mischance the swords of both
In that maiden's breast were laid.

Then pause was laid for a little space,
And her life-blood ebbed away;
But when stark death in that face appear'd
To fight they again essay.

In feebler battle they grappl'd still,
—For both were in woeful ease—
They struggled on, but ere night appear'd
Were lying in death's embrace.

The morning's light saw all three dead,
And woeful was the sight,
And buried they were in Edvin's Church
At night, by a taper's light.

They rear'd to their memories statues three,
The knights were in armour grav'd,
And age to age has the sad tale spread;
And as the tombs have time's tooth brav'd,
A glory great has round them wav'd.

And years ago, at morning prime
All near that faithful dead,
Did love-lorn maids their orisons tell,
And priests have their masses said.

It is just possible that the knight yclept, "Baron Ralph," did reside at or near Instone Bridge, and it is not at all unlikely that a minor castle stood there or thereabouts in far off times. Popular tradition has generally some foundation in fact.

ADDITIONS

TO THE

FLORA OF HEREFORDSHIRE

(PUBLISHED IN 1889.)

BY THE

REV. AUGUSTIN LEY,

Vicar of Sellack, with King's Capel, Herefordshire.

—

1894.

RECORDS OF HEREFORDSHIRE PLANTS ADDITIONAL TO THOSE PUBLISHED IN THE FLORA OF HEREFORDSHIRE.

By Rev. Augustin Ley.

It is with great pleasure that we find ourselves in a position to publish in the *Transactions* of the Woolhope Club some facts relating to the Flora of the County additional to those brought together in the *Flora of Herefordshire*. More than five years have elapsed since the publication of the *Flora;* and the anticipations formed at the time of its publication that it would rather quicken than retard botanical investigation in the County have been amply borne out by the fact that after five years we have 15 fresh species of Flowering Plants, 31 of Mosses, and 39 of Fungi, making in all an addition of 85 species and well-marked varieties to record for a county in which so much work had been previously done; besides additional facts and records with regard to plants previously known and recorded as belonging to Herefordshire. Of the latter class of records, a large number have been made in the five years; and selections of these are here thought worthy of being transferred to the *Transactions* of the Woolhope Club to the number of rather over 1,000.

Among the groups of plants to which especial attention has been paid since the publication of the *Flora*, may be mentioned the Cinquefoils of the *reptans—Tormentilla* group; the Hybrids of the Willow-herb and Thistle genera, and the Burdocks. Some work, it is hoped, will be found to have been done in each of these groups of plants, and we here acknowledge with thanks the ready help afforded by Rev. E. S. Marshall, M.A., F.L.S., in naming the first two of these interesting series of plants. The result is that Herefordshire has proved rich in the Potentilla-hybrids; all the forms hitherto known to Britain having been found in the County.

The group to which the attention of Herefordshire botanists needs now especially to be directed is that of the Willow-hybrids, in which much good work has been done since the publication of the *Flora* by Dr. F. Buchanan White, F.L.S., and by the Revs. W. and E. F. Linton, which has not yet been brought to bear upon the Herefordshire Flora.

One other critical genus remains for mention—*Rubus*—: and here the extension of knowledge in the past five years, both with regard to new forms, and those previously known to inhabit Herefordshire, is so great that we have been compelled to exclude the genus from this paper, and to leave it over for separate treatment, which will not, it is hoped, be delayed for any great length of time.

Looking to special Districts of the County we have to thank Rev. T. S. Lea for a careful catalogue of Flowering Plants and Mosses of Tedstone Delamere, which has greatly extended our knowledge of the botany of the Bromyard District: Mr. Cecil Butler, for a short time resident at Dulas Court, for similar work in his own neighbourhood, in the Golden Valley and Black Mountain Districts: Mrs. Robinson and Mrs. T. Powell for many records of Golden Valley plants: Miss Raper for many of those inhabiting Colwall: and Rev. C. A. Binstead, M.A., for a very exhaustive catalogue of the Mosses of Eardisley and its neighbourhood, and for much other valuable help, which his practised eye and great knowledge in this group of plants has enabled him to contribute. Lastly, our old and staunch friend, Dr. M. C. Cooke, has gathered up and placed in our hands the whole results of the five years' work in the Fungi of the County.

Since 1889, a small but interesting manuscript has come into our possession (through the kindness of Miss E. Armitage) which is alluded to several times in the *Flora of Herefordshire* under the title of "J. Lloyd, M.S.S." We have made use of this as often as opportunity served, in the following notes. It refers almost exclusively to the plants of the Bromyard District.

The following paper has been divided into two parts; the first recording fresh species and varieties which found no place in the *Flora of Herefordshire:* the second and longer portion recording fresh facts with regard to species or varieties previously known to inhabit the County. Some of the latter class of records will appear at first sight trivial; but it has not been thought well to omit records of even the most common species, when such records add a new botanical District to the previously known distribution of the species in the County.

"On January 24th, 1870, died John Lloyd, gardener, in the 79th year of his age—one of those characters who, without the least attempt at display or effect, could scarcely help being noticed, known, and esteemed pretty extensively by men of his own profession and pursuits. His name and his character were best known among succulent plant growers, and Fern collectors. He had a wonderful success in cultivating both these tribes of interesting plants; and with regard to succulents, he certainly was gifted with a most extraordinary ability in distinguishing species—a quick and penetrating eye to catch at once the difference between one species and another; this was more especially observable in his knowledge of *Aloes*, *Agaves*, etc., and caused him to be known as the Richard Bradley of our times. This peculiar talent, added to the strictest integrity and upright dealing in all transactions, caused him to be much valued by his employers; and when it was found that his strength was failing, and that no adequate provision for his declining years had been made, several of those who had benefited by his faithful services made up for him a small annuity to help him along in the close of his earthly career. Although he had not the advantage of any great amount of early education, John Lloyd had made the most of all opportunities to acquire knowledge wherever it was to be got at, and the amount of general knowledge that he possessed was something quite out of the common. This rendered him a valuable

companion in a botanising, or a garden-visiting ramble, for his information was not only varied and extensive, but it was of a depth which could not very easily be exhausted or drawn dry.

"Leaving his native home in Herefordshire in early life, he came to London, and his first employment was in the old Brompton Nursery of Harrison & Co., and nearly the whole of his life was passed in the vicinity of the metropolis, except that for a few years he occupied a subordinate position in the gardens of the Duke of Grafton, at Euston Hall.

"That John Lloyd was a keen observer of facts in most branches of natural science besides botany, may be gathered from his occasional contributions to the latter volumes of the *Phytologist*, and some few communications to our own columns in past years. He had been in his time a capital walker; nothing pleased him more than a good botanising ramble. A very favourite part with him was that interesting district in Surrey and Hants—south and south-west of Hind Head, and the intervening country towards Selbourne, of which the village of Thursley marks about the centre of what may be called Lloyd's wanderings; every yard of which was perfectly known to him—one result of his researches being that he actually gathered four out of the six British species of *Lycopodium*, including the *L. alpinum*. But very many of the most distant parts of the kingdom had been at some period or other visited by him; Scotland, Ireland, and the Channel Islands; and last of all, and latest in life, the central and most interesting parts of North Wales. In the year 1867 the writer of these lines had the pleasure and advantage of his companionship, and again in the last year (1869) for several weeks; and his delight at, and admiration of, our Merionethshire scenery and vegetation, were, so to speak, unbounded. The freshness of the mountain air seemed to have a most invigorating effect upon him, and he made no difficulty of a walk from his village (Llandderfel) across the mountain to Llangynog and back in one day—or over that other noted grand pass to Llan-y-mowddy, besides almost daily excursions more or less distant in other directions—the furthest day's ramble involving a walk of not less than 18 or 20 miles, a rather formidable one for a man who had seen 77 years and more.—W. P.
Gardeners' Chronicle, 1870, p. 180.

"Lloyd, John. Note on *Lastrea uliginosa*. *Phytologist*, IV., 1851, pp. 22, 23.

2. *Lastrea uliginosa* at Wybunbury Bog, Cheshire, with remarks upon its supposed hybrid origin. *Phytologist*, I., 1855-56, pp. 178—180.

3. The Sorb-tree of Wyre Forest. *Phytologist*, I., 1855-56, pp. 343-345.

4. On the vernation of British Ferns. *Phytologist*, II., 1857-58, pp. 539-541.

5. Some account of Rozel, in the island of Jersey, with remarks upon the plants growing upon the island, indigenous and exotic. *Phytologist*, III., 1858-59, pp. 14-17.

6. On the discovery of *Isatis tinctoria* at New Wandsworth station. *Phytologist*, IV., 1860, pp. 233—236.

"Lloyd, John, and McEnnes. Three days in Tilgate Forest: a botanical ramble. *Phytologist*, IV., 1852, pp. 633-638."

Catalogue of Scientific Papers (Royal Society), Vol. IV., p. 64.

Part I.

FLOWERING PLANTS.

Note.—The numerals placed within brackets, thus (1), (2), (3), indicate the Botanical Districts into which the County has been divided; for details of which see Map accompanying the *Herefordshire Flora*.

! indicates that a dried specimen has been seen by the author of the paper.

! ! indicates the same of a fresh specimen.

! ! ! indicates that the plant in question has been seen growing at the station by the author.

Cerastium arvense, *L.*

Native? In a poor hilly pasture, very rare. In a field near Labour-in-vain Farm, in Hope Mansel parish (2), in some quantity, 1892 and subsequent seasons; *Miss E. Gee! ! !* It must remain uncertain for the present whether the plant can be considered native at this station; there is nothing in the situation or circumstances to preclude its being so.

Pyrus intermedia, *Ehrh.; Eng. Bot.*, ed. 3, Supp. p. 166.

Native, in limestone woods, very rare. In the Lord's wood, Great Doward (2), 1882; *Ley*. Wood at Symond's Yat (2), near the mouth of the tunnel, just within the county, 1894; *Ley*. The Doward specimens were referred by the late Dr. Boswell to *P. Aria, Sm.*, variety; there can, however, I think, be no doubt that they are *P. intermedia, Ehrh.* Judging from Herefordshire, Gloucestershire, Monmouthshire and Breconshire specimens which I have gathered, there can, I think, be no doubt that *P. intermedia* is a native plant.

Hieracium rubicundum, *F. J. Hanb.; Journ. Bot.*, 1892, p. 208.

Native on mountain rocks, rare. On the Red Daren, Hatterel hills (14); *Ley*.

H. sparsifolium, *Lindeb.*

Native on mountain rocks, at one station only. In the Olchon Dingle, Hatterel hills (14); *Ley*. This plant is referred to in the *Flora of Herefordshire*, p. 526, where the name "*H. gothicum, Fr.*" must be altered to the present.

Erythræa pulchella, *Fr.*

Native, in poor pastures, and by roadsides; rare or very rare. First found in 1889 by myself on a roadside near Dinmore (8), and subsequently in profusion at the same station by Rev. W. H. Purchas and myself in 1891; and in a wood-track in the same neighbourhood in 1892. In pastures on hill-sides above Dulas (13), 1892; pointed out to me by Mr. Cecil Butler.

Lysimachia ciliata, *L.*

Alien, of garden origin. Found by Rev. H. T. Williamson! on the river bank at Bredwardine (13) in 1889. The station is, I believe, in proximity to gardens, and the plant is doubtless an escape from cultivation.

Littorella lacustris, *L.*

Native, on the margin of moorland pools; very rare. Discovered in 1889 by Dr. Wood! on Cusop Hill (14). Previously found by the same acute observer in the same neighbourhood, but just within the Breconshire boundary.

Chenopodium Vulvaria, *L.*

Once found, and probably a Casual. Hop-yard, Colwall (4), 1889; *Miss Raper*. The hop-yard in which the plant grew was unfortunately destroyed in 1890, and the plant has not reappeared since.

Rumex pulcher, *L.*

Waste ground and poor pastures, very rare. Native, or introduced with seeds? In some plenty on waste ground near an outhouse, Foy (2), in August, 1889; *Ley*. Probably introduced in this station; still possibly a native plant which had escaped detection.

Aristolochia Clematitis, *L.*

Alien; the remains of cultivation? In one spot. Waste ground, in the proximity of gardens at Ross (2), 1891; *Ley*. Already (in 1892) the spot has been built over, and the plant, it is feared, destroyed.

Salix undulata, *Ehrh.*

Introduced, in osieries; very rare. Osiery in an old brick-field, Pontrilas (14), September, 1893; *Ley*.

Narthecium Ossifragum, *Huds.*

Native, on moorlands; very rare. On the moorland of the Hatterel range of hills at the head of the Olchon Dingle (14), at about 2,000 ft. in small quantity, 1889; *Dr. Wood!* This conspicuous and well-known plant must be extremely rare upon the Black Mountain group of hills. It had been sought there in vain for many years, until discovered by Dr. Wood.

Luzula albida, *D.C.*

Introduced, at two stations. In the grounds at Eywood, Titley (11), in turf; May, 1889, *Dr. Wood!* Sides of a railway-cutting near Titley Junction, in fair abundance, along with *Luzula maxima, D.C.*, and native grasses; August, 1889, *Purchas* and *Ley*. These two stations lying within a mile of each other, it can hardly fail to suggest itself that the occurrence of this beautiful foreign Wood-rush at both in the same year is due to some common cause, but what such cause can be is not clear. Dr. Wood informs me that there was nothing in the station at Eywood to indicate intentional planting; while as an escape upon railway-sides the plant is very unusual.

Carex curta, *Good.*

Native, in bogs; very rare. In a small bog near Titley Junction (11), 1890; *Ley.* Two or three clumps only of this Sedge were seen; but the plant was fine and healthy, and there is no apparent danger of the plant being lost in the near future through drainage.

Avena fatua, *L.*, var. b. *intermedia.*

Scattered through the county, and probably general; but overlooked, and much less abundant than var. a. *pilosissima.* On several of the farms in Sellack parish (2) 1889; Moraston, Bridstow (2), 1886; *Ley.* Field, Cowleigh Park, North Malvern (4), 1893; near Storridge (5), 1886; *Ley.*

MOSSES.

Gymnostomum calcareum, *Nees.*

Shady limestone and travertine rocks, rare; the fruit very rare; *Journ. Bot.*, 1891, p. 331. At two stations on the Great Doward (2); Adam's Rocks, Backbury (3). First found in 1889. Fruiting at the Great Doward in 1892.

Dicranum Scottianum, *Turn.*

Conglomerate rocks; very rare. On conglomerate on the north face of Huntsham Hill, 1889; *Ley.* Barren.

Seligeria Doniana, *Müll.*

Cavernous limestone, very rare; *Journ. Bot.*, 1891, p. 332. Cave, Great Doward (2) in very small quantity, 1890; *Ley.* Sandstone rock in Carey wood (2). 1893; *Ley.*

S. pusilla, *B. & S.*

Shady or cavernous limestone, rare; *Journ. Bot.*, 1891, p. 332. On the Great and Little Dowards (2), at several stations. Huntsham hill (2). First found in 1891.

Dicranum palustre, *Hedw.*, var. *juniperifolium.*

Rough submoorland ground, rare? Hill pasture, S. Weonards (1), 1880; *Ley.* Rough meadow, Upper Welson, near Eardisley (12), 1893; *Binstead.*

Blindia trichodes, *Lindb.*; *Braith.*, i. 297.

On wet mountain rocks. The Red Daren, Hatterel Hills, Herefordshire (14), 1894; *Ley.* First detected by Rev. C. H. Binstead a few miles north of this station, in Breconshire; subsequently also by myself in the Brecon Beacons. It may probably prove not to be infrequent in South Wales.

Fissidens incurvus, *Schwg.*, var. *tamarindifolius.*

Very rare. On damp clay of a river-bank at Caplar (2), fruiting, April, 1891; *Ley.*

Didymodon flexifolius, *H. & T.*

Moorlands and mountain glens, very rare. Cwm Buchel, Llanthony, May, 1887; *Ley.* Omitted by oversight from the *Flora of Herefordshire.*

Leptotrichum flexicaule, *Hampe*, var. *densum.*

On limestone *débris*, or bare limestone rock, rare; *Journ. Bot.*, 1891, p. 333. Great Doward (2), 1891, *Ley*, but very starved and poor. Common hill, Fownhope (3), 1893; *Binstead* and *Ley.*

Trichostomum rubellum, *C. Müll.*, var. *dentatum.*

On shady limestone. In the gorge of the Teme, Downton (10), 1889; *Ley.* It will probably be detected at other stations.

Tortula convoluta, *Hedw.*, var. *sardoa.*

On walls and rocks, both of sandstone and limestone, common. Sandstone at Fawley (2); dry ground at Caplar (2); walls and rocks at Great Doward (2). Walls in the lower part of the Honddu valley (14). This well-marked variety will probably be found equally common with the type throughout the county. *Journ. Bot.*, 1891, p. 333.

T. inclinata, *Hedw.; Mollia, Braith.*, i. 251.

On a limestone bank; very rare. On the Common Hill, Fownhope (3), 1893; *Rev. C. H. Binstead!* Only detected in minute quantity, but in all probability the true plant.

T. subulata, *L.*, var. *subinermis.*

Very rare. On a willow bole near Hereford (7), 1889; *Ley.* Growing, at this station, in company with the large river-side state of typical *T. subulata* which is so abundant in such situations in Herefordshire.

T. angustata, *Wilson; Braith.*, i. 221.

In moorland banks and rocks near streams; very rare. Cwm Buchel, Llanthony, Monmouthshire (14), 1894; *Ley.*

T. Vahliana, *Schultz.*

Very rare. On an ant-hill on dry limestone ground, Great Doward (2), 1889; *Ley. Journ. Bot.*, 1891, p. 333.

Grimmia Schultzii, *Wils.* *G. decipiens, Schultz; Braith.*, ii. 22.

Mountain rocks, very rare. In plenty at the White Rocks, Garway hill (1), 1893; *Ley.*

G. montana, *B. & S.*

Sandstone and limestone rocks, rare and barren. Conglomerate at the Little Doward (2), 1890. Exposed limestone at the Great Doward (2), 1890; *Ley.* Sandstone near Dorstone, in the Golden Valley (13); sandstone near Pont Esgob (14); *Ley.* This moss clearly has a large range in Herefordshire, and will probably be found less rare in the county than might be expected; it is given by Dr. Braithwaite as a rare plant of porphyry and granite rocks. *Journ. Bot.*, 1891, p. 334.

G. commutata, *Hueb.*

On old stone tile of roofs, rare. Barn-roof, Sellack (2), with fruit, October, 1889; *Ley.* Barn-roof at Eardisley! (12), and at Willersley! 1890; *Rev. C. H. Binstead.* Barn-roof, Vowchurch (13), 1893; *Ley.* Likely to be met with throughout the county on our old stone roofs, but especially on its western and northern sides.

G. leucophæa, *Grev.*

On old stone tile of roofs, as *G. commutata*, but more rare. Barn-roof at Eardisley, abundantly, 1890; *Rev. C. H. Binstead! ! !*

Zygodon Stirtoni, *Schimp.*

Limestone and sandstone rocks, rare. Sandstone at Huntsham hill (2), 1891; *Ley.* Limestone at more than one station, Great Doward (2); *Binstead* and *Ley.* Limestone at Ludford, Ludlow (10), 1883; *Ley.* Fruit not yet detected. *Journ. Bot.*, 1891, p. 334.

Z. viridissimus, *Dicks.*, var. *rupestris.*

Limestone rocks, rare. Limestone of the Great Doward, at several stations; first in 1884; *Ley.* Fruiting, 1891. *Journ. Bot.*, 1891, p. 334.

Ulota intermedia, *Schimp.* *Weissia ulophylla* var. *intermedia, Braith.*, ii. 94.

On oak-branches, very rare. In small quantity on rotting branches blown down from oak-trees in a wood near Gipsy Hall, Eardisley (12), 1891; *Rev. C. H. Binstead.*

U. phyllantha, *Brid.* *Weissia, Braith.*, ii. 96.

On elder boles, very rare. In very small quantity on elder in a hedge near Pentrejack, Eardisley (12), 1892; *Rev. C. H. Binstead.*

Bryum argenteum, *L.*, var. *lanatum.*

On a rocky hill-side, at one station only. Western face of the Little Doward hill (2), on bare rock and earth, 1893; *Ley.*

B. erythrocarpum, *Schwg.* **B. sanguineum**, *Brid., Bry. Brit.*

Wooded or heathy banks, very rare. Path-side, Winforton wood (12), May, 1891; *Rev. C. H. Binstead!* It is with great pleasure that we are enabled, by the acumen of Mr. Binstead, to place this moss definitely in the records of Herefordshire (see *Flora of Herefordshire*, p. 409). The Herefordshire specimens are small and poor, but leave no doubt that the name is accurately given.

Mnium orthorhynchum, *B. & S.*

Shady banks, rocks, &c., very rare. On old alder boles near Pont Esgob (14), the male plant, 1890; *Ley.* Growing in company with *M. serratum* and *M. hornum*, but in small quantity. A second search in the same ground in 1891 failed to rediscover the plant.

Atrichum undulatum, *L.*, var. *minus.*

On the ground in woods, rare? *Journ. Bot.*, 1891, p. 336. In the Lord's wood, Great Doward, abundantly at one or two spots on conglomerate sand, 1890; *Ley.*

Polytrichum gracile, *Dicks.; Braith.*, i. 52.

Turbaries and moorlands; very rare. Moseley Mere, near Kington (11), in small quantity, May, 1892; *Rev. C. H. Binstead.*

Hedwigia ciliata, *Dicks.*, var. *viridis.*

On the stone tile of an old roof, Eardisley (12), in abundance, 1890; *Rev. C. H. Binstead ! ! !*

Cylindrothecium Montagnei, *B. & S.*

Barren calcareous hills; very rare. Near Buckenhill (3), 1893; *Binstead* and *Ley.*

Plagiothecium latebricola, *Wils.*

On decaying stumps in marshes, very rare. On alder boles in the marsh at Pont Esgob (14), abundantly, 1890, 1891; *Ley.* The fruit was not detected.

FUNGI.

Agaricus (Tricholoma) panæolus, *Fr.*
Dinmore (8); Whitecliffe (10).

Agaricus (Mycena) acicula, *Schaeff.*
Downton (10).

Agaricus (Omphalia) fibula, *Bull.*, var. *Swartzii.*
Whitecliffe (10).

Agaricus (Omphalia) alutaceus, *Cke. & Mass.*
Whitecliffe (10).

Agaricus (Entoloma) ameides, *B. & Br.*
Whitecliffe (10).

Agaricus (Eccilia) carneo-griseus, *B. & Br.*
Whitecliffe (10).

Agaricus (Pholiota) præcox, *Pers.*
Stoke Edith (3).

Agaricus (Hebeloma) nauseosus, *Cooke.*
Dinmore (8).

Agaricus (Hebeloma) nudipes, *Fr.*
Dinmore (8).

Agaricus (Inocybe) descissus, *Fr.*
Whitecliffe (10).

Agaricus (Inocybe) muticus, *Fr.*
Dinmore (8).

Agaricus (Naucoria) sobrius, *Fr.*
Stoke Edith (3).

Agaricus (Galera) mniophyllus, *Fr.*
Stoke Edith (3).

Agaricus (Hypholoma) cascus, *Fr.*
Stoke Edith (3).

Agaricus (Stropharia) Percevalii, *B. & Br.*
Whitecliffe (10).

Agaricus (Psilocybe) sarcocephalus, *Fr.*
Downton (10).

Agaricus (Psathyra) semivestitus, *B. & Br.*
Dinmore (8). Downton (10).

Agaricus (Panæolus) retirugis, *B.*
Dinmore (8).

Agaricus (Psathyrella) trepidus, *Fr.*
Stoke Edith (3).

Cortinarius (Telamonia) brunneus, *Fr.*
Whitecliffe (10).

Cortinarius (Telamonia) psammocephalus, *Bull.*
Dinmore (8). Whitecliffe (10).

Cortinarius (Dermocybe) albocyaneus, *Fr.*
Whitecliffe (10).

Lactarius subumbonatus, *Lind.*
Dinmore (8).

Russula virescens, *Fr.*
Whitecliffe (10).

Russula lutea, *Fr.*
Downton (10).

Russula xerampelina, *Fr.*
Whitecliffe (10).

Boletus candicans, *Fr.*
Whitecliffe (10).

Corticium sambuci, *Fr.*
Dinmore (8).

Corticium epiphyllum, *Pers.*
Downton (10).

Puccinia glechomatis, *D.C.*
Downton (10).

Puccinia scorodoniæ, *Link.*
Downton (10).

Morchella Smithiana, *Cooke.*
Bridstow (2).

Morchella semilibera, *Fr.*
Bridstow (2).

Lachnella nivea, *Hedw.*
Downton (10).

Diaporthe inquilina, *Wallr.*
On *Umbelliferæ*, Downton (10).

Paxillus alexandri, *Fr.*
Whitecliffe (10).

Grandinia ocellata, *Fr.*
Downton (10).

Phyllachora angelicæ, *Fr.*
Stoke Edith (3).

Empusa muscæ, *Fr.*
On flies, Stoke Edith (3).

Part II.

1. Clematis Vitalba, *L.*

New Districts. 12 and 13. Burton Court near Eardisland; *Ley* : and in several stations in the Golden Valley; *Mrs. Powell* and *Mrs. Robinson* ! ! !

15. Ranunculus Flammula, *L.*

Var. pseudo-reptans.

New Districts. 2 and 3. Filling a small pool at Warren Wood near Bishopswood; and at the Devereux pools, Woolhope; *Ley.*

22. Ranunculus parviflorus, *L.*

New District. 5. Bearwood Common near Storridge; *Towndrow* !

Very abundant in a neglected tillage field near Langstone, Llangarren, D. 1; *Ley.*

27. Helleborus viridis, *L.*

The Green Hellebore has been found at several fresh stations, including a new District (13). Tedstone brook near Paradise Dingle (5); *Ley.* Near Bacton (13); Dulas; and near Rowlstone (14); *Mr. C. Butler.* In each case the plant was found in single specimens and near a cottage; thus confirming the view that it is mostly if not always an Introduced plant in Herefordshire.

28. Helleborus fœtidus, *L.*

Three new Districts (1, 4, and 5) and several fresh stations. Crossiago, St. Weonards (1), but near a cottage; *Ley.* Rocky limestone wood, Welsh Bicknor (2), in several spots; *Ley.* Whittlebury and Lower Buckenhill, in limestone woods; *Ley.* Bank at Birches' End near Castle Frome, with *Rosa spinosissima,* and *Cephalanthera grandiflora; Dr. Wood* ! ! !

Brook side near Brockhampton (5); *Ley.* "Brook side near Sapey Mill"; *Mr. J. Lloyd, MS.*

29. Aquilegia vulgaris, *L.*

New Districts. 5 and 14. Tedstone Delamere (5) at a single station; *Rev. T. S. Lea.* Hedge row between Penylan and Hardwicke (14); *Moore:* Dulas (13 and 14); *Butler* ! !

Reported from Whitehouse woods, Vowchurch, and Brownhill woods, Peterchurch (13); *Mrs. Powell.*

30. Aconitum Napellus, *L.*

The Monkshood is reported from one fresh District (11). By the Arrow, Titley, apparently native; *Billiald.*

31. *Nymphæa alba, *L.*

With the next at the Devereux pools, Woolhope (3); *Ley.*

32. Nuphar lutea, *Sm.*

New District. 5. "In the Sapey brook at Whitbourne Hall, but almost certainly planted"; *Lea.*

Devereux pools, Woolhope (3), and in the brook at Stretford (8); *Ley.*

38. Meconopsis cambrica, *Vig.*

Further research has led to the conclusion that the Welsh Poppy is nearly certainly a Native in the Grwyne valley (14), where it occurs in rough hedge banks both in Herefordshire and Breconshire.

41. Corydalis claviculata, *D.C.*

One fresh District noted for this plant. 11. Old pool bed at Shobdon, 1887 and 1889; *Ley.*

42. Fumaria pallidiflora, *Jord.*

New District. 6. In great plenty as a garden weed at Yarkhill, 1888; *Ley.* Treseck, Hoarwithy, and in Sellack parish (2), as a garden weed, 1888; *Ley.*

It is curious that this rare Fumitory, after escaping notice in the county since 1849, should have occurred at three distinct stations in 1888.

49. Sinapis nigra, *L.*

In many fresh stations, in Districts 4, 5, 6, and 7 in tillage fields. Colwall; Bromyard, and the country to its East and North: near Dormington. Also in a tillage field at Rowlstone (14); *Ley.* These records appear to shew the Black Mustard to be as much a Native in tillage fields as on river banks.

65. Barbarea stricta, *Andrz.*

New station. Osier bed on the Lugg at Mordiford (7); *Ley.*

66. Barbarea intermedia, *Boreau.*

New District. 14. *Dulas; Mr. C. Butler* ! Field near Cwm-y-oy; *Ley.*

70. Nasturtium palustre, *D.C.*

Two new Districts. 5. On the Teme, Whitbourne, abundantly; *Ley.* 7. Several spots between Marden and Dinmore; also at Rotherwas; *Ley.*

On the Lugg at Dinmore (8); on the Teme at Brampton Bryan (10); *Ley.*

71. Nasturtium amphibium, *Brown.*

Two new stations in District 2. Pool side at Benhall, Ross, 1892: old pools at Sellack; first in 1890, and increasing rapidly each subsequent year; *Ley.*

One new District. 5. Plentiful on the Teme at Whitbourne; *Ley.* On the Frome brook, Weston Beggard (6); *Ley.*

75. Camelina sativa, *Crantz.*

New District. 2. Grass field at Moraston, near Ross, 1888; *Miss E. Armitage* ! ! !

76. Thlaspi arvense, *L.*

New District. 7. Hopyard at Larport near Dormington; *Ley.*

77. Teesdalia nudicaulis, *R. Brown.*

Wapley hill (11) on walls, and on the summit of the hill, 1889; *Mr. E. H. Greenly! !*

81. Lepidium Smithii, *Hook.*

New District. 14. Dulas; *Butler.*

82. Senebiera didyma, *Pers.*

New District. 2. Weed in Sellack garden, first appearing in a courtyard after a dressing of coarse salt, and spreading to the garden; *Ley.*

85. Helianthemum vulgare, *Gaert.*

Several fresh stations have been found for the Rock Rose in Districts 5 and 6. Sapey bridge, and at Dale End Farm (5): road side at Stoke Lacey (6), plentifully, together with a pale flowered variety; *Ley.*

The Rev. T. Hutchinson writes that the Rock Rose has been rapidly on the increase in the Kimbolton neighbourhood of late years.

88. Viola permixta, *Jord.*

Two new localities: wood at Lower Buckenhill (3); woods on the Ridgeway, Eastnor (4); at both places fine and plentiful; *Ley.*

90. Viola sylvatica, *Fr.*, var. *b. Reichenbachiana.*

New District. 4. Colwall; *Towndrow.*

Plentiful at Buckenhill, and on the Common Hill, Fownhope (3), in full flower March 25th, 1893; *Ley.*

91. Viola canina, *L.*

New District. 3. Pasture in the higher part of Stoke Edith park; *Dr. Wood! !*

93. Viola lutea, *Huds.*

One new station in D. 14. Buller's Bank, Cusop hill; *Mrs. Powell.*

94. Drosera rotundifolia, *L.*

New District. 13. The Bell Orls, Dorstone; *Ley.* Near Mynydd brith, Dorstone (14); *Mrs. Powell.*

99. *Dianthus deltoides, *L.*

Found on Coxwall Knoll, near Brampton Bryan (D. 10) by Mrs. Key, some years ago: but whether on that part which lies within Herefordshire, or no, remains doubtful. The plant should be searched for and the doubt, if possible, cleared up.

103. Silene noctiflora, *L.*

Still at the old station near Ruardean (2), in 1888; *Ley.* Field between Puttridge lane and the Chase wood, Ross (2); *Purchas.* Weed in the garden, Sellack Vicarage, 1888; *Ley:* in the garden at Dadnor, 1892; *Miss E. Armitage! ! !*

It will be observed that this plant is still confined to the Ross District (2): all the above stations lying in this District.

107. Lychnis Githago, *Lam.*

New District. 5. Cornfields at Tedstone Delamere, occasionally; *Rev. T. S. Lea.*

108. Mœnchia erecta, *Sm.*

Two fresh stations. On Knill Garraway, "rather common"; on Wapley hill and wall surrounding it (11). *Mr. E. H. Greenly! ! !.* Ewias Harold Common (13); *Butler! !*

113. Stellaria nemorum, *L.*

New Districts. 12. By the stream between Cwmma moors and Eardisley, 1885; *Mr. Le Brocq.* 14. Craswall brook, at a single spot, 1893; *Ley.*

On the river bank at Carey islands (2), 1893; *Ley.* The discovery of this rare Stitchwort at Eardisley and Craswall is important, and establishes the plant beyond doubt as a Native in Herefordshire. The other stations, with the exception of the old and doubtful one at Allensmore, are all on the actual banks of the Wye, whither it is possible the plant may have been carried by floods.

114. Stellaria media, *With.*, var. *umbrosa.*

Recorded from several fresh Districts. River bank at Caplar, and at the Great Doward, both under shade and in the open (2); *Ley;* Colwall (4); *Towndrow.* Wood near Titley (11); *Ley.*

124. Sagina ciliata, *Fr.*

New District. 4. Road-side between the Herefordshire Beacon and Eastnor, July, 1894; *Towndrow.*

127. Sagina nodosa, *Meyer.*

New District. 14. Spring heads on Cusop hill, 1886; *Ley.*

128. Spergula arvensis, *L.*

Add District 5. Upper Sapey; *Ley.* Tedstone Delamere; *Rev. T. S. Lea.*

129. Spergularia rubra, *Fenzl.*

New District. 12. Winforton; "at the point where the tramway crosses the road"; *Hutchinson.*

131. Montia fontana, *L.*

New District. 5. Bearwood Common, near Storridge; *Towndrow!*

Backbury hill (3); *Dr. Wood! !* Ewias Harold Common (13); *Mr. C. Butler.*

132. Hypericum Androsæmum, *L.*

Several fresh stations recorded. Frequent in Tedstone Delamere parish (5); *Lea.* Leysters (9); *Hutchinson.* Poston, Peterchurch (13); *Mrs. Robinson! ! !* and Dulas (13 and 14); *Mr. C. Butler! ! !*

142. Malva sylvestris, *L.*

Add District 8. Brinsop; *Hutchinson.*

144. Tilia grandifolia, *Ehrh.*

New District. 13. Old pollard in Haybrook wood, Vowchurch, appearing quite native ; *Ley.*

146. Tilia parvifolia, *Ehrh.*

Two new Districts. 6. Coppice bushes in Westhide wood. *Ley.* 8. Woods near Dinmore ; *Ley.*

Woods at Dulas ; *Ley* : Old rocky wood at Woodbury hill, both in D. 13 ; *Cornewall ! ! !*

150. Geranium phæum, *L.*

Two fresh Districts reported. 5. "Reported with some doubt from the Sapey brook, but never personally seen" ; *Lea.* 6. "In Pencombe parish, well established" ; *Mrs. Burroughes.*

Geranium striatum, *L.*

Two new Districts. 9. Between Berrington and Ashton, *Miss Hutchinson ! !* 13. London rocks, Peterchurch, near a cottage, *Mrs. Robinson ! ! !* Hardwicke ; *Ley.*

154. Geranium molle, *L.*

Add District 5 ; *Ley.*

155. Geranium pusillum, *L.*

New District. 14. Dulas, both in Districts 13 and 14 ; *Mr. C. Butler.*

Tillage field at Upper Moraston, Ross (2) ; *Ley.*

161. Erodium moschatum, *L'Herit.*

New District. 5. Dry bank at Dale End farm near Cradley, apparently native ; *Ley.*

163. Oxalis Acetosella, *L.*

A lilac flowered variety is reported by Rev. T. S. Lea from Tedstone Delamere (5). With deep pink flowers near Llanthony Abbey (14) ; *Ley.*

167. Rhamnus Frangula, *L.*

Several fresh stations. Suff wood, Howle hill (2) : Queen's wood, Upton Bishop (3) : Canon Vallets wood, Westhope hill (8) ; *Ley.*

176. Ononis arvensis, *Auct.*

Add District 14 Near Arthur's Stone ; *Mrs. Powell.*

177. Anthyllis vulneraria, *L.*

New District. 7. Rough bank near Burghill in plenty ; *Dr. Chapman ! ! !*

Railway embankment in King's Capel (2) ; first in 1890, and in subsequent years up to the present date ; *Ley.*

Melilotus alba, *Lam.*

In District 2. Turnip field on Pengethly estate, Sellack : turnip field on Penoxton estate, King's Capel ; at both stations in company with the next, and in some quantity, 1890 ; *Ley.*

Melilotus parviflora, *Lam.*

District 2. With the last, at both stations ; the plants large, and in some quantity ; *Ley.*

183. Trifolium medium, *L.*

New Districts. 5. Tedstone Delamere in plenty ; *Ley :* also reported by *Rev. T. S. Lea.* 7. Broomy Rise, Clehonger ; *Ley.*

186. Trifolium hybridum, *L.*

Add District 14. Mouse Castle ; *Purchas, Ley.* Rowlstone ; *Ley.*

191. Trifolium filiforme, *L.*

Two new Districts. 6. Shucknell hill ; *Ley.* 14. Pasture near Longtown, in the Olchon Valley ; *Ley.*

Several fresh stations are recorded. Welsh Newton Common (1) ; Huntsham hill (2) ; *Ley.* Backbury hill (3) ; *Dr. Wood.* Bromyard Downs, and on a bank near Dale End farm, Cradley (5) : garden lawn at Burton Court (12) ; *Ley.* Ewias Harold (13) ; *Mr. C. Butler.*

196. Ornithopus perpusillus, *L.*

Two fresh stations. Whitecliffe, Ludlow (10), just within the county boundary ; *Ley.* Wapley hill (11), 1889 ; *Mr. E. H. Greenly.*

200. Vicia tetrasperma, *Mœnch.*

Add District 5. Near Tedstone Delamere ; *Ley.*

205. Vicia angustifolia, *Roth.*

Add two Districts. 4. Colwall ; *Miss Raper !* 5. Tedstone Delamere ; *Rev. T. S. Lea.*

208. Orobus tuberosus, *L.*, var. *tenuifolius.*

Add District 13. Dulas, both in 13 and 14 ; *Butler.*

213. Prunus Cerasus, *L.*

New Districts. 13 and 14. "Common in woods near Dulas, in both Districts" ; *Butler ! ! !*

216. Spiræa Filipendula, *L.*

Mr. J. Lloyd, in his M.S. *Flora* says of this "Headlands in tillage fields, Whitbourne." Is it possible that *S. Ulmaria* could have been mistaken for *S. Filipendula ?*

The habitat indicated seems more that of *S. Filipendula* than of *S. Ulmaria*, which prefers moist spots such as ditch sides.

218. Agrimonia odorata, *Miller.*

Recorded from two fresh Districts. 3. Brookside near Sollershope, finely developed ; *Ley.* 11. Old pool bed, Shobdon : road side near Staunton-on-Arrow ; *Ley.*

Coxwall Knoll (10) ; *Ley.*

226. Potentilla procumbens, *Sibth.*

Some information has been gathered since the publication of the *Flora* respecting this plant and its allies. Taking the paper published in the *Journal of Botany*, 1893, p. 325, by the Rev. E. S. Marshall as a guide, the following forms have been observed in Herefordshire.

1. *P. tormentilla* × *procumbens* (*P. suberecta, Zim.*) Rare. Howle Green (2), 1891; *Purchas* and *Ley*. Brake near Athelstane's wood (2), 1893; *Ley*.

2. *P. procumbens, Sibth.* Rare. St. Weonards (1), 1885; *Ley*. Common, I believe, in St. Weonards parish. Dinmore (8), 1888; *Ley*.

3. *P. Tormentilla* × *reptans* (*P. italica, Lehm*). Rare. Roadside near Kingsland (12), 1893; *Ley*.

4. *P. procumbens* × *reptans* (*P. mixta, Nolte*). Common: by far the most abundant of the forms lying between *P. tormentilla* and *P. reptans*. Sellack: brake near Athelstane's wood, with *P. suberecta*, 1893; *Ley*. St. Weonards (1), 1893; *Ley*. Pasture in Upton Bishop parish, near Queen's wood (3), 1893; *Ley*. Broadmore Common (3), 1889; *Purchas* and *Ley*. Haugh wood (3), a form close upon *P. reptans*, 1891; *Ley*. Grantsfield, Kimbolton (9), 1891; *Ley*. Near Presteign (10); *Ley*. Between Kington and Stanner; Harewood near Hay; and Noke near Staunton (11); *Ley*. Llanthony Abbey (14), 1886; near Cwm-y-oy (14), 1894; *Ley*. Mr. Murray has kindly looked over our set of these puzzling plants, and the names assigned to them are given with his consent, and for the most part at his suggestion. All of the forms, as well as *P. Tormentilla* and *P. reptans* produce indifferently 4 petalled and 5 petalled flowers; but the latter are rare in *P. Tormentilla*, the former in *P. reptans*. In the intermediates the two forms are nearly equally common.

232. Fragaria elatior, *Ehrh.*

New District. 10. Turf of the river bank at Downton Castle, abundantly, 1892; *Ley*.

265. Geum rivale, *L.*

District 5. "Sapey brook near Sapey Church"; *J. Lloyd, MS.* We are informed by Rev. T. S. Lea that the localities both for *G. rivale* and *G. intermedium* at Sapey in Lees's *Malvern Botany* (that is near Lower Sapey old Church) are in *Worcestershire*. District 7. Wet wood near Coedmore Common; *Ley*.

266. Geum intermedium, *Ehrh.*

The station in (5) on the Sapey brook must apparently be transferred from our Flora to that of Worcestershire (see above on *G. rivale*). The earliest record will therefore be that at Ruckhall mill (7), 1879.

267. Rosa spinosissima, *L.*

New District. 4. Birches' End near Castle Frome; *Dr. Wood! ! !*

272. Rosa micrantha, *Sm.*

New District. 14. Near Dulas: near Michaelchurch Escley; *Ley*.

273. Rosa canina, *L.*

Var. b. surculosa.

New District. 10. Near Mary Knoll farm, well-marked; *Ley*.

Var. f. biserrata.

New District. 10. Head of the Mary Knoll valley; *Ley*. Rough hill ground near Vowchurch (13); *Ley*.

Var. h. frondosa.

On the Lugg and Wye near Mordiford (2); *Ley*.

New Districts: Rough ground near Vowchurch; the Bell Orls, Dorstone; and plentiful near Dulas; all in D. 13; *Ley*. Hedges near Mouse Castle, and near Michaelchurch Escley, D. 14; *Ley*.

Var. obtusifolia.

New District. 14. Near Mouse Castle; *Purchas* and *Ley*. Between Dulas and Rowlstone; *Ley*.

Var. i. arvatica.

Whitcliffe wood, and Ludford (10); *Ley*. Several bushes near Vowchurch (13); *Ley*.

Var. j. dumetorum.

New Districts. 8. Near Burghope farm, Dinmore; *Ley*. 14. Several spots near Michaelchurch Escley; *Ley*.

Var. m. tomentella.

Howle hill (2), 1891; *Rev. W. M. Rogers*.

Var. o. verticillacantha.

New Districts. 3. Lane side near Littlehope; a form falling under the *aspernata* of Deséglise; but with small round fruit; *Ley*. 13. Hill side, Dulas; *Ley*.

Var. u. subcristata.

New District. 10. Head of the Mary Knoll valley, well marked; *Ley*. Snodhill park near Dorstone (13), not well marked; *Ley*.

Var. x. coriifolia.

On the top of Bishopstone hill, D. 8; well marked and satisfactory specimens, 1891; *Ley*. It is agreeable to be able to record this Rose for the county with certainty.

274. Rosa stylosa, *Desv., var. systyla.*

New District. 2. In the Lord's wood, Great Doward, 1891; *Rev. W. M. Rogers* and *Ley*.

275. Rosa arvensis, *Huds., var. bibracteata.*

New District. 2. Hedge at Sellack, well marked; *Ley*.

276. Cratægus Oxyacantha, *L., var. oxyacanthoides.*

D. 2. One large bush in Lodge Grove, Bishopswood, apparently native, 1891; *Rev. W. M. Rogers* and *Ley.*

277. Pyrus torminalis, *Ehrh.*

New District. 13. Dulas Common; *Mr. C. Butler ! ! !*

"*Pyrus pinnatifida;* in a wood near Cradley"; *J. Lloyd, MS.* Nothing is known of this; and the tree was without doubt a planted one.

281. Pyrus communis, *L.*

One shrub in the Lord's wood, Great Doward (2): probably bird-sown; *Ley.* New District. 3. In the Haugh wood, but very scarce; *Dr. Wood ! ! !* Probably native here.

282. Pyrus Malus, *L., var. a. acerba.*

New District. 13. Woods on the hill sides near Dulas, abundantly; *Ley.* Woods near Michaelchurch Escley (14); *Ley.*

283. Lythrum Salicaria, *L.*

New District. 14. On the Worm brook below Pontrilas; *Ley.*

285. Peplis Portula, *L.*

Old pool bed at Shobdon: Vallets wood, Titley; both in D. 11; *Ley.*

286. Epilobium angustifolium, *L.*

New Districts. 5. Edwin wood, in two spots; *Ley.* Whitbourne; *J. Lloyd, MS.* Badley wood, Tedstone; *Rev. T. S. Lea.* 13. Wood near Poston Lodge, Peterchurch; *Mrs. Robinson ! ! !*

Var. b. brachycarpum, *Leighton.*

In Athelstane's wood (2), 1885, apparently quite native; *Ley.*

290. Epilobium roseum, *Schreb.*

Howle hill (2); *Ley.* Bush farm near Coddington (4); *Towndrow.* Ludford (10); *Ley.* Brookside, Dulas (13); *Ley.* Near Clifford, and in Cusop dingle (14); *Ley.*

291. *Epilobium Lamyi, *F. Schultz.*

This plant is rare in Herefordshire; but it is undoubtedly a Native in the county.

Localities: D. 1. Wood at the Slip, Ganarew, 1884; *Ley.* D. 2. Garden ground near the quarries, Great Doward, 1888; wood path in the Lord's wood, Great Doward, 1889; *Ley.* D. 8. Wood paths at Dinmore, 1891, 1892; *Ley.* The above records have all been authenticated by the Rev. E. S. Marshall. D. 4. Colwall, on a railway bank; *Miss Raper !* 13. In Haybrook wood near Vowchurch; *Ley.*

292. Epilobium obscurum, *Schreb.*

New District. 13. The Cwm dingle, Dorstone; *Ley.*

293. Epilobium palustre, *L.*

At the Bush farm, Coddington (4); *Towndrow.* On the Red Daren, Hatterels (14); and plentiful in the old brickfield, Pontrilas (14); *Ley.*

The following Hybrids in this genus have been detected in the county, and have almost in every case been authenticated by Rev. E. S. Marshall:—

1. *E. hirsutum* × *montanum.* Dinmore (8), 1889. River bank, Hereford (7), 1890; *Ley.*
2. *E. hirsutum* × *parviflorum.* On the Lugg at Dinmore (8); *Ley.*
3. *E. parviflorum* × *montanum.* Linton wood, Gorstley (3), 1887; *Purchas* and *Ley.*
4. *E. montanum* × *obscurum.* Dinmore (8), 1879; *Ley.* Haugh wood (3), 1891; *Ley.* See *Botanical Exchange Club Report,* 1891, p. 336.
5. *E. montanum* × *Lamyi.* Lodge Grove (2), 1887; *Ley.* Garden ground at Mount Craig (2), 1887; *Ley.*
6. *E. tetragonum* × *obscurum.* Dinmore (8), 1889, 1892; *Ley.* Wood walk in the Lord's wood, Great Doward (2), 1891; *Ley.*

294. *Circæa alpina, *L.*

River side Caplar (2), 1889; the *var. intermedia,* and possibly referrible rather to *C. lutetiana* than *C. alpina: Ley.*

298. *Callitriche verna, *L.*

Pool and ditch near Monk's Grove, Brampton Abbots (2), 1890; pool at Benhall, near Ross (2), 1892; *Ley.*

303. Ribes Grossularia, *L.*

New District. 13. Brook and lane sides near Dorstone; *Rev. T. Powell.*

304. Ribes alpinum, *L.*

New District. 7. Wood hedge below Belmont, Hereford, 1894; *Ley.*

306. Ribes nigrum, *L.*

New Districts. 3. Damp, bushy spot in the Haugh wood; *Ley.* 6. Dewdaleshope, in an old hedge; *Ley.* 14. *Ley.*

307. Sedum Telephium, *L., var. a. purpurascens.*

New District. 3. Edge of Haugh wood, near Mordiford, but quite close to a garden; *Ley.* Hedge, at some distance from houses, Great Doward: wall in a lane, near houses, Little Doward (2), 1890; *Ley.* It still remains quite doubtful whether this plant can be accounted native in Herefordshire.

308. Sedum album, *L.*

New District. 6. Near England's Gate; *Ley.*

316. Saxifraga tridactylites, *L.*

New District. 5. On walls and roofs, occasionally, at Tedstone Delamere; *Rev. T. S. Lea.*

317. **Saxifraga granulata**, *L.*

New Districts. 5. Moist woods near the Sapey brook; *Rev. T. S. Lea.* 14. Brook side rocks on the Grwyne; *Ley.* Ludford (10) on rocky banks by the river; *Ley.* The Cwm dingle, Dorstone (13); *Ley.*

318. **Saxifraga sponhemica**, *Gmel.*

On the Red Daren, Hatterels above Longtown, 1888; *Ley.* This record brings the plant within the Flora of *Herefordshire* proper.

321. **Chrysosplenium alternifolium**, *L.*

New District. 5. "Common in the valley of the Sapey"; *Rev. T. S. Lea.* Colwall (4), *Miss Raper!* Meadow under the wood, Carey (2); *Ley.*

322. **Hydrocotyle vulgaris**, *L.*

New District. 7. Near Warlow pool; *Ley.*

338. **Œnanthe Phellandrium**, *Lam.*

Old pool bed near Bredwardine (13); *Ley.*

345. **Torilis infesta**, *Spreng.*

New District. 6. Road side at Larport farm near Dormington; *Ley.*

350. **Chærophyllum temulum**, *L.*

New District. 12. Kingsland, Eardisland, &c.; *Ley.*

351. **Myrrhis odorata**, *Scop.*

New District. 6. Hedge near Risbury; well established, but near cottages; *Ley.*

352. **Scandix Pecten-Veneris**, *L.*

New District. 11. Tillage field near Empton; *Ley.*

353. **Conium maculatum**, *L.*

On the Frome above Bromyard (5); *Ley.* On the Monnow and Dore at Pontrilas (14); *Ley.*

357. **Viscum album**, *L.*

On Sycamore at Benhall, near Ross (2); *Ley.* On Ash, at Moorhampton Station (8); *Mr. T. Hutchinson.* On Hazel, and Sycamore, at Eardisland (12); *Rev. J. Barker.*

358. **Adoxa Moschatellina**, *L.*

New Districts. 5. "Brook side near Gaines"; *J. Lloyd, MS.* Hedge banks, Tedstone Delamere, "frequent"; *Rev. T. S. Lea.* 6. Pencombe; *Rev. R. Burroughes.* 7. Wareham wood, near Hereford; *Miss Boycott!* Colwall (4); *Miss Raper!* In several spots both in the Honddu and Grwyne valleys (14); *Ley.*

359. **Sambucus nigra**, *L., var. laciniata.*

Rowlstone, near a house (14); *Ley.*

360. **Sambucus Ebulus**, *L.*

New District. 11. Bank of the Arrow at Titley; *Ley.* St. Devereux (1); *Mr. C. Butler.*

361. **Viburnum Opulus**, *L.*

Wet copse near Withington station (6); *Ley.*

370. **Galium uliginosum**, *L.*

The Bell Orls, and Golden Well, near Dorstone (13); *Ley.*

374. **Sherardia arvensis**, *L.*

New Districts. 5; *Ley.* 14; *Ley.*

375. **Valeriana dioica**, *L.*

New District. 5. Swamp at the "Punch Bowl," also on the Sapey brook; *Rev. T. S. Lea.*

377. **Valerianella olitoria**, *Mœnch.*

New Districts. 5. "By the Teme near Whitbourne Church"; *J. Lloyd, MS.* 10. Limestone rocks by the Teme at Ludford, 1892; *Ley.*

381. **Dipsacus pilosus**, *L.*

Wood near Dulas (13); *Mr. C. Butler.*

383. **Scabiosa columbaria**, *L.*

Several plants, at the Seven Sisters rocks, Great Doward, 1892; *Ley.*

386. **Silybum Marianum**, *Gaertn.*

New Districts. 5. Weed in a garden at Upper Sapey; *Ley.* 13. Near Poston Lodge, Peterchurch; *Mrs. Powell.*

393. **Carduus acaulis**, *L.*

New Districts. 5. Bromyard Downs; *Rev. T. S. Lea.* 13. Dulas; *Mr. C. Butler.*

The following hybrids in this genus have been detected in the county:—

1. *Nutans* × *crispus.* Apparently far the most common of the hybrids, and varying much, especially in the size of the anthodes. St. Weonards (1), 1882, 1883; *Botanical Exchange Club Report*, 1882, p. 73; 1883, p. 90; *Ley.* River bank at the Leys (2), 1881: hedge, Sellack, in two spots (2), 1888; *Botanical Exchange Club Report*, 1888, p. 221: Much Fawley (2), 1883; *Ley.*

2. *Nutans* × *lanceolatus.* Hedge, Sellack (2), 1888; *Ley.*

3. *Nutans* × *arvensis.* Near Prothether farm, Hoarwithy (2), 1888: railway bank, King's Capel (2), 1889; *Ley.* *Botanical Exchange Club Report*, 1889, p. 263.

4. *Lanceolatus* × *eriophorus.* With *C. eriophorus* on a warm bank at Much Fawley, August 1883; *Ley.*

5. *Palustris* × *?* Corner of Bolston wood nearest to Holm Lacey park, October 1888; *Ley.* *Botanical Exchange Club Report*, 1888, p. 221.

395. Carlina vulgaris, *L.*

"London rocks" near Peterchurch (13); *Mrs. Robinson ! ! !*

396. Arctium majus, *Schkuhr.*

Near Dulas (13): near Pontrilas (14); *Ley.*

398. Arctium intermedium, *Lange.*

Not rare in Herefordshire.

Loc. *South.* 1. Field border at Llangunnock, Llangarren, 1893; *Ley.* 2. Pengethly, 1891: Great Doward, near the Weir, 1891: Little Doward, on bushy ground by the river side, 1893; *Ley.*

Central. 8. Hill Hole near Hampton Court, 1885; *Ley.*

North. 11. Road side near Noke, 1893; *Ley.*

West. 14. In the Llanthony valley near the Queen's Head, 1891; *Ley.*

399. Arctium nemorosum, *Lej.*

Less common in Herefordshire than *A. intermedium.*

Loc. *South.* 1. On the Monnow near Garway mill, 1883: field border at Llangunnock, in company with *A. intermedium; Ley.* 2. Open places in the Lord's wood, Great Doward, 1889, 1891: river side, Little Doward, in company with *A. intermedium*, 1893; *Ley.*

Var. tomentosum. *A. pubens, Bab.*, teste *J. G. Baker.* Rare.

Treago, St. Weonards, 1879: road side at Michaelchurch, 1879, both in D. 1; *Ley.* In the Lord's wood, Great Doward (2), 1874: lane near the Paddock farm, Cobrey (2), 1889; *Ley.* Deepwell wood, Moccas (13), 1887; *Ley.*

400. Serratula tinctoria, *L.*

New District. 11. Wood border between Presteign and Nash; *Ley.* In many places in the Haugh wood (3); *Dr. Wood.* Pasture at Colwall station (4); *Ley.* Plentiful in a rough pasture on Egdon hill (6); *Ley.*

402. Centaurea Scabiosa, *L.*

New District. 5. Dry banks near Merry hill, near the county boundary; *Ley.* Stoke Lacey; *Rev. T. S. Lea.*

403. Centaurea Cyanus, *L.*

New District. 5. "Rare; occasional near Tedstone Delamere"; *Rev. T. S. Lea.*

411. Anthemis arvensis, *L.*

New District. 5. Reported with some doubt from Upper Sapey by Rev. T. S. Lea.

Anthemis Tinctoria, *L.*

Appeared as a Casual on Caradoc farm, Sellack (2) in August, 1884; *B. M. Watkins!*; but has not reappeared.

419. Gnaphalium uliginosum, *L.*

New District. 13. Bredwardine; *Ley.*

420. Gnaphalium sylvaticum, *L.*

New Districts. 13. Hill pasture at Snodhill park, Dorstone; *Ley.* 14. Pasture in Cwm Buchel, Llanthony; *Ley.*

420.* Gnaphalium dioicum, *L.*

Great Doward (2), at a single spot; some 60—70 spikes of flower, 1892; *Ley.* No doubt identical with Mr. Farr's station.

Crib-yr-Garth, on the Hatterels (14), 1890; *Mr. G. Trafford!*

423. Senecio viscosus, *L.*

New District. 6. On the railway at Weston Beggard and Tarrington; *Dr. Wood ! !* Casual; inclined to spread and establish itself.

430. Bidens tripartita, *L.*

New Districts. 5. On the Teme, Whitbourne; *Ley.* Pond near Tedstone Wafre; *Rev. T. S. Lea.* 13. Dulas; *Mr. C. Butler.* Pool side at Rotherwas (7); *Ley.*

431. Inula Helenium, *L.*

Between Kilpeck and Bagwyllydiart (1); *Woolhope Club Expedition, 1887!* Near cottages on the Great Doward (2); *Ley.* Kingstone Grange (13); *Mr. H. C. Moore.* Rowlstone (14); *Mr. C. Butler.*

436. Erigeron acris, *L.*

New District. 13. Ewias Harold; *Mr. C. Butler.*

437. Solidago Virga-aurea. *L.*

New District. 13. Peterchurch; *Mrs. Powell.* Whitfield woods; *Mr. C. Butler.*

439. Petasites vulgaris, *Desf.*

The pistillate plant was noticed growing in a brook near Clifford (14), on occasion of the Woolhope Club expedition, July, 1889: and this is the first record of its appearance in Herefordshire; *Purchas, Ley.*

440. Eupatorium cannabinum, *L.*

New District. 11. Near Presteign; *Ley.*

441. Cichorium Intybus, *L.*

New District. 13. Dulas; *Mr. C. Butler.* "In land left to fall out of cultivation at Norton, near Bromyard" (5); *Rev. T. S. Lea.*

443. Hypochœris radicata, *L.*

New District. 3. *Ley.*

444. **Leontodon hirtus**, *L.*
New Districts. 12. Pasture at Cwmma, near Eardisley; *Ley.* 13. Pasture near Poston Lodge, Peterchurch; *Ley.* 14. Mountain side, Cwm-y-oy; *Ley.* Dulas; *Mr. C. Butler.*

446. **Leontodon autumnalis**, *L.*
New District. 3. Broadmore Common, Woolhope; *Ley.*

447. **Picris hieracioides**, *L., var. arvalis.*
At the large quarries, Great Doward (2); *Ley.*

448. **Helminthia echioides**, *Gaertn.*
New District. 7. Rough ground near Burghill; *Dr. Chapman.*

450. **Taraxacum officinale**, *Wigg., var. b. erythrospermum.*
New District. 6. Quarry at Dewdaleshope; *Ley.*

Crepis setosa, *Hal. fil.*
New Districts. 2. In clover on Cutters farm, Sellack, 1888; in clover on the Whitehouse farm, Sellack, 1889; *Ley.* 13. Tillage field near Dulas; *Mr. C. Butler!*

Crepis biennis, *L.*
New District. 2. In a small grass field on the Great Doward, 1888 and 1889; *Ley.* In sown grass, King's Capel, 1894; *Ley.* In sown grass, Sellack, 1894; *Ley.*

Hieracium aurantiacum, *L.*
New District. 5. In meadow turf at Tedstone Delamere Rectory; *Rev. T S. Lea.*

461. **Hieracium murorum**, *L. pt.*
New District. 6. Westhide wood, in plenty; *Ley.* Edwin wood (5), plentifully: wooded bank near Upper Sapey (5); *Ley.*

464. **Hieracium tridentatum**, *Fries.*
Wood bank at Symond's Yat, but just within the county boundary (2): bank, on sandstone, near the quarries, Great Doward (2); *Ley.*

465. **Hieracium umbellatum**, *L.*
Linton wood near Gorstley, and at Gorstley quarries (3), on limestone; *Ley.* Mountain pasture near Craswall (14); *Ley.*

467. **Jasione montana**, *L.*
Hedge bank, Lyonshall park wood (11); *Purchas, Ley.* Hedge near Eardisley (12); *Ley.*

Campanula rapunculoides, *L.*
"Well established in the Rectory garden hedge, Tedstone Delamere (5), where it has existed for over 20 years"; *Rev. T. S. Lea.*

Campanula Rapunculus, *L.*
"Still existing at the Bridstow station in 1888"; *Miss E. Armitage.*

475. **Vaccinium Myrtillus**, *L.*
New District. 13. Snodhill park near Dorstone; *Ley:* woods at Poston Lodge, Peterchurch; *Mrs. Robinson! ! !*

478. **Calluna vulgaris**, *Salisb.*
Edwin wood (5); *Ley.*

479. **Pyrola minor**, *L.*
In the Lord's wood, Great Doward (2); *Miss Dean!*

482. **Ligustrum vulgare**, *L.*
New District. 5. "Hedge at Gaines"; *J. Lloyd, MS.* Hedge at Tedstone Delamere, "native"; *Rev. T. S. Lea.*

484. **Vinca minor**, *L.*
Green wood, Much Marcle (3), appearing native; *Ley.* Copse at the New Weir (7); *Ley.* Ewias Harold (14); *Mr. C. Butler.*

487. **Gentiana Amarella**, *L.*
New District. 5. "On the top of the Punch Bowl bank, Tedstone Delamere"; *Rev. T. S. Lea.*
Howle Green (2); *Purchas, Ley.* Colwall (4); *Miss Raper!* Banks of the Penteloe brook (3); *Mr. C. G. Martin! !.* Treville wood lime quarries (13); *Ley.* Bacton, and Ewias Harold Common (13); *Mr. C. Butler.*

488. **Gentiana campestris**, *L.*
New District. 2. Pasture near Labour-in-vain farm, 1891; *Rev. W. M. Rogers* and *Ley.*

493. **Cuscuta Trifolii**, *Bab.*
New Districts. 5. Clover field, Tedstone Delamere: *Rev. T. S. Lea.* 11. Titley; *Mr. E. H. Greenly!.* 13. Dulas, on the Lower Werndu farm; *Mr. C. Butler.*

497. **Hyoscyamus niger**, *L.*
New District. 4. Cultivated ground, Colwall; several young plants, April, 1894; *Towndrow.* On ground recently disturbed at Caradoc (2), 1892; *Ley.*

499. **Verbascum virgatum**, *With.*
New District. 13. Waste ground at Dorstone; *Mrs. Robinson.*

Verbascum Blattaria, *L.*
New District. 13. Waste ground at Peterchurch; *Mrs. Robinson.* On the Wye bank near Rotherwas, 1891; *Mr. H. C. Moore!*

500. **Scrophularia Balbisii**, *Hornem.*
New District. 11; *Ley.*

506. **Linaria Elatine**, *Mill.*
Abundant in poor tillage fields in the Checkley valley (3); *Ley.*

506. ***Linaria spuria**, *Mill.*
New District. 4. Tillage field at the Wall hills, Ledbury, on Cornstone gravel, 1891; *Dr. Wood!* This re-discovery may be considered an addition to the Flora of Herefordshire, the plant having long been extinct at its former station near Eye.

508. **Linaria minor**, *Desf.*
New District. 14. In tillage near Rowlstone; *Ley.* Cornfield, Colwall (4); *Miss Raper!*

Mimulus luteus, *L.*
Rill near a cottage, Snodhill park near Dorstone (13); *Ley.*

514. **Veronica arvensis**, *L.*
New District. 5. Tedstone Delamere; *Rev. T. S. Lea.*

516. **Veronica officinalis**, *L.*
New District. 13. Dulas; *Mr. C. Butler.*

523. **Bartsia Odontites**, *Huds., var. verna.*
New Districts. 3. Wood paths in the Haugh wood; *Ley.* 7. Path side at Rotherwas; *Ley.* 14. Tillage near Llanveyno; *Ley.*

524. **Pedicularis palustris**, *L.*
New District. 1. Boggy meadow on the Gamber brook above Tretire; *Ley.* Boggy meadow Woolhope (3); *Ley.*

528. **Lathræa Squamaria**, *L.*
New District. 2. Wood on east face of the Coppet hill, April, 1890; *Ley.* Willow holt on the Teme, Downton (10); *Ley.* Not uncommon at Dulas, in (13) and (14); *Mr. C. Butler.*

529. **Orobanche major**, *L.*
New District. 14. Dulas, *Mr. C. Butler.* Tedstone Delamere occasionally; and near Bromyard (5); *Rev. T. S. Lea.*
On *Sarothamnus* at London Rocks near Peterchurch (13); *Mrs. Robinson! ! !*

530. **Orobanche minor**, *L.*
New District. 4. Colwall; *Miss Raper!*. Dry bank at Wilson near Glewstone, and at Huntsham hill (2); *Ley.* Abbey Dore (13); *Mr. C. Butler.*

533. **Mentha rotundifolia**, *L.*
Old pasture near Burghope farm, Dinmore (8); a form approaching *var. alopecuroides, Hull.*; *Ley.*

534. **Mentha sylvestris**, *L.*
New District. 4. Colwall mill; *Towndrow!* On the Wye near Hay (14); *Ley.*

535. **Mentha viridis**, *L.*
New Districts. 8. Brinsop; *Mr. F. W. Headley.* 12. Stream side at Strangford forge, Staunton-on-Arrow; *Ley.*

536. **Mentha piperita**, *Huds.*
New District. 5. On the Sapey brook; also at Tedstone Delamere; *Rev. T. S. Lea.* Stream side at Lower Bullingham (7); *Ley.* At several spots near brooks, Snodhill park near Dorstone, in both Districts (13) and (14); *Ley.* Road side near Rowlstone (14); *Ley.*

538. **Mentha sativa**, *L.*
New District. 13. Snodhill park, Dorstone; *Ley.*

Var. b. paludosa.
Lane side under the hills at Crib-yr-garth: also near Michaelchurch Court (14); *Ley.*

Mentha gracilis, Sm., *var. b. cardiaca.*
Lane side near buildings at the foot of Crib-yr-garth; also at Llanveyno (14): *Ley.*

547. **Nepeta Cataria**, *L.*
Hedge at King's Capel Church (2); *Ley.*

550. **Scutellaria galericulata**, *L.*
New District. 11. Vallets wood near Titley; *Ley.* Shady damp wood, Little Doward (2); *Rev. E. F. Linton, Ley.*

552. **Marrubium vulgare**, *L.*
New District. 3. Common hill, Fownhope; *Ley.*

558. **Stachys arvensis**, *L.*
New Districts. 5. Tillage field at Tedstone Delamere; *Rev. T. S. Lea.* 13. Tillage at Poston Lodge, Peterchurch; *Ley.* 14. Dulas; *Mr. C. Butler.*

569. **Echium vulgare**, *L.*
New District. 13. In a wood at Poston Lodge near Peterchurch, but only a single specimen; *Mrs. Robinson! ! !*

Pulmonaria officinalis, *L.*
One patch, near the Sapey brook (5); *Rev. T. S. Lea.*

570. **Lithospermum officinale**, *L.*
New District. 14. Bank of the Monnow; *Mr. C. Butler! ! !*

574. **Myosotis repens**, *Don.*
New District. 11. Plentiful in old boggy pools in Lyonshall park wood; *Ley.*

Myosotis sylvatica, *Ehrh.*

This plant seems to be spreading in Herefordshire, and occurs now at several stations at which it would probably be accounted native, were there not preponderating evidence that it did not exist there a few years ago.

In the Lord's wood, Great Doward (2), in more than one place on the river bank, 1890; *Ley.* Brook sides, Tedstone Wafre (5), 1892; *Rev. T. S. Lea ! !* At intervals on the banks of the Arrow for about a mile, between Titley and Staunton (11); *Ley.*

576. Myosotis collina, *Reich.*

New District. 9. Upper Kimbolton; *Hutchinson.*

579. Symphytum officinale, *L.*

New District. 6. Moorend farm near Shucknell; a single plant; *Ley.*

581. Pinguicula vulgaris, *L.*

At the Bell Orls, Dorstone (13); *Ley.*

Extinct at Coughton Marsh (2); *Ley*: "extinct at Kimbolton" (9); *Hutchinson.*

585. Lysimachia vulgaris, *L.*

Old pool beds in Moccas park, and near Bredwardine (13); *Ley.*

586. Lysimachia Nummularia, *L.*

New District. 14. Dulas; *Mr. C. Butler.* "Common in the Golden valley" (13); *Mrs. Powell.* Pool bed in Moccas park (13); *Ley.*

588. Anagallis arvensis, *L.*

New District. 13. Tillage near Dorstone, and near Peterchurch; *Ley.*

590. Anagallis tenella, *L.*

By the Dore near Dorstone, in many places (13); *Mrs. Powell.*

594. Plantago lanceolata, *L., var. Timbali.*

New Districts. 3. In large quantities in a clover field on the edge of the Haugh wood near Fownhope; *Ley.* 13. Clover field near Snodhill Castle, Dorstone; *Ley.*

595. Plantago Coronopus, *L.*

New District. 10. Dry bank near the Teme, Ludlow; *Dr. Chapman ! !* It remains doubtful whether the exact station is in Herefordshire or Shropshire.

596. Chenopodium polyspermum, *L.*

New District. 13. In an old pool bed near Moccas park; *Ley.*

599. Chenopodium urbicum, *L., var. b. intermedium.*

New District. 13. Old pool bed in Moccas park; *Ley.*

600. Chenopodium rubrum, *L.*

New District. 8. Brinsop; *Mr. F. W. Headley !*

601. Chenopodium Bonus-Henricus, *L.*

New District. 5. Wall base at Bromyard Grammar School; *Rev. T. S. Lea.* Waste ground, Eardisland (12); *Ley.*

608. Rumex maritimus, *L.*

New District. 13. Old pool bed near Bredwardine, in some plenty, 1887; *Ley.*

610. Rumex pratensis, *M. & K.*

New District. 8. Field near Dinmore Church; *Ley.*

618. Polygonum mite, *Schrank.*

On the right bank of the river below Goodrich Court; and in the Oak meadow, Ross; both in (2); *Ley.*

622. Polygonum amphibium, *L.*: also *var. b. terrestre.*

Both forms flowering at a small pool in the Heath wood, Llangarren (1), 1889; *Ley.* River side at Whitbourne (5); *J. Lloyd, MS.*

623. Polygonum Bistorta, *L.*

New District. 5. "Near the Scaur farm near Bromyard"; *J. Lloyd, MS.* Dorstone (13); *Ley.* Abundantly at Longtown, and in the Olchon valley (14); *Ley.* Grwyne valley (14); *Ley.*

625. Daphne Laureola, *L.*

"Frequent in woods and coppices at Tedstone Delamere and Whitbourne (5), and undoubtedly native"; *Rev. T. S. Lea.* Rough bank, Burghill, plentifully (7); *Ley.* Wood at London rocks, Peterchurch (13); *Mrs. Robinson ! !* Ewias Harold (14); *Mr. C. Butler.*

635. Parietaria diffusa, *Koch.*

New District. 13. Near Dorstone; *Ley.* Eardisland bridge (12); *Ley.*

641. Quercus Robur, *L., vars. b. intermedia* and *c. sessiliflora.*

New Districts. 13. Snodhill Castle, Dorstone, and near Peterchurch: Dulas, frequent; *Ley.* 14. Abundant in woods near Michaelchurch Escley: Rowlstone churchyard; *Ley.*

645. Betula alba, *L., var. a. verrucosa.*

Hilly fields near Rowlstone; and on the Cefn hill ridge near Michaelchurch Escley (14); *Ley.*

Var. b. glutinosa.

On the Cefn hill ridge near Michaelchurch Escley (14) with the last var.; *Ley.*

646. Populus alba, *L.*

New District. 5. "Scattered trees, in the neighbourhood of Tedstone Delamere"; *Rev. T. S. Lea.*

649. **Salix fragilis**, *L., var. b. decipiens.*
New District. 14. Hedge of the osiery at Pontrilas ; *Ley.*

651. **Salix alba**, *L.*
New District. 10. Near Burrington, and on the Teme at Downton ; *Ley.*

Var. c. vitellina.
Several bushes, in an osiery at the base of a pond at Aymestry (10) ; *Ley.*

652. **Salix triandra**, *L.*
New Districts. 4. Pool side in the grounds at Mainstone Court ; *Ley.* 10. Abundant in a small osier bed on the Teme at Downton ; *Ley.* Osiery at Pontrilas (14) ; *Ley.*

653. **Salix hippophaæfolia**, *Thuil.*
Several bushes on the right bank of the Wye at Sheppen hill, Hoarwithy, in Sellack and Hentland parishes (2) ; *Ley.* This station lies about 4 miles further up the river than any previously known.

654. **Salix purpurea**, *L.*
Small osier bed on the Teme at Downton (10) ; *Ley.* Osiery at Pontrilas (14) ; *Ley.*

656. **Salix Smithiana**, *Willd.*
New Districts. 13. Brook side near Dulas ; *Ley.* 14. On the Monnow above Pontrilas ; *Ley.*

660. **Salix aurita**, *L.*
Hill sides near Dulas (13) ; *Ley.* Near Rowlstone, and abundant on hill sides near Michaelchurch Escley, and from thence to the head of the Craswall valley (14) ; *Ley.*

666. **Typha latifolia**, *L.*
In several pools at Tedstone Delamere (5) ; *Rev. T. S. Lea.*

667. **Typha angustifolia**, *L.*
New District. 7. Plentiful in the head of an old pool at Rotherwas ; *Ley.* Planted, in this station ?

670. **Sparganium simplex**, *Huds.*
New District. 10. Old pools in Ludford park ; the form with floating leaves ; *Ley.*

673. **Lemna trisulca**, *L.*
New District. 14 ; *Ley.*

677. **Potamogeton natans**, *L.*
Old pools in Ludford park (10) ; *Ley.*

678. **Potamogeton polygonifolius**, *Pour.*
Old pool bed in Moccas park (13) : the Bell Orls, Dorstone (13) ; *Ley.*

680. **Potamogeton salicifolius**, *Wolfgang.*
At three stations in the river Wye near Carey (2), 1893 ; *Ley.* It flowered freely at one of these stations ; and some immature fruit was detected by Rev. E. F. Linton.

681. **Potamogeton lucens**, *L., var. b. decipiens.*
In the Wye at Carey ; in the Wye at Sellack ; in the Wye at Huntsham, all in D. 2 ; *Ley.*

682. **Potamogeton perfoliatus**, *L.*
New Districts. 10. In the Teme at Downton ; *Ley.* 12. In the Pinsley brook, at Cursneh Camp, near Leominster ; *Ley.*

683. **Potamogeton crispus**, *L.*
New Districts. 6. Pool at Weston Beggard ; *Ley.* 14. In the Wye near the Hay ; *Ley.*

689. **Zannichellia palustris**, *L.*
New Districts. 3. Small pool in connection with the Pentelow brook at Mordiford ; *Purchas, Ley.* 12. In the Arrow at Eardisland ; *Ley.* 14. Mill pond at Rowlstone mill ; *Ley.* The station for this plant in D. 9 mentioned in the *Flora* is now destroyed.

690. **Triglochin palustre**, *L.*
New District. 3. Bogs in the Haugh Wood ; *Dr. Wood ! Purchas, Ley.* Boggy field below Howle Green farm (2) ; *Ley.*

691. **Sagittaria sagittifolia**, *L.*
New District. 8. Letton lake ; *Cornewall.* One plant in the Wye at Sellack, during very low water, July, 1887 ; *Ley.*

696. **Orchis pyramidalis**, *L.*
Road side, Stoke Lacey (6) ; Woolhope Club Expedition, 1887 ; *Ley ! !*

700. **Orchis latifolia**, "*L.*"
Pool tail at Sellack (2), plentifully ; *Ley.*

701. **Orchis incarnata**, "*L.*"
New Districts. 7. Marshy wood near Coedmore Common, 1889 ; *Ley.* 13. The Bell Orls, Dorstone, 1889 ; *Ley.*

703. **Gymnadenia conopsea**, *Brown.*
"Near Arnold's mill and Whitehall, Tedstone Delamere" ; *J. Lloyd, MS.* In two localities in Tedstone Delamere parish (5) ; *Rev. T. S. Lea.* Dorstone (13) ; *Mrs. Powell ;* Dulas (13) ; *Mr. C. Butler.*

705. Habenaria viridis, *Brown.*
New District. 13. Dulas ; *Mr. C. Butler.*

706. Habenaria bifolia, *R. Br.*
Brownshill, Peterchurch (13) ; *Mrs. Powell.*

707. Habenaria chlorantha, *Bab.*
Woods in the neighbourhood of Peterchurch and Dorstone (13) ; *Mrs. Powell.*

710. Spiranthes autumnalis, *Rich.*
New Districts. 5. "In several localities at Tedstone Delamere" ; *Rev. T. S. Lea.* 13 and 14. Dulas ; *Mr. C. Butler.* Plentiful near Poston Lodge, Peterchurch (13) ; *Mrs. Robinson ! ! !*

712. Neottia Nidus-avis, *Rich.*
New District. 14. Near Dulas, also in (13) ; *Mr. C. Butler.* Colwall (4) ; *Miss Raper !.* "Caphill wood, Gaines" (5) ; *J. Lloyd, MS.*

713. Epipactis latifolia, *Auct.*
New District. 13. Woods near Poston Lodge, Peterchurch ; *Mrs. Robinson ! !* 13 and 14. Dulas ; *Mr. C. Butler.* Tedstone Delamere (5) ; *Rev. T. S. Lea.*
All the stations above mentioned refer, probably, to the common strong-growing plant, with very broad lower leaves.

716. Epipactis palustris, *Crantz.*
New District. 13. The Bell Orls, Dorstone, in plenty ; *Ley.* Several spots in the Haugh wood (3) ; *Dr. Wood ! ! !*

717. Cephalanthera ensifolia, *Rich.*
New District. 10. Hazel copse near Mary Knoll, Ludlow, 1890 ; *Rev. G. W. Turner.*

722. Narcissus Pseudo-narcissus, *L.*
New Districts. 5. Field near Wood-end School, abundantly ; *Rev. T. S. Lea.* "*Plena ;* with *N. poeticus, Galanthus nivalis,* and *Ornithogalum umbellatum,* in an orchard at the Oaks farm, Whitbourne" ; *J. Lloyd, MS.* 14. Very plentiful at Dulas, also in (13) ; *Mr. C. Butler.*

723. Narcissus biflorus, *Curtis.*
Pasture adjoining the churchyard at Goodrich (2) ; *Ley.*
New District. 5. "A record extending to more than half a century shows this plant well established in a field near the Limehouse farm, Tedstone Delamere" ; *Rev. T. S. Lea.*

724. Galanthus nivalis, *L.*
Wood near the river below the New Weir, Great Doward (2) ; *Ley.* "All down the Sapey brook : possibly washed down from the Hat house, where it exists in huge and increasing quantities" ; *Rev. T. S. Lea.*

726. Paris quadrifolia, *L.*
Woods near Poston Lodge, Peterchurch ; *Mrs. Robinson.* 13 and 14. *Dulas ; Mr. C. Butler.*

728. Convallaria majalis, *L.*
Bollings wood, Gorstley (3) ; *Ley.*

732. Allium oleraceum, *L., var. a. genuinum.*
New District. 7. Path side between Hereford and Clehonger, in great abundance, 1892 ; *Ley.*

736. Luzula Forsteri, *D.C.*
New District. 14. Wood bank near the Queen's Head, Llanthony valley, with *L. pilosa* ; *Ley.*

737. Luzula pilosa, *Willd, var. b. Borreri.*
New District. 14. With *L. pilosa* and *L. Forsteri* on a wood bank near the Queen's Head, Llanthony valley ; *Ley.*

738. Luzula sylvatica, *Beck.*
New District. 14. Dulas woods ; *Mr. C. Butler.*

740. Luzula multiflora, *Koch.*
Boggy pastures near Tram Inn (7), *var. congesta* ; *Ley.* Lyonshall park (11) ; *umbellata* and *congesta* ; *Ley.*

743. Juncus diffusus, *Hoppe.*
Wall hills, Ledbury (4) ; *Dr. Wood ! !*

748. Juncus supinus, *Mœnch.*
New District. 11. Boggy pool bed, Lyonshall park ; *Ley.* Boggy spot, among *Sphagnum* in the Haugh wood (3) ; *Ley.*

753. Blysmus compressus, *Panz.*
New District. 3. In the Haugh wood, in two stations in company with *Epipactis palustris ; Ley.* Found again at the Dropping Well, Great Doward (2), 1889 ; *Ley.*

755. Scirpus palustris, *L.*
New District. 6. Ditch near Shucknell ; *Ley.*

759. Scirpus setaceus, *L.*
Hilly field near Dulas (13) ; *Mr. C. Butler.*

761. Scirpus sylvaticus, *L.*
New Districts. 5. Swamp in the "Punch Bowl," Tedstone Delamere ; *Rev. T. S. Lea.* 10. By the Teme at Downton ; *Ley.*

763. Eriophorum angustifolium, *Roth.*
New District. 13. The Bell Orls, Dorstone; *Ley.* At the Dropping Well, Great Doward (2); *Watkins !, Ley.*

764. Eriophorum latifolium, *Hoppe.*
New District. 3. Bog in the Haugh wood, abundantly; *Dr. Wood ! ! !* Marshy field near Tram Inn (7); *Ley.*

767. Carex paniculata, *L.*
New District. 10. Abundant about two old pools at Aymestry; *Ley.*

771. Carex stellulata, *Good.*
New Districts. 3. Bogs in the Haugh wood; *Ley.* 11. Boggy pool beds in Lyonshall park; *Ley.*

774. Carex ovalis, *Good.*
New District. 7. Boggy field near Tram Inn; *Ley.* Lyonshall park (11); *Ley.* Field near Woodbury (13); *Ley.*

775. Carex stricta, *Good.*
New District. 7. Old pool at Warlow, 1889; *Ley.*

777. Carex vulgaris, *Fr.*
Boggy pasture near Tram Inn (7); the type, with the *var. juncella; Ley.* Boggy pool beds in Lyonshall park (11); *Ley.*

779. Carex digitata. *L.*
Limestone wood on Huntsham hill (2), 1890; *Ley.*

784. Carex pallescens, *L.*
At the Bell Orls, Dorstone (13); *Ley.*

785. Carex panicea, *L.*
New District. 11. Boggy pool beds, Lyonshall park; *Ley.*

787. Carex strigosa, *Huds.*
Damp place in Yatton wood (3); *Ley.* Wet woods near Dulas (13) and (14); *Ley.*

792. Carex fulva, *Good.*
New District. 13. At the Bell Orls, Dorstone; *Ley.*

Var. c. sterilis.
New District. 13. At the Bell Orls, Dorstone; *Ley.* Cusop hill (14); *Purchas, Southall, Ley.*

794. Carex hirta, *L., var. hirtæformis.*
On the river beach at the Great Doward (2), plentifully, 1890; *Ley.*

795. Carex pseudo-cyperus, *L.*
New District. 11. Old pool bed at Shobdon; *Ley.*

799. Carex vescicaria, *L.*
Small pool in the Heath wood, Llangarren parish (1); *Ley.* Pool head, Aymestry (10); *Ley.*

803. Alopecurus fulvus, *Sm.*
New District. 7. Pool at Canon Bridge; old pools at Warlow; pool near Bridge Sollers; *Ley.* Dry bed of a small pool at Picts Cross, Sellack (2), 1890; *Ley.*

811. Calamagrostis Epigejos, *Roth.*
Wet hedge, Coughton marsh (2); *Ley.*

815. Aira flexuosa, *L.*
New District. 6. Westhide wood; *Ley.*

Avena strigosa, *Schreb.*
New District. 7. Oat field, near Wareham, Hereford; *Ley.*

820. Avena fatua, *L., var. pilosissima.*
New District. 6. Near Shucknell; *Ley.*

824. Triodia decumbens, *Beauv.*
New District. 13. Ewias Harold; *Mr. C. Butler.*

825. Kœhleria cristata, *Pers.*
New District. 6. About two dozen plants of this Grass, on Shucknell hill, 1890; *Ley.*

829. Catabrosa aquatica, *Beauv.*
New Districts. 5. Pool between Tedstone Wafre and Edwin Loach; *Rev. T. S. Lea.* 6. Ditch near Shucknell; *Ley.* Marshy pasture near Tram Inn; pool at Allensmore (7); *Ley.*

830. Glyceria fluitans, *Brown.* Type; and *var. pedicellata.*
New District. 13. At the Bell Orls, Dorstone; both varieties; *Ley.*

834. Sclerochloa rigida, *Link.*
Walls at Shucknell hill (6); *Ley.*

836. Poa nemoralis, *L.*
New District. 6. Wall tops at Weston Beggard, and at Shucknell hill; *Ley.*

837. Poa compressa, *L.*
New District. 8. Kenchester churchyard wall; *Ley.* Wall top at Dulas mill (13); *Mr. C. Butler ! ! !*

843. Festuca Pseudo-myurus, *Soyer.*
New District. 6. Wall top at Shucknell hill; *Ley.* Wall, and waste ground, at Eardisland (12); *Ley.*

844. Festuca sciurioides, *Roth.*
Shucknell hill (6); *Ley.*

845. Festuca ovina, *L.*
New District. 7. Under trees on the west slope of Dinedor hill; *Ley.*

846. Festuca rubra, *L.*
New District. 12. Common, as elsewhere in the county; *Ley.*

847. Festuca sylvatica, *Vill.*
Shady conglomerate rocks on the Great Doward, 1889 (2); *Ley.*

848. Festuca elatior, *L.*
New District. 3. Rough meadows under the Haugh wood, near Fownhope; *Ley.*

849. Festuca pratensis, *Huds., var. b. loliacea.*
New District. 9. Meadow at Leominster; the type, in company with a variety bearing crowded spikelets at the top of the rachis, like the analogous var. of *Lolium perenne*; *Ley.*

Lolium temulentum, *L., var. b. arvense.*
Recorded from Dulas (13) by Mr. C. Butler.

862. Hordeum sylvaticum, *Huds.*
New District. 3. At one spot in the Haugh wood, near Fownhope, 1888; *Ley.*

863. Hordeum pratense, *Huds.*
Pasture at Littlehope near Mordiford (3); *Ley.* Waste ground near Leominster railway station; the spot quite doubtful whether in Districts 8, 9, or 12; *Ley.*

865. Nardus stricta, *L.*
Ewias Harold (13); *Mr. C. Butler.*

868. Lomaria spicant, *Desv.*
New District. 13. New Lodge wood near Dorstone; *Mrs. Powell ! ! !*

870. Asplenium Trichomanes, *L.*
New District. 5. "Garden wall at Gaines"; *J. Lloyd, MS.*

872. Asplenium Adiantum-nigrum, *L.*
New Districts. 3. Wall at Burton Court near Linton; *Ley.* 5. Hollow lane between Gaines and Elmore's End; *J. Lloyd, MS.*

874. Ceterach officinarum, *Willd.*
Wall near Dorstone (13); *Ley.* Churchyard cross and wall at Rowlstone (14); *Mr. C. Butler ! ! !*

877. Aspidium aculeatum, *Sw.*
New District. 13. In many places near Dorstone; *Mrs. Powell.*

880. Nephrodium spinulosum, *Desv., var. b. exaltatum.*
New District. 6. Westhide wood; *Ley.* Shirl wood near Eardisland (12); fine and abundant; *Ley.* Abundant at the Golden well, Dorstone (13); *Ley.*

882. Nephrodium æmulum, *Baker.*
Reported from the neighbourhood of Dorstone (13), by Mrs. Powell.

884. Nephrodium Oreopteris, *Desv.*
New District. 4. Colwall; *Towndrow.*

886. Polypodium Phegopteris, *L.*
New District. 13. Snodhill park near Dorstone; *Mrs. Powell.*

890. Ophioglossum vulgatum, *L.*
New Districts. 4. "Quite common, at Colwall"; *Miss Raper !* Between Colwall station and the Winds Point, plentifully; *Towndrow.* 5. Tedstone Delamere, near the Rectory; *Rev. T. S. Lea.* 11. Meadow between Staunton and Milton Court, and near Shobdon; *Ley.* Plentiful in a meadow near Dorstone (13); *Mrs. Powell.* Dulas (14); *Mr. C. Butler.*

891. Botrychium Lunaria, *Sw.*
Small copse near Llandinabo (2); *Watkins.* On Springfield farm, Hope Mansel parish, 1892; *Dr. Serancke.* "At the bottom of a causeway upon a bank in Stonyfoot field, Gaines" (5); *J. Lloyd, MS.* Bringwood Chase, near Downton (10); *Ley.*

895. Equisetum maximum, *Lam.*
Deepwell wood, Moccas (13) abundantly; *Ley.*

896. Equisetum sylvaticum, *L.*
New District. 12. Thicket at Elsdon near Lyonshall; *Ley.*

897. Equisetum palustre, *L.*
New District. 4. Between Colwall station and the Winds Point, plentifully; *Towndrow.*

901. Chara hispida, "*L.***"**
New District. 3. Calcareous bog near the Pentelow brook in the Haugh wood; *Ley.*

902. Chara vulgaris, *L.*
New District. 5. Pool at Tedstone Delamere, 1890; *Rev. T. S. Lea.*

MUSCI.

1. **Archidium phascoides,** *Brid.*
New District. 12. In a rough pasture near Eardisley, barren and in small quantity; *Rev. C. A. Binstead.*

2. **Pleuridium nitidum,** *Hedw.*
New District. 10. On the Lugg, near Aymestry, associated with *Bryum carneum*; *Ley.*

3. **Pleuridium subulatum,** *L.*
New District. 5. Badley wood; *Rev. T. S. Lea.*

4. **Pleuridium alternifolium,** *B. & S.*
New District. 12. Eardisley; *Binstead.* On ant hills in the river meadows at Strangford (2); *Ley.*

5. **Systegium crispum,** *Hedw.*
New District. 12. Clayey spots in damp meadows at several stations in Eardisley parish; *Binstead.*

7. **Gyroweissia tenuis,** *Schrad.*
On loose earth in a cave, Great Doward (2), 1889: Sandstone in an old lane near Fidler's Cross (2); *Ley.*

The station given in the *Flora of Herefordshire* as "Tufaceous rock, Great Doward," for this plant must be eliminated; the plant at that station being the very similar but much rarer *Gymnostomum calcareum, Nees.*

10. **Weissia squarrosa,** *C. Müll.*
New Districts. 3. Plentiful on the Common hill, Fownhope, and in barren limestone pastures near Buckenhill, 1893; *Binstead* and *Ley.* 12. With *Systegium crispum* in damp clayey spots in Eardisley parish; and at Cwmma moors near Eardisley; *Binstead.*

12. **Weissia mucronata,** *Bruch.*
New District. 12. On ant hills at Eardisley; *Binstead.*

16. **Dichodontium pellucidum,** *L.*
New Districts. 5. On the Sapey brook; "fruiting just outside the county boundary"; *Rev. T. S. Lea.* 13. Fruiting plentifully in a rill in Snodhill park, Dorstone; *Ley.* On the Teme at Downton (10); *Ley.* Eardisley (12); *Binstead.*

16a. **Dichodontium pellucidum,** *L., var. fagimontanum.*
New District. 10. Downton gorge, on the Teme; *Ley.*

17. **Dichodontium flavescens,** *Lindb.*
Eardisley (12); *Binstead.* Plentiful in the Grywne, and the Olchon brook (14), both barren; *Ley.*

18. **Dicranella Schreberi,** *Hedw.*
New District. 12. Eardisley; *Binstead.* Lane hedge on the Great Doward (2); *Ley.*

21. **Dicranella varia,** *Hedw.*
New Districts. 3. Gorstley quarries; *Ley.* 12. Eardisley; *Binstead.*

Var. b. tenuifolia, *Bruch.*
New District. 10. Fallow field near Burrington, on the side of Bringwood chase, 1889; *Ley.*

22. **Dicranella rufescens,** *Turn.*
Eardisley (12); *Binstead.*

27. **Dicranum palustre,** *Hedw.*
New District. 12. Eardisley; *Binstead.* In the Haugh wood (3); *Dr. Wood.*

28. **Dicranum majus,** *Turn.*
Woods near Checkley Common (3); *Ley.* Eardisley (12); *Binstead.*

29. **Campylopus flexuosus,** *Brid.*
Fruiting plentifully in the Lord's wood, Great Doward (2); *Ley.* Fruiting on the Ffwddog, Llanthony (14); *Ley.*

Var. paradoxus.
New District. 14. On the Ffwddog, Llanthony, with fruit, May, 1890; *Ley.* Wood path, in the Lord's Wood, Great Doward (2), on sandstone, 1888; *Ley.*

31. **Campylopus torfaceus,** *Br. & S.*
Warren wood, Bishopswood (2); *Ley.*

35. **Seligeria recurvata,** *Hedw.*
New District. 10. Shady rocks at Ludford, and in the Downton gorge, on limestone, 1892; *Weyman, Ley.*

37. **Fissidens exilis,** *Hedw.*
New Districts. 3. Wood bank above Mordiford; wood bank at the Devereux pools, Woolhope; *Ley.* 10. Wood near Burrington; *Ley.* On a sandstone rock in Carey wood (2); *Ley.*

38. **Fissidens viridulus,** *Wils., var. fontanus, Wils.*
New District. 14. In the Grwyne, rather plentifully, and in the Olchon brook; *Ley.* Burton mill near Linton (3); *Ley.*

39. Fissidens incurvus, *Schwg.*
Wood on the east face of Coppet hill (2), 1890; *Ley.* Fallow fields at more than one spot at Eardisley (12); *Binstead.*

40. Fissidens pusillus, *Wils.*
On shady limestone, plentifully, at several stations on the Great Doward (2); *Ley.* Rill at Cwmma moors, Eardisley (12); *Binstead.*

Var. Lylei, *Wils.*
New District. 14. Lane bank near Llanthony, 1890; *Ley.*

42. Fissidens adiantoides, *Hedw.*
New Districts. 3. In several tufaceous rills and springs in the Haugh wood, fruiting freely; *Ley.* 13. At the Bell Orls, Dorstone; *Ley.* Cwmma moors near Eardisley (12); *Binstead!*

43. Fissidens decipiens, *De Not.*
New Districts. 10. Whitecliff, Ludford; and in the gorge of the Teme, Downton; *Ley.* 13. Shaded rocks on Woodbury hill, Moccas park; *Ley.*

47. Phascum serratum, *Schreb.*
New District. 12. Eardisley; *Binstead.*

49. Phascum muticum, *Schreb.*
New Districts. 12. On an ant hill at Eardisley; *Binstead.* 14. Bare spot on the ridge of the Hatterels above Pandy; *Ley.*

50. Phascum cuspidatum, *Schreb.*
New District. 5. Common at Tedstone Delamere; *Rev. T. S. Lea.*

52. Phascum rectum, *Sm.*
Bare ground at Gorstley quarries (3); *Ley.*

53. Phascum bryoides, *Dicks.*
New District. 12. "On rough ground among broken brickwork of a bridge; the loosened mortar of the brickwork accounting for the presence of a limestone moss," 1892; *Binstead.* "No trace of the moss to be found there in 1893."

54. Pottia minutula, *Br. & S.*
New Districts. 5. Tedstone Delamere; *Rev. T. S. Lea.* 12. Eardisley; *Binstead.* Abundant on Backbury hill (3), 1889; *Ley.*

56. Pottia intermedia, *Turn.*
New Districts. 10. Whitecliff, Ludford; *Ley.* 12. Eardisley; *Binstead.* Wall top at Baysham Court (2) abundantly; *Ley.* Gorstley quarries (3); *Ley.*

60. Eucladium verticillatum, *L.*
New District. 12. Eardisley; *Binstead.* In large masses, and in fruit, on a dripping rock in Bicknor wood (2); *Ley.* Growing luxuriantly, and fruiting, in rocky dingles on the Olchon brook (14), in more than one spot; *Ley.*

61. Leptotrichum homomallum, *Hedw.*
New District. 12. Stony bank between Welson and Pentrejack, Eardisley 1891; *Binstead.* Sandstone rock near the Paddock farm, Cobrey (2); *Ley.* Aconbury (2); *Miss E. Armitage.*

64. Trichostomum luridum, *Hornsch.*
New District. 12. Eardisley; *Binstead.* River side rocks under Coppet hill (2) fruiting; *Ley.*

65. Trichostomum crispulum, *Bruch.*
New Districts. 10. Limestone rocks at Whitecliff, Ludford; *Ley.* 14. Stones at the camp on the Gaer hill; *Ley.* Lane bank, Brockhampton (2); *Ley.* Abundant in limestone woods above Checkley (3); *Ley.*

67. Trichostomum tophaceum, *Brid.*
New District. 12. Eardisley; *Binstead.* Dripping limestone rocks, in Bicknor wood with fruit, and at the Great Doward with fruit (2); *Ley.*

68. Trichostomum nitidum, *Lindb.*
New District. 13. London rocks near Peterchurch; *Ley.* Exposed rocks on the Hatterels above Pandy (14), in Herefordshire; *Ley.*

75. Tortula recurvifolia, *Schpr.*
New Districts. 3. Common hill, Fownhope, 1893; *Binstead, Ley.* 12. Waste stony road side between Eardisley and Almeley, 1892; *Binstead.* 14. Rocks on the Black mountain, 1892; *Binstead!* Lime quarry on the west face of Great Doward hill (2); *Ley.*

76. Tortula cylindrica, *Tayl.*
New Districts. 11. On the Arrow near Titley; *Ley.* 14. On the Olchon, above Longtown; *Ley.* Fruiting finely on the Teme at Downton (10), and on the Lugg above Aymestry (10); *Ley.*

77. Tortula vinealis, *Brid.*
New District. 12. Eardisley; *Binstead.*

78. Tortula rigidula, *Dicks.*
New District. 3. Backbury hill; *Ley.*

79. Tortula spadicea, *Mitt.*
New District. 12. "On mossy rocks in the brook at the Derry, Eardisley; and in similar situations along the course of the brook upwards to the Cwmma"; *Binstead.*

80. Tortula Hornschuchiana, *Schultz.*
New District. 12. Eardisley; *Binstead.* Walls, at Wilton and Ross (2); *Ley.* Wood paths above Checkley Common (3); *Ley.*

81. **Tortula revoluta**, *Schw.*
New District. 12. Eardisley; *Binstead.*

82. **Tortula convoluta**, *Hedw.*
New District. 12. Eardisley; *Binstead.*

84. **Tortula tortuosa**, *L.*
New District. 10. In the gorge of the Teme at Downton; *Ley.*

87. **Tortula muralis**, *L., var. rupestris.*
New District. 10. At Downton, well marked; *Ley.*

88. **Tortula marginata**, *B. & S.*
On the Travertine at the Dropping Well, Great Doward (2), abundantly: on shady limestone, Bicknor wood (2); *Ley.*

91. **Tortula intermedia**, *Brid.*
New District. 12. Wall tops at Kingsland; *Ley.* In fruit at Backbury, and on a limestone wall at Devereux park, Woolhope (3); *Ley.*

92. **Tortula ruralis**, *L.*
New District. 14. Roofs at Llanthony Abbey, and elsewhere in the Llanthony valley; *Ley.* Roof at Peterchurch (13); *Ley.*

95. **Grimmia apocarpa**, *L., var. b. rivularis.*
New District. 10. In the Teme, Whitecliff, Ludford; *Ley.*

Var. gracilis.
At Caplar quarry (2), on sandstone; *Ley.*

96. **Grimmia orbicularis**, *B. & S.*
In a quarry on the north-west side of the Great Doward (2), 1889; also near the original station; *Ley.*

99. **Grimmia trichophylla**, *Grev.*
New District. 12. Eardisley; *Binstead.*

102. **Racomitrium heterostichum**, *Hedw.*
New District. 14. Stones near Pont Esgob, and common throughout the Black mountains; *Ley.* Conglomerate rocks, Great Doward (2); *Ley.*

Var. alopecurum.
New District. 2. Conglomerate boulders on the north side of Great Doward; fruiting at this station in 1890; *Ley.*

103. **Racomitrium fasciculare**, *Schrad.*
On an old altar-tomb in Sellack churchyard (2); *Ley.*

105. **Racomitrium canescens**, *Hedw., var. b. ericoides.*
New District. 1. Sandstone rock in Goldsmith's wood, Ganarew, 1893; *Ley.*

110. **Ulota crispa**, *Hedw.*
New District. 1. On a willow bole at Llanwarne old Church, 1893; *Ley.*

111. **Orthotrichum saxatile**, *Brid.*
New District. 13. London rocks near Peterchurch; *Ley.*

112. **Orthotrichum cupulatum**, *Hoffm.*
On stone in the Llanthony valley (14), one mile south of the Abbey; *Ley.*

Var. b. nudum.
New District. 4. Colwall; *Miss Raper!* Plentiful on stones by the river, under Caradoc (2); *Ley.*

114. **Orthotrichum stramineum**, *Hornsch.*
New District. 14. Ash bole on the Olchon brook, near Longtown: Ash bole in the Grwyne valley; *Ley.* On Maple at Upper Welson, Eardisley (12); *Binstead.*

115. **Orthotrichum tenellum**, *Bruch.*
Eardisley (12); *Binstead.*

117. **Orthotrichum diaphanum**, *Schrad.*
New District. 10. On Elder, near Downton; *Ley.*

118. **Orthotrichum Lyellii**, *H. & T.*
New District. 14. Near Llanthony Abbey; *Ley.*

119. **Orthotrichum leiocarpum**, *B. & S.*
On Ash near the junction of the Garren and Gamber brooks (1); *Ley.* On Apple, Sellack; on Willow, Eccleswall; on Ash at the Old Pike; on Ash and Oak at the Great Doward; all in (2); *Ley.* On Maple at Upper Welson, Eardisley (12); *Binstead.*

120. **Orthotrichum Sprucei**, *Mont.*
On a Willow bole on the Garren brook near Langstone (1); *Ley.* Willow bole at the New Weir, Great Doward (2); *Ley.* On the Wye between Winforton and Letton (12); *Binstead.*

121. **Orthotrichum rivulare**, *Turn.*
Willow bole by the Teme at Downton (10); *Ley.* Eardisley (12); *Binstead.*

124. **Encalypta streptocarpa**, *Hedw.*
New District. 12. Eardisley; *Binstead.*

125. **Physcomitrella patens**, *Hedw.*
New Districts. 7. Pool at Rotherwas; *Ley.* 12. Pool near Eardisley; *Binstead!!* 13. Old pool bed, Moccas, growing with *Ceratodon cylindricus*, 1888; *Ley.*

126. **Physcomitrium pyriforme,** *L.*

Ditch side at Sellack Marsh (2); *Ley.* Pool brink, Canon Bridge (7); *Ley.* Elsdon near Lyonshall (12); *Ley.* Eardisley (12); *Binstead.*

127. **Entosthodon ericetorum,** *Bals.*

At a second station in the Lord's wood, Great Doward, 1890; *Ley.* Still unknown elsewhere in the county.

128. **Funaria fascicularis,** *Dicks.*

New Districts. 12. Eardisley; *Binstead.* 14. Tillage field near Pont Esgob; *Ley.*

130. **Funaria hygrometrica,** *L.*

New District. 5. Tedstone Delamere; *Rev. T. S. Lea.*

132. **Bartramia pomiformis,** *L.*

New District. 12. Eardisley, "rare"; *Binstead.*

134. **Bartramia Œderi,** *Gunn.*

At the Red Daren, on the Hatterels (14), in Herefordshire; *Ley.*

135. **Philonotis fontana,** *L.*

New Districts. 5. On Bromyard downs, barren; *Rev. T. S. Lea.* 12. "Plentiful in damp meadows at Eardisley, a stunted form"; *Binstead.*

136. **Philonotis calcarea,** *B. & S.*

Spring head on the Cefn hill, near Michaelchurch (14); *Ley.*

140. **Bryum pyriforme,** *L.*

Shady limestone at the New Weir, Great Doward; and at the mouth of the tunnel, under Symond's Yat (2); *Ley.* At several places on greenhouse pots, in which situation it is far from rare; ***Ley.***

142. **Bryum nutans,** *Schreb.*

New Districts. 4. Colwall, in fruit; *Miss Raper!* 12. Eardisley; *Binstead.* On sandstone rock above the Paddock farm, Cobrey (2): on a decaying rail, King's Capel (2); *Ley.*

143. **Bryum crudum,** *Schreb.*

Fruiting plentifully in the gorge of the Teme, at Downton, 1889; *Ley.*

145. **Bryum carneum,** *L.*

New District. 10. On the Lugg near Aymestry; *Ley.*

147. **Bryum pendulum,** *Hornsch.*

Plentiful on river side stones, Caradoc (2); *Ley.* Railway bank, King's Capel (2); *Ley.*

148. **Bryum inclinatum,** *Swartz.*

New Districts. 1. Tretire, 1889; *Miss E. Armitage!* 2. Wall tops, at the Great Doward; *Miss E. Armitage!*; *Ley.* 12. Wall top, Kingsland, plentifully, 1893; *Ley.*

149. **Bryum Barnesi,** *Wood, Schimper.*

This obscure barren *Bryum* has now been rightly reduced by Dr. Braithwaite to barren states of other species. Our Herefordshire plant he refers to *B. atropurpureum, W. & M.*

150. **Bryum intermedium,** *W. & M.*

New District. 8 or 13. Sandy cliff by the Wye between Bredwardine and Letton; *Binstead.*

151. **Bryum bimum,** *Schreb.*

New Districts. 10. Pool margin at Aymestry; *Ley.* 12. Marshy land at Upper Welson, Eardisley; *Binstead.* Fruiting on a pool margin at Poulstone (2), 1893; *Ley.* Pool margin near Bridge Sollers (7); *Ley.*

153. **Bryum murale,** *Wils.*

Eardisley (12), but rare; *Binstead.*

154. **Bryum atropurpureum,** *W. & M.*

New District. 14. Wall top near Cwm-y-oy; *Ley.*

155. **Bryum versicolor,** *A. Braun.*

This interesting moss must be erased from our lists: the Doward specimens having been attributed by Dr. Braithwaite to *B. atropurpureum, W. & M.*, variety.

158. **Bryum capillare,** *L., var. Fuckelii.*

Well marked plants of this variety occur on stones in Cwm Buchel, Llanthony (14); *Ley.*

158a. **Bryum Donianum,** *Grev.*

New District. 10. Downton gorge, 1890; *Ley.* Rocky lane bank at Much Fawley; hedge bank at Hentland Church (2); *Ley.* Fruiting at Dadnor (2) in 1889; *Ley.*

160. **Bryum pallens,** *Swartz.*

New Districts. 11. Bank of the Arrow near Titley; *Ley.* 12. Clayey spots by a pond, Eardisley; *Binstead.*

161. **Bryum turbinatum,** *Hedw.*

New District. 14. Abundant in the upper part of the Grwyne, on rocks in the river bed, but barren; *Ley.* River side rocks at Kerne Bridge (2); wooded rocky bank above the tunnel, Carey (2); at both stations barren; *Ley.*

162. Bryum pseudotriquetrum, *Hedw.*
New District. 13. Deepwell wood, Moccas; *Ley.*

163. Bryum roseum, *Schreb.*
New Districts. 3. Boggy spots on the north side of the Haugh wood; *Dr. Wood ! ! !* 12. Eardisley; *Binstead.*

166. Mnium affine, *Bland.*
New Districts. 5. Tedstone Delamere; *Rev. T. S. Lea.* 12. Shobdon marsh; *Ley.* Coughton marsh (2); *Ley.*

167. Mnium cuspidatum, *Hedw.*
New District. 12. Eardisley, "rare"; *Binstead.* Fruiting on shady limestone at Bicknor wood (2); *Ley.* Limestone rocks in Downton gorge (10); *Ley.*

169. Mnium rostratum, *Schrad.*
New Districts. 3. Adam's rocks, Backbury, in fruit, 1889; *Ley.* 5. On the Sapey brook, fruiting; *Rev. T. S. Lea.* Eardisley (12); *Binstead.*

171. Mnium serratum, *Schrad.*
New District. 11. On the Arrow near Titley; Park stile, Lyonshall; *Ley.* Eardisley (12); *Binstead.*

172. Mnium stellare, *Hedw.*
Fruiting, in an old lane near Penyard (2); *Miss E. Armitage!*

173. Mnium punctatum, *Hedw.*
New Districts. 5. Tedstone Delamere, with fruit; *Rev. T. S. Lea.* 13. Snodhill park, Dorstone, with fruit; *Ley.*

174. Aulacomnium androgynum, *L.*
At the Cock Crow rock, The Chase (2); *Ley.*

175. Aulacomnium palustre, *L.*
Plentiful but barren, at Moseley Mere, near Kington (11); *Binstead.*

176. Tetraphis pellucida, *L.*
New Districts. 7. Old stump in a wet copse, near Coedmore; *Ley.* 12. Eardisley; *Binstead.* 14. Rotten alder stumps in the marsh at Pont Esgob; *Ley.* Fruiting on shady rotten stumps in Lyonshall park wood (11); *Ley.*

178. Pogonatum nanum, *Neck.*
New District. 14. Bank, in the Grwyne valley; *Ley.* Wood path in Athelstane's wood (2); *Ley.*

180. Pogonatum urnigerum, *L.*
New District. 12. Eardisley; *Binstead.*

182. Polytrichum formosum, *Hedw.*
New District. 12. Eardisley; *Binstead.*

183. Polytrichum juniperinum, *Hedw.*
New Districts. 12. Wall top, Eardisland churchyard; *Ley.* 14. On the Hatterels above Pandy; fine and plentiful on the Ffwddog range above Llanthony; *Ley.*

185. Polytrichum commune, *L.*
New District. 12. Eardisley; *Binstead.*

187. Fontinalis antepyretica, *L.*
New District. 4. Colwall; *Miss Raper !*

190. Cryphæa heteromalla, *Hedw.*
New District. 12. On Elder, at the Green Lane, Eardisley; *Binstead.*

193. Neckera pumila, *Hedw.*
New Districts. 12. "On damp tree stems in the Lemore dingle, Eardisley," 1890; *Binstead.* 14. On an Ash at the head of the Grwyne valley, near the county boundary, in company with *Orthotrichum stramineum*; *Ley.*

196. Homalia trichomanoides, *Schreb.*
New District. 12. Eardisley; *Binstead.* Tedstone Delamere (5); *Rev. T. S. Lea.*

197. Pterygophyllum lucens, *Sm.*
"Shady brook between the Derry and Pentrejack, Eardisley" (12), in good fruit; *Binstead.*

198. Myrinia pulvinata, *Wahl.*
New District. 12. "In great plenty, on trees and bushes, by a ditch between Willersley and the Wye"; *Binstead.*

200. Anomodon viticulosus, *L.*
New District. 11. On the Arrow near Titley; *Ley.*

201. Heterocladium heteropterum, *Bruch.*
Wooded rocks on the Grwyne, near Pont Esgob (14); *Ley.*

202. Thuidium tamariscinum, *Hedw.*
New District. 5. Fruiting at Tedstone Delamere; *Rev. T. S. Lea.*

203. Pterogonium gracile, *Dill.*
New District. 14. Dry rocks above Pandy, on the Hatterel range; *Ley.*

204. Climacium dendroides, *L.*
New District. 11. In an old pool bed at Shobdon; *Ley.* Eardisley (12), rare; *Binstead.* In a poor pasture at Michaelchurch court (14); *Ley.*

205. Pylaisia polyantha, *B. & S.*

New Districts. 2. In a rotton willow bole at Sellack; on Poplar at King's Capel; *Ley.* 7. On rotten sticks in an old pool bed, Rotherwas, fruiting, 1890; *Ley.* 12. Apple, and Oak, near Eardisley; *Binstead.*

206. Thamnium alopecurum, *L.*

New Districts. 4. Colwall, in fruit; *Miss Raper!* 5. On the Sapey, in fruit; *Rev. T. S. Lea.*

208. Orthothecium intricatum, *Hartm.*

Taren on the Ffwddog; and in Cwm Buchel, Llanthony (14); *Ley.*

211. Scleropodium illecebrum, *Schwg.*

Fruiting, at Eardisley (12); *Binstead.*

212. Scleropodium cæspitosum, *Wilson.*

Rock by the Wye, Little Doward (2): by the Teme at Whitecliff, Ludford (10): on the Lugg above Aymestry (10); *Ley.* Eardisley (12); *Binstead.*

213. Brachythecium glareosum, *B. & S.*

New Districts. 12. Eardisley; *Binstead.* 14. Rock at the Red Daren, Hatterels; *Ley.*

217. Brachythecium rivulare, *B. & S.*

New District. 14. Springheads on the Hatterels above Pandy: abundant in Cwm Buchel, Llanthony: abundant on the Grwyne; *Ley.*

218. Brachythecium populeum, *Hedw.*

New District. 12. Eardisley; *Binstead.*

219. Brachythecium plumosum, *Swartz.*

New District. 12. On rocks in the brook below the Cwmma farm, Eardisley; in the brook below Brilley; *Binstead.*

220. Eurhynchium myosuroides, *L.*

New District. 14. On the tarens in the Llanthony valley, and on the Red Daren, Hatterels: on rocks in the Grwyne valley; *Ley.* Eardisley (12); *Binstead.*

221. Eurhynchium circinatum, *Brid.*

In plenty on shady limestone on the east face of Little Doward (2); *Ley.*

224. Eurhynchium crassinervium, *Tayl.*

New Districts. 3. At several spots on Backbury hill; *Ley.* 14. Stone in the Grwyne near Pont Esgob; *Ley.*

225. Eurhynchium piliferum, *Schreb.*

New District. 12. Eardisley; *Binstead,*

227. Eurhynchium Swartzii, *Turn.*

Fruiting at Brilley green and Questmoor near Eardisley; *Binstead!*

228. Eurhynchium abbreviatum, *Sch., Syn.*

New District. 12. Eardisley, but not abundant; *Binstead.* On limestone, on the Great Doward (2): in a small gulley on the Hatterels above Llanthony Abbey (14); *Ley.*

230. Eurhynchium pumilum, *Wils.*

New District. 12. Eardisley; *Binstead.*

231. Eurhynchium Teesdalii, *Sm.*

New Districts. 10. Old mill wheel at the Hay mill, Downton; *Ley.* 12. Eardisley; *Binstead.* Stones in the river Wye, at Coppet hill (2): at more than one station on the Olchon brook (14); *Ley.*

232. Rhynchostegium curvisetum, *Brid.*

New Districts. 10. Stones in the Teme, Downton gorge, in two spots; *Ley.* 14. Cwm Buchel, Llanthony, 1890; *Ley.*

233. Rhynchostegium tenellum, *Dicks.*

New District. 12. Eardisley, "in the mortar of an old wall down which water trickles," rare; *Binstead.*

234. Rhynchostegium depressum, *Bruch.*

New Districts. 3. Adam's rocks, Backbury; *Ley.* 12. Not uncommon between Eardisley and Pentrejack; *Binstead.*

235. Rhynchostegium confertum, *Dicks.*

New District. 10. Downton gorge; *Ley.*

236. Rhynchostegium murale, *Hedw.*

New Districts. 5. Tedstone Delamere; *Rev. T. S. Lea!* 8. On stones in Dinmore woods; *Ley.* Muddy stones by the river at Coppet hill (2): sandstone wall at the Chase farm near Ross (2) under the drip of a spout: Bicknor wood (2); *Ley.* Eardisley (12), rare; *Binstead.*

240. Plagiothecium denticulatum, *L.*

New District. 5. Tedstone Delamere, fruiting; *Rev. T. S. Lea.*

Var. aptychus.

Great Doward, on the conglomerate (2); *Ley.*

241. Plagiothecium sylvaticum, *L.*

The following stations for the fruiting plant may be all accepted as undoubted. When barren it is a matter of difficulty to separate this species from some forms of *P. denticulatum.*

District 2. Shady limestone on Huntsham hill: old lane near the Paddock farm, Cobrey: Harechurch, Hope Mansel; *Ley.* Lane at Hentland school; *Mr. Power!!* 4. Colwall; *Miss Raper!* 12. Eardisley; *Binstead.* 13. Deepwell wood, Moccas; *Ley.*

242. Plagiothecium undulatum, *L.*

New District. 14. Among heather on the moorland, Ffwddog, Llanthony ; *Ley.* Eardisley (12) ; *Binstead.*

Amblystegium radicale, *P. Beauv.*

At the time of writing the *Herefordshire Flora* I did not know this plant from *A. irriguum, Wils.* ; and in consequence the accounts there given of the two species are untrustworthy. Substitute the following.

244. Amblystegium radicale, *P. Beauv.*

Hab. In old pool beds, stagnant water or marshes ; rare, but fruiting plentifully. May.

Loc. *North.* 9. Berrington pool, 1884 ; *Ley.*

West. 13. Old pool bed near Bredwardine, 1887 ; *Ley.* 14. Marsh in the old brickfield at Pontrilas, plentifully, 1893 ; *Ley.*

245. Amblystegium irriguum, *Wils.*

Hab. On stones in brooks and rills, frequent, and fruit plentiful. May.

Loc. *South.* 2. Stream at Sellack Church ; stream at Hentland Church ; stream above Prothether mill, Hoarwithy, abundantly ; *Ley.*

East. 4. Colwall ; *Miss Raper !* 5. In the Frome near Edwin Ralph, not plentiful ; *Ley.* Rills near Pencombe and Little Cowarne, 1887 ; *Ley.*

Central. 7. Rill at Breinton, abundantly ; *Ley.* Rills in Clehonger parish ; *Ley.*

North. 9. In the Stretford brook near the Bach camp, Kimbolton, 1887 ; *Ley.* 10. Limebrook mill near Lingen ; *Ley.* 11. Rill, Lyonshall ; *Crouch.* 12. Stream at Whitney ; *Ley.* Almeley ; *Ley.* Eardisley ; *Binstead.*

West. 13. Rill above Bredwardine ; rill in Snodhill park ; *Ley.* 14. Plentiful in the Grwyne ; in the Olchon brook above Longtown : spring head near Pont Esgob ; *Ley.*

247. Amblystegium riparium, *L.*

New Districts. 3. Pool near Eccleswall both in this District and District (2) ; *Ley.* 10. Abundant, and fruiting in the Lugg above Aymestry ; *Ley.* 13. Old pool beds at Moccas ; *Ley.*

Plentiful in an old pool at Rotherwas (7) ; *Ley.* Old brick pit at the Portway (8) ; *Ley.* Eardisley (12) ; *Binstead.*

248. Hypnum Somerfelti, *Myrin.*

Shady limestone at Huntsham hill (2) ; *Ley.*

249. Hypnum chrysophyllum, *Brid.*

New District. 12. Eardisley ; *Binstead.*

250. Hypnum stellatum, *Schreb., var. b. protensum.*

New Districts. 13. Fruiting at the Bell Orls, Dorstone, 1889 ; *Ley.* 14. Bogs on the Ffwddog, Llanthony valley (Monmouthshire) ; *Ley.* Fruiting at the bog on the Great Doward (2) in 1888 ; *Ley.*

251. Hypnum aduncum, *Hedw.*

In the Devereux pools, Woolhope (3) ; *Ley.*

252. Hypnum exannulatum, *Gümb.*

New District. 14. Spring heads and bogs on the Hatterel range, in Herefordshire, at several spots ; *Ley.*

253. Hypnum vernicosum, *Lindb.*

New Districts. 13. At the Bell Orls, Dorstone, 1889 ; *Ley.* 14. Cwm Buchel, Llanthony, with fruit, June 1894 ; *Ley.*

255. Hypnum revolvens, *Swartz.*

In young fruit on the Ffwddog range, Llanthony (Monmouthshire), May 1890 ; *Ley.*

256. Hypnum fluitans, *L.*

New Districts. 8. Osiery at Kinnersley station ; *Ley.* 12. Old brickfield near Kinnersley ; *Ley.* Pool in Warren wood, Bishopswood (2) ; *Ley.*

258. Hypnum filicinum, *L., var. b. vallis-clausæ.*

New Districts. 13. Bog at the Bell Orls near Dorstone ; *Ley.* 14. Small well near the Queen's Head, Honddu valley ; *Ley.*

259. Hypnum commutatum, *Hedw.*

New District. 5. "Petrifying brooks" at Tedstone Delamere ; *Rev. T. S. Lea.* Eardisley (12) ; *Binstead.* Growing and fruiting finely in a rocky dingle on the Olchon brook (14) ; *Ley.*

261. Hypnum falcatum, *Brid.*

New Districts. 3. Calcareous bog in the Haugh wood ; *Ley.* 13. Bell Orls, Dorstone ; *Ley.*

264. Hypnum patientiæ, *Lindb.*

New District. 12. Eardisley ; *Binstead.*

Abundant in wood paths on the Great Doward (2) ; *Ley.*

265. Hypnum molluscum, *Hedw.*

New District. 12. Marly bank at Cursneh camp, near Leominster ; *Ley.* Eardisley ; *Binstead.*

266. Hypnum palustre, *L.*

New District. 13. Rill in Snodhill park near Dorstone ; *Ley.*

267. Hypnum ochraceum, *Turn.*

New District. 14. Stones in the Grwyne ; and in Cwm Buchel, Llanthony ; *Ley.*

268. Hypnum cordifolium, *Hedw.*

New District. 12. Boggy copse near Eardisley, fruiting, 1890; *Binstead.* Old pools in Lyonshall park (11); *Ley.* Moseley Mere (11) with fruit, 1890; *Binstead.*

270. Hypnum Schreberi, *Ehrh.*

New District. 5. Tedstone Delamere; *Rev. T. S. Lea.*

Fruiting at the High Vinnalls, near Ludlow (10); *Mr. A. Weyman!*

275. Hypnum brevirostre, *Ehrh.*

New District. 12. At the Cwmma moors, Eardisley, growing with *Dicranum juniperifolium*, March, 1892; *Binstead!*

277. Hypnum loreum, *L.*

New District. 3. In the Haugh wood, near the Pentelow brook; *Ley.* Woods in Downton gorge (10); *Ley.* At more than one station near Eardisley (12); *Binstead.* Among heather on the moorland, Ffwddog (Monmouthshire), Llanthony (14); *Ley.*

278. Hypnum triquetum, *L.*

Fruiting at Tedstone Delamere (5); *Rev. T. S. Lea.* Fruiting near Elton (10); *Mr. A. Weyman.*

279. Sphagnum acutifolium, *Ehrh.*

New Districts. 11. Moseley mere near Kington, "in some plenty," 1890; *Binstead.* 12. Boggy copse near Eardisley; *Binstead.*

281. Sphagnum cuspidatum, *Ehrh.*

In a damp depression in the Lord's wood, Great Doward (2) (sandstone), 1890; *Ley.*

The following records came to hand too late for insertion in their proper place:—

357. Viscum album, *L.*

On the Wych Elm at Wigmore vicarage (10); *Rev. J. Charlesworth.*

496. Atropa Belladonna, *L.*

River bank at the New Weir, at the site of the ancient masonry abutments (7); *H. C. Moore!* Field corner near the New Weir (7); *Blashill, in lit.*

RUBUS.

I HAVE the concurrence of Rev. W. H. Purchas in attempting to deal with this genus, as it is represented in Herefordshire, *de novo*, in preference to giving simply the additions which have been made since the publication of the *Flora*. The abundant fresh material which has accrued, the new light which has been thrown on many old forms, the changes in arrangement and nomenclature which have taken place since that date, have rendered this the only satisfactory method of treating the subject. Moreover, the great richness of Herefordshire in the forms of bramble encourages a full treatment, and renders such a treatment imperative on any Herefordshire naturalist who would do justice to the flora of the county.

In 1894, Dr. Focke, the well known authority upon this genus, visited England, and spent a few days in Herefordshire. His visit cleared up several obscurities, and brought to light more than one fresh species in the county. We wish to acknowledge the uniform readiness with which he placed his great knowledge on all occasions at our service; and not less that of the Rev. W. Moyle Rogers; without which indeed this part of our work could never have been carried out.

In working out the genus Rubus in Herefordshire, we have been compelled, in one or two cases, to adopt new names, and draw up new descriptions: but this has in no case been done without the plant in question having been studied for a series of years, nor without exhausting all the available means of ascertaining whether it had been previously named and described upon the Continent. The same may be said of a Monmouthshire form, of which, though at present unknown in Herefordshire, we have taken this opportunity of publishing a description.

1. Rubus idæus, *L.* *Flora of Herefordshire*, pages 84 and 517. The *Flora* gives an accurate account of the distribution of the Raspberry in Herefordshire. The following localities are additional.

East. 5. Stanford park, Upper Sapey; *Ley.* Abundant in woods near Buckenhill; *Rev. T. S. Lea.*

North. 10. Whitecliffe wood, near Ludlow; *Ley.* The white-fruited variety occurs in Westhide wood, District 6.

Var. b. obtusifolius, *Wild.*

Very rare.

Loc. *South.* 2. Hedge and garden border near a cottage, Sellack; 1892 and subsequent years; *Ley.*

First notice; *Journal of Botany*, 1895, p. 46.

The locality is one which I pass daily; and I think it impossible that this hybrid could have escaped detection, had it existed there for any length of time previously to 1892.

2. Rubus suberectus, *And.* *Flora*, p. 517.

Still unknown in any other Herefordshire station than that at Edwin wood, near Bromyard.

Perhaps doubtful between this species and *R. fissus*, Lindl., of which it usually possesses the characteristic subulate thorns, and to which Rev. W. Moyle Rogers would prefer to refer it. The shape of the leaflets however, and the occasional broader-based thorns induce me to keep it under *R. suberectus*.

3. Rubus sulcatus, *Vest.*

Shrub; height 6—7 feet. July and August.

Hab. Native in boggy thickets, very rare.

Loc. *North.* 10. In a boggy thicket near Staunton-on-Arrow, first found in 1891; *Ley.* Formerly this thicket occupied a much larger area, and the plant probably was more abundant. It is now confined to a single spot, in which at present only a few bushes exist.

The *R. sulcatus*, Vest., *Flora*, p. 518, must be excluded; this plant having subsequently proved to be *R. carpinifolius*, W. & N.

First found, 1891; first notice, *Journal of Botany*, 1892, p. 111.

4. Rubus plicatus, *W. & N.* *Flora*, p.p. 84, 518.

Small shrub; June and July.

Hab. Native in heathy or boggy woods; very local.

Loc. *South.* 2. In the Lord's wood, Great Doward; *Watkins*, *Ley.* Suff wood, and along the stream border between Suff wood and the Dam, Howle hill; *Ley.*

East. 4. "In moist thickets below Mooral's well, Colwall"; *Lees*, *Malvern Botany.* See *Phytologist*, for 1853, p. 825.

Var. Bertramii, *G. Braun.* *Focke, Synopsis Rub. Germ.*, p. 117.

Small shrub; June and July.

Hab. As the type, and often growing with it: very local.

Loc. *South.* 2. Cockshot wood, near Ruardean; *Ley.* Suff wood, and between this and the Dam, growing with the type; *Ley.*

East. 5. Edwin wood, near Bromyard; *Ley.*

First found, 1887; first record, the present paper.

The plant above referred to *R. plicatus*, W. & N., *var. Bertramii* makes a decided step from the type in the direction of *R. nitidus*, W. & N. to which species indeed Dr. Focke referred the Howle hill and Cockshot wood plants after seeing them growing.

Foreign specimens however of *R. Bertramii*, G. Braun, have convinced me that our Herefordshire plant belongs to this rather than to *R. nitidus*, W. & N.

R. Bertramii differs from *R. plicatus* and agrees with *R. nitidus* in having stalked basal leaflets and stamens longer than the styles. It differs from *R. nitidus* and agrees with *R. plicatus* in the finer toothing of the broader leaflets. It will probably prove to be pretty widely distributed in the British Isles.

5. Rubus affinis, *W. & N.*

Shrub; June and July.

Hab. Native in hilly situations; very rare.

Loc. *North.* 10. On a rough bank at Corton, near Presteign, fine and well marked, June, 1895; *Ley.*

First found, 1895; first record, the present paper.

6. Rubus imbricatus, *Hort.* *Flora*, p. 86.

The following are the only additions to be made to the account of this Bramble in the *Flora*:—

South. 2. Stream border in Lodge Grove, near Ruardean, abundantly; *Ley.* 3. In two spots above the Lea tunnel, plentifully; *Ley.* This is the only station in Herefordshire in which the plant has been detected out of the Wye valley.

7. Rubus carpinifolius, *W. & N.* *Flora*, p. 518 (as *R. sulcatus*, Vest.): 520 (as *R. erubescens*, Wirtg.)

Shrub; beginning to flower in the end of June.

Hab. Native, in heathy and boggy woods and thickets; rare and local.

Loc. *South.* 1. Trolloway brook, St. Weonards; *Ley.* 2. Cockshot wood and Lodge Grove, near Ruardean; *Ley.* Boggy woods and thickets near the Dam, Howle hill, abundantly; *Ley.* 3. Marshy thicket near the Lea village, 1893; *Ley.*

North. 10. Wood, and rough bank at Corton, near Presteign, 1895; *Ley.* 11. Boggy woods, Lyonshall park; *Ley.* 12. Hedge near the Apostles farm, Eardisley; *Ley.*

First notice; *Journal of Botany*, 1895, p. 48.

It is necessary to state that some of the plants from Howle hill and the Cockshot wood, here put to *R. carpinifolius*, W. & N., were by Dr. Focke, who saw them growing in 1894, placed as a variety under *R. nitidus*, W. & N., on account of their straggling panicle with long divaricate branches. Is it possible that the plant, which begins to flower, late in June, with the short ascending panicle-branches characteristic of *R. carpinifolius*, may assume by the end of July, and still more later in the season, a large, widely branched panicle which is very misleading? The Lyonshall plant was recognised by Dr. Focke as *R. carpinifolius*. See *Flora*, p. 518 (under *R. sulcatus*). The Howle hill plant was called by the late Prof. Babington *R. rubicolor*, and *R. erubescens*; both which names are now excluded from the British lists. See *Botanical Exchange Club Report*, 1885, p. 126; 1887, p. 174.

8. Rubus incurvatus, *Bab.* *Flora*, p. 518.

Add the following station:

North. 10. Rough ground at the head of the Mary Knowl valley; *Ley.*

It will be seen that this Bramble is still unknown in the whole of the South, West, and Eastern Districts of the County.

9. Rubus Lindleianus, *Lees. Flora*, p. 85.

The following localities are additional :—

Central. 8. Woods near Dinmore ; *Ley.*

North. 9. Woods near Leycesters, but not abundant ; *Ley.*

West. 13. Very abundant about Dorstone, rare near Dulas ; *Ley.*

The following hybrids of this bramble have been noticed :—

Lindleianus × *rhamnifolius.* Edge of Criseley Vallets wood, Whitfield, D. 13.

Lindleianus × *infecundus?* Eaton park wood, Foy, D. 2.

10. Rubus erythrinus, *Genev. Flora*, p. 90 (as *R. Salteri*, Bab.)

Arching shrub : July.

Hab. Native, in hedges and thickets ; rather rare and local.

Loc. *South.* 1. Hedges and thickets at more than one station in St. Weonards parish ; *Ley.* 2. Thicket on Huntsham hill ; *Rev. W. Moyle Rogers! !* 3. Eaton park wood ; *Ley.*

East. 4. Abundant in Cowleigh park, Malvern ; *Rogers, Ley.* 5. Woods and hedges near Storridge, abundantly ; *Ley.*

This Bramble was picked by me at Storridge in 1884, but remained unrecognised until the late Mr. Archer Briggs pointed out (in 1888) that the Eaton park plant was identical with a Plymouth Bramble which he subsequently identified with *R. erythinus*, Genev.

Rare or absent over a large part of the county ; not fine nor very typical at its stations in the southern districts : nowhere in Herefordshire so abundant or typical as in Cowleigh park and its neighbourhood. It thus differs strikingly in distribution, so far as Herefordshire is concerned, from its near ally *R. Lindleianus.*

First record, *Journal of Botany*, 1890, p. 206.

11. Rubus rhamnifolius, *W. & N. (sp. collect.).* Var. a. cardiophyllus, *Muell. & Lef. Flora*, p. 85.

Add the following localities :—

Central. 8. Woods and hedges near Dinmore ; *Ley.*

North. 9. Near Leycesters, but not abundant ; *Ley.* 10. Plentiful in Ludford park ; *Ley.*

West. 13. Abundant and well developed about Dorstone. Near Dulas ; *Ley.* Criseley and Thruxton Vallets, abundantly ; *Ley.*

A remarkable form, very much smaller in all its parts, occurs in several stations in Herefordshire. Rhydicaer, St. Weonards (D. 1) : Howle hill (D. 2) : and at Belmont (D. 7.)

More than one variety of the aggregate species, *R. rhamnifolius*, W. & N., in addition to the *var. cardiophyllus*, which is the ordinary form of the plant in Britain, occurs in Herefordshire, and merits investigation. These plants remain at present unidentified with any described forms ; and we cannot now do more than thus shortly indicate them.

12. Rubus nemoralis, *P. J. Muell.*

Shrub ; July and August.

Hab. Native in woods : rare or very rare.

Loc. *South.* 1. In the Mynde wood, near Butter's Court, 29th August, 1894 ; *Ley.*

The specimens were seen by Rev. W. Moyle Rogers, and assigned by him without hesitation to typical *R. nemoralis.*

First found, 1894 ; first notice, *Journal of Botany*, 1895, p. 48.

Var. b. glabratus, *Bab. Flora*, p. 95.

Shrub ; July and August.

Hab. Native, in woods ; widely spread in Herefordshire, and locally common.

Loc. *South.* 2. Abundant in Riggs' wood and Pengethly Gorse, Sellack ; *Purchas, Rogers, Ley.* Woods near Harewood ; Athelstane's wood and Carey wood, abundantly ; *Ley.* 3. Abundant in parts of the Haugh wood ; *Ley.* Howley Grove, near Mitcheldean ; *Ley.*

East. 6. Westhide wood, abundantly ; *Ley.*

Central. 8. Dinmore woods, scarce ; *Ley.*

North. 11. Wood at Nash scaur, near Presteign ; *Ley.*

This is a well marked Bramble, and usually easily recognised. I find difficulty, however, in separating it from some of the forms of *R. mucronatus*, Blox.

Var. c. Silurum, *A. Ley. Flora*, p. 518 (as *R. ramosus*, Blox.)

Shrub ; July and August.

Hab. Native, in hilly and heathy woods and banks ; very local in Herefordshire.

Loc. *North.* 10. Wood at Stapleton, near Presteign, and between Presteign and Lingen ; *Ley.* Heathy park, Brampton Bryan ; *Ley.* 11. Lyonshall park wood ; Moseley and Kingswood, Kington ; *Ley.* Forest wood, Upper Hergest, near Kington ; *Ley.* 12. Hilly pastures near Moseley, abundantly ; *Ley.*

West. 13. Snodhill park wood, near Dorstone, in small quantity ; *Ley.*

It will be seen that this plant is, in Herefordshire, almost confined to a limited area in the north-west of the county. It is far more abundant in the Welsh counties lying immediately to the west of us ; and recurs on Mitcheldean Meend, West Gloucester, within a short distance of the Herefordshire boundary.

For a description of this Bramble, see *Journal of Botany*, 1894, p. 142.

First record, *Flora*, p. 518, under the name of *R. ramosus*, Blox.

13. Rubus pulcherrimus, *Neum.* *Flora*, p. 93 (as *R. macrophyllus*, Weihe., *var. umbrosus*).

The account of this plant in the *Flora* needs little alteration or addition; but the station in D. 9 described as "Alder copse, near Kimbolton" belongs to *R. Borreri*, Bell Salt., *var. virgultorum*.

The following stations are additional:—

South. 2. Abundant in parts of the Lord's wood, Great Doward; *Ley.* Rigg's wood and Pengethly Gorse, Sellack; woods near Aconbury Church; Bolston wood; *Ley.*

Not yet observed in any of the Eastern Districts.

Central. 8. Garnons hill; *Ley.*

North. 10. Head of the Mary Knowl valley, Ludlow; *Ley.* 12. Winforton wood, and other stations near Eardisley; *Ley.*

West. 13. Moccas; Thruxton Vallets; *Ley.* 14. Near Pont Esgob; *Ley.*

Forma setosa.

Loc. *South.* 1. St. Woolstan's wood, Welsh Newton, 1885; *Ley.*

This variety, in its extreme form, is so strongly marked, that it might well be given a place among the *Radulæ*. It is, however, probably connected with type *R. pulcherrimus* by a series of gradations, and is kept here in deference to the views of Rev. W. M. Rogers. See *Journal of Botany*, 1895, p. 48.

14. Rubus Lindebergii, *P. J. Muell.*

Shrub; July and August.

Hab. Native, on open hilly ground; rare and local in Herefordshire.

Loc. *North.* 9. Open bushy ground near Hatfield, 1893; *Ley.* 11. Rough ground under Ashley Vallets, near Presteign, 1895; *Ley.* Lyonshall park wood, under shade, and not very characteristic; *Ley.* 12. Hilly pastures, near Moseley, in Eardisley parish, 1895; *Ley.*

This Bramble will probably be found at other stations in the hilly parts of the north of the county.

First found, 1893; first notice, *Journal of Botany*, 1895, p. 49.

15. Rubus dumnoniensis, *Bab.*

Shrub; July and August.

Hab. Native, in hedges and thickets; rare.

Loc. *South.* 2. Hedge near the Dam, Howle hill, 1891; *Rogers, Purchas, Ley.* 3. Hedge at the Common hill, Fownhope, 1893; *E. F. Linton, Ley.*

The plant growing at Howle hill is not typical, but is placed under *R. dumnoniensis* by Rev. W. M. Rogers. The Fownhope plant is much nearer the type.

First found, *Rogers*, 1891; first record, *Botanical Exchange Club Rep.*, 1891, p. 327.

16. Rubus mercicus, *Bagnall.* **Var. b. bracteatus,** *Bagnall.*

Shrub; July.

Hab. Native; in a hedge.

Loc. *North.* 11. Hedge at Moseley Mere, September, 1895; *Ley.*

It is to be hoped that this rare Bramble, now that it has been found to inhabit Herefordshire, will be discovered at other localities in the county. Recorded, as yet, only for Warwick and Carnarvon.

First found, 1895; first record, the present paper.

17. Rubus villicaulis *(sp. collect.)* **Var. b. Selmeri** *(Lindeb.)* *Flora* p. 518 (as *R. affinis*, W. & N.)

Shrub; July and August.

Hab. Native in open hilly ground; rare or very rare.

Loc. *South.* 1. Orcop, in two spots on the Old Hall farm, well marked and characteristic, 1886, 1894; *Ley.*

North. 10. Heathy park, Brampton Bryan, 1886; *Ley.*

The other localities quoted for this plant in the *Flora* do not belong to this species.

18. Rubus rhombifolius, *Weihe.* *Flora*, pp. 90 (as *R. Salteri*, Bab): 96 (as *R. Borreri*, Bell. Salt.)

Shrub; July and August.

Hab. Native in woods and thickets; rare or very rare.

Loc. *South.* 2. Howle hill, in a single station, 1883 and subsequent years; *Purchas, Rogers, Ley.*

North. 12. Winforton wood, 1895; *Ley.*

West. 14. Boggy thickets near Pont Esgob, 1884; *Purchas, Ley.*

First record; *Botanical Exchange Club Report*, 1884, p. 104.

19. Rubus gratus, *Focke.*

Shrub; July and August.

Hab. Native in hilly woods and thickets; very rare in Herefordshire.

Loc. *South.* 2. Suff wood, Howle hill, 1892; *Rogers ! ! !* Thicket by the stream below Suff wood, 1894; *Dr. Focke ! ! !* Unknown at present from any other Herefordshire locality, but occurring in plenty in some of the plantations on Mitcheldean Meend, West Gloucestershire, quite near the Herefordshire boundary.

First found, *Rogers*, 1892; first notice, *Journal of Botany*, 1895, p. 77.

20. Rubus argentatus, *P. J. Muell. Flora*, p. 88 (under *R. leucostachys*, Sch., *var. vestitus*).

Tall shrub; July to September.

Hab. Native in woods and hedges: abundant, at least in parts of the county.

Loc. *South.* 1. Hedge near Ganarew: wood near Orcop; *Ley.* 2. Rigg's wood and Pengethly Gorse abundantly; *Rogers, Ley.* 3. Linton wood, Gorstley; *Ley.*

East. 4. West Malvern; *Rogers!* Cowleigh park, abundantly; *Rogers, Ley.* 5. Storridge: Thornbury Walls hill; *Ley.*

Central. 7. Williams' wood, near Aconbury; *Ley.*

Hybrids:—*Argentatus* × *rhamnifolius?* Hedge near Knapper's well, D. 2.

Argentatus × *glabratus* (*teste* Rogers), Rigg's wood, D. 2.

Argentatus × *leucostachys* (*teste* Rogers), Lord's wood, Great Doward, D. 2.

Argentatus × *infecundus* (*teste* Rogers), Rigg's wood.

Var. b. robustus, *(P. J. Muell.). Flora*, p. 88 (as *R. thyrsoideus*, Wimm): p. 519 (as *R. fragrans*, Focke).

Very tall arching shrub; July to August, and later.

Hab. Woods and thickets, very local.

Loc. *South.* 1. Caisty wood, and in many other places in St. Weonards parish; *Watkins, Ley.* 2. Lodge Grove, Bishopswood; *Ley.*

North. 12. Thicket at Rhydispence, Whitney; *Ley.*

Hybrid:—*Robustus* × *leucostachys.* Near the Coppice farm, St. Weonards.

Var. clivicola, *n. var. Flora*, pp. 91 (under *R. Salteri*, Bab.); 519 (as *R. montanus, Wirtg.*)

Stem arched, angled, with many scattered hairs, red in exposure. Prickles uniform, strong, slightly declining, *bright rosy red at base*, with yellow tip.

Leaves quinate or 5-pedate; leaflets small not imbricate, lowest very shortly stalked, peduncle and mid-rib armed with strong sharp prickles. Leaflets with close *white or ash-coloured felt* beneath. Terminal leaflet long stalked, *roundish cuspidate-acuminate*, all the leaflets deeply, doubly serrate, *with conspicuously waved edges*, green above, *ashy white beneath.*

Flowering branch with many strong thorns, which are similar to those of the stem. Rachis hairy, glandular especially on the lower part, branched and slightly wavy below, the ultra-axillary part long, nearly cylindrical, with patent, 1—3 flowered, often 1 flowered branches. Fruit round, rather small, freely produced.

Sepals ovate-acuminate, reflexed in flower and fruit, with ash-coloured felt. Flowers cup-shaped, petals white or faintly rose coloured; stamens longer than, ultimately connivent on, the yellow-green styles.

The ash-coloured felt of the leaves, the waved edges and prominent veins of the *small* leaflets; the subrotund, somewhat obtusangular shape of the terminal

one, and the patent 1— or 1—3 flowered upper branches of the panicle are characteristic. The stem bears some, sometimes many, sessile glands; rachis and pedicels bear many; the latter bear also numerous hooked prickles.

Clearly in its place as a variety of *R. argentatus*, P. J. Muell., with which plant it was associated by Dr. Focke, who saw it growing, and by Rev. W. M. Rogers.

Hab. Native, in woods, hedges and thickets; locally abundant, especially in hill or mountain districts.

Loc. *South.* 1. Hedge near Ganarew; *Ley.* Abundant in Orcop parish; *Ley.* 2. Hill side near Mitcheldean Road Station; *Ley.* Wood hedge near Puttridge quarry, Ross, a very aciculate form; *Ley.* 3. Coldborough park wood; *Ley.*

East. 5. Rough ground near Hatfield; *Ley.*

Central. 7. Rough meadow, Belmont, Hereford; *Focke, Ley.* 8. Garnstone hill; *Ley.*

North. 9. Hatfield; in this District as well as in D. 5; *Ley.* 10. Hill side near Burrington; *Ley.* 11. Noke; Staunton-on-Arrow, and at Chickward, near Kington; *Ley.* 12. Abundant near Eardisley; *Ley.*

West. 13. Road side near Clifford; *Ley.* 14. Abundant near Mouse Castle, Hay: abundant in the upper parts of the Monnow and Escley valleys: abundant in the Honddu and Grwyne valleys; *Ley.*

Outside Herefordshire, this Bramble is very abundant in the hilly parts of Breconshire, ascending to 1,300 feet in the Brecon Beacons (Glyn Collwng, at Torpantau tunnel mouth); and extends up the Wye valley into Montgomery where it is the highest fruticose Bramble on the Wye (at Tarenig junction). It occurs also in West Gloucester and Monmouthshire; and in Oxfordshire (*Rev. W. M. Rogers!*)

21. Rubus rusticanus, *Merc. Flora*, p. 87 (as *R. discolor*, W. & N.)

Very widely distributed in the county and absent from no District. The very large-based thorns, both of the stem and panicle, are perhaps the most reliable characteristic of this Bramble; which, well marked as it mostly is, is sometimes deceptive in leaf characters.

Hybrids are frequent:—

Rusticanus × *rhamnifolius:* wood at Breinton, D. 7.

Rusticanus × *pyramidalis:* Dinmore (*teste* Rogers, D. 8); Criseley Vallets wood, D. 13).

Rusticanus × *leucostachys:* hedge near Sellack Marsh, D. 2.

Rusticanus × *echinatus:* wood border at Callow, Welsh Newton (*teste* Rogers), D. 1.

Rusticanus × *fuscus:* West Malvern, D. 4; *Rogers!*

Rusticanus × *corylifolius:* Crump End, near Malvern, D. 4.

22. Rubus pubescens, *Weihe (sp. collect.) Flora*, p. 87 *(ex parte).*

Shrub; July.

Hab. Native in woods and thickets; rare and local.

Loc. *South.* 2. Wood bank at Caplar quarry; *Ley.* 3. Gorstley quarries; *Ley.*

North. 10. Wood on Coxwall Knoll; *Ley.*

The plants of Caplar and Coxwall Knoll are very similar to each other, and have been assigned to *R. pubescens*, W., with confidence, after long study, both by Rev. W. M. Rogers and Dr. Focke. That from Gorstley is not precisely similar, and makes an approach to the next variety.

Var. b. subinermis, *Rogers. Flora*, p. 520 (as *R. macrophyllus*, W.)

Shrub; July.

Hab. In open woods; very local.

Loc. *South.* 2. Cockshot, Harechurch, and Lodge Grove woods, in Hope Mansel and Bishopswood parishes, in great abundance; *Ley.* Not yet detected elsewhere.

This Bramble is a handsome and remarkable plant, assuming, in the above named localities, a nearly suberect growth. It is assigned with confidence by Rev. W. M. Rogers to his *R. subinermis.*

First notice; *Journal of Botany*, 1895, p. 78.

23. Rubus thyrsoideus, *Wimm. (sp. collect.).* Exclude *R. thyrsoideus*, Wimm., *Flora*, p. 88.

Shrub; July.

Hab. Native in open thickets, very rare.

Loc. *East.* 4. Cowleigh park, Malvern, 1887, *Ley*; (*teste* Rogers & Focke).

I have some hesitation in including this Bramble in our *Flora*, upon the evidence of a single specimen. This specimen is, however, very similar to plants now assigned to the species by Mr. Rogers (see his remarks, *Journal of Botany*, 1895, p. 78): and it was assigned to *R. thyrsoideus*, Wimm., with confidence by Dr. Focke.

First found, 1887; first notice, *Journal of Botany*, 1895, p. 78.

24. Rubus silvaticus, *W. & N. Flora*, p. 94 (under *R. macrophyllus*, W.)

Shrub; July.

Hab. Native in open thickets, and in woods; rare.

Loc. *South.* 2. Rigg's wood, Sellack, but in very small quantity; *Ley.*

Central. 8. Wood at Hell Hole, Hampton park, *teste* Focke; *Ley.*

West. 14. Abundant in the lower parts of the Llanthony valley, near the Queen's Head. Extending up the valley to one mile above the Abbey, and reappearing on the Honddu bank at Pandy, and on the ridge of the hill at Dialgarreg; *Ley.*

First found about 1884; first notice, *Journal of Botany*, 1895, p. 78.

25. Rubus macrophyllus, *(sp. collect.).* **Var. a. macrophyllus,** *W. & N. Flora*, pp. 93, 94 (*ex parte*).

Shrub; July and August.

Hab. Native in woods and thickets, rare.

Loc. *South.* 3. Haugh wood, rare; *Ley.*

North. 10. Wood at Stapleton, near Presteign; *Ley.* Wood at Aymestry quarry; *Ley.*

West. 14. Thickets near Pont Esgob: thickets on the Hatterel side near Llanthony; *Ley.* Between Hay and Cusop; *Ley.*

I still feel much diffidence about this Bramble. It has been recorded from many Herefordshire stations besides the above (see *Flora*, as above), some certainly in error. All the above plants have been seen and verified by Rev. W. Moyle Rogers, except that at Aymestry: and the Bramble is probably more common in the county than the present meagre list of stations would suggest.

A very distinct looking plant grows at Shobdon and elsewhere in the neighbourhood, for which many names have been suggested by the authorities, but which is here retained under *R. macrophyllus*, at the suggestion of Mr. Rogers. It deserves, however, a distinct recognition, as I have found it not only in Herefordshire but also in Carmarthenshire; specimens also of the same plant have been sent to me by Rev. W. H. Purchas from Merionethshire. It may eventually be identified with some continental form, or deserve a new name.

Loc. *North.* 10 and 11. Abundant in the thickets at Shobdon pools in both Districts; *Ley.* River bank near Aymestry (10); *Ley.* Woods at more than one spot near Titley (11); *Ley.*

Var. b. Schlechtendalii, *W. Flora*, p. 94 (*ex parte*).

Shrub; July.

Hab. Native in hedges and open thickets, not often in woods. A locally abundant and well-marked plant.

Loc. *South.* 1. Common in St. Weonards parish; *Ley.* 2. Lord's wood, Great Doward; *Purchas*, *Watkins*, *Ley.* Aconbury Common and Camp; *Ley.* 3. Abundant in hedges in the Checkley valley; *Ley.*

East. 4. Crump End, and Cowleigh park, near Malvern; *Ley.* 5. Abundant near Thornbury; between Hatfield and Pudleston; also near Upper Sapey, and at Butterly; *Ley.*

Central. 7. Near the Waterworks, Hereford, and at Wareham and Belmont; *Ley.* 8. Dinmore; *Ley.*

North. 9. Abundant near Berrington, and at Grantsfield, Kimbolton *Ley.* 10. Hedges at Yatton, and elsewhere near Aymestry; *Ley.* Between Presteign and Lingen: and in the Mary Knowl valley, Ludlow; *Ley.* 12. Hedges between Whitney and Rhydispence: hedges near Kingsland station: common near Eardisley; *Ley.*

The above full list of stations for this common Bramble are given because there is much confusion in the plants mentioned under this name in the *Flora*, where also it is combined with the next variety. The plant, as above localised,

is a well marked plant: it has been seen growing, at the Belmont station by Dr. Focke, and in a dry state, from Butterly by the Rev. W. M. Rogers, and pronounced to be *R. Schlechtendalii.*

Var. d. amplificatus (*Lees*). *Flora*, p. 94.

Shrub; July.

Hab. In open thickets? Very rare.

Loc. *South.* 1. On the bank of the Garron at Treago; *Ley.*

This plant was pronounced by the Rev. W. H. Purchas in 1880 to be "good *amplificatus*": and I still believe this determination to hold good. It is recognised by Rev. W. M. Rogers, in the *Journal of Botany*, 1895, p. 79. I have not seen the plant elsewhere in the county.

26. Rubus Salteri, *Bab. Flora*, pp. 90 (*ex parte*), 519.

Tall shrub; July and August.

Hab. Native, in woods and open ground; very local.

Loc. *South.* 2. In all the woods clothing the summit and northern slope of Aconbury hill, abundantly; extending to the hedges and open ground above Aconbury Church, and to hedges on Aconbury Common; *Ley.*

Central. 7. Williams' wood, and on open rough ground at Tar's mill, near Aconbury; *Ley.*

These central stations are really extensions of the Aconbury colony of this rare plant. It has not been detected elsewhere in the county.

The credit of having determined the name of this Bramble is due to Dr. Focke; and the determination has been acquiesced in by all the leading authorities.

27. Rubus Sprengelii, *W. Flora* p. 96 (as *R. Sprengelii, var. Borreri, Bell Salt.*)

Low shrub; July.

Hab. In heathy or boggy woods and thickets: rare and local in Herefordshire.

Loc. *South.* 2. Lord's wood, Great Doward, confined to the sandstone conglomerate; *Ley.* Stream bank, in clay, below Suff wood, Howle hill; *Rogers, Purchas, Focke, Ley.*

North. 11. Kingswood, near Kington, 1895; *Ley.*

Rubus orthoclados, *n. sp.*

Stem bluntly angular, green, *suberect:* hairy, with few nearly sessile glands. Prickles uniform, slender, declining, almost subulate, mostly confined to the angles.

Leaves 3—5nate-pedate; terminal leaflet short-stalked, ovate or elliptic, *gradually acuminate with long point;* intermediate similar, basal sub-sessile, imbricate. Leaflets green on both sides, with scattered hairs above, and short stiff hair beneath: veins prominent beneath, impressed above; toothing shallow, irregular

Panicle irregularly pyramidal, with blunt top: rachis zigzag: prickles very few, acicular. Branches 3—5 flowered, extra-axillary part short, with patent 1—3 flowered branches, and sub-sessile primordial flower. Peduncles, pedicels, and calyx with *rather numerous, slender, unequal, stalked glands*, far exceeding the grey felt and short hair.

Petals white, stamens white, styles short green. Sepals ovate-acuminate, spreading, *externally green*, with white margins; points rising round the fruit, which is globular and acid.

Locality. Woods on the Beacon hill, near Trelleck, Monmouthshire, abundantly.

This Bramble was named by Dr. Focke, from dried specimens, *R. myricæ*, Focke, *var. virescens*, G. Braun: and was sent out as such in Messrs. Rogers and Linton's Sets (No. 60): in 1894, however, on seeing the plant growing, Dr. Focke withdrew the name.

Distinctive features are the curiously suberect habit and sepals recalling the Suberect group, in combination with a *glandular* panicle: and the gradually acuminate leaflets, green on both sides.

The plant above described occupies a large area of woodland (some three square miles) on Beacon hill, Monmouthshire. On the adjoining heath occurs what seems to be a form of the same Bramble with leaves much more deeply cut and plicate, and with the glands of the panicle rachis fewer and subsessile.

A hybrid also occurs on the heath between the last named plant and (probably) *R. Sprengelii*, W.

28. Rubus micans, *Gren. & Godr. Flora*, pp. 91, 519 (as *R. adscitus*, Genev.)

Low shrub; July.

Hab. Native, in thickets and open ground, not in hedges. Widely distributed, but not very common.

Loc. *South.* 1. Woods at the Slip, Ganarew, abundantly; *Ley.* 2. Little Doward, abundantly, near Wyaston Leys, and adjoining the Ganarew station; *Ley.* Penyard Plain; *Purchas, Ley.* Peterstow, and Pengethly Gorse, abundantly; *Ley.* 3. Wood at Sharpnage well; *Ley.*

Not yet recorded for the eastern or central Districts.

North. 10. Shobdon hill, at the base of the northern flank; *Ley.* 11. Lyonshall park wood, abundantly; *Ley.*

West. 13. Dulas, on a stream side above the Court; *Ley.*

Hybrid: *micans* × *Purchasianus.* With both parents at Pengethly Gorse (2).

29. Rubus hirtifolius, *Muell. & Wirtg. Flora*, p. 92 (under *R. adscitus*, Genev.)

Shrub; July and August.

Hab Native in thickets and open ground; rare and local.

Loc. *South.* 2. Harechurch wood, Hope Mansel, scarce; *Ley.*

North. 10. Woods and rough ground in the neighbourhood of Ludlow; abundant in Ludford Park, and in the Mary Knowl valley, and extending into Shropshire in Whitecliffe wood.

The *R. hirtifolius* of Herefordshire is a distinct plant from that of the Plymouth neighbourhood, which had until recently been thought the true plant of Mueller and Wirtgen. Subsequently Mueller and Wirtgen's name was found to have been erroneously given to the Plymouth plant; hence we have no hesitation in accepting Dr. Focke's determination of our Herefordshire plant, as the *R. hirtifolius*, Muell and Wirtg.

R. hirtifolius occurs in West Glo'ster (Mitcheldean Meend), Montgomery (near Llangurig), Radnor (near Llandrindod), Brecon (Llanwrtyd), and Carnarvonshire (Felin hên, near Bangor), and will probably be found to be widely distributed in the West of England.

Found in Herefordshire as early as 1880; first notice as *R. hirtifolius*, *Journal of Botany*, 1895, p. 80.

30. Rubus pyramidalis, *Kalt.* *Flora*, p. 91 (as *R. villicaulis*, W. & N.)

The following should be added to the localities mentioned in the *Flora:*

North. 9. Berrington wood; *Ley.*

The abundant Herefordshire bramble described in the *Flora* as *R. villicaulis*, W. & N. is not typical *R. pyramidalis*, Kalt., but a variety with longer panicle, larger leaflets and a freer growth than usual. Typical *R. pyramidalis* hardly occurs in Herefordshire, but was found at West Malvern by Rev. W. M. Rogers, whether in Herefordshire or Worcestershire, so far as the exact locality goes, does not appear.

Varietas eglandulosa.

Loc. *East.* 4. Abundant in Cowleigh Park, Malvern; *Rogers, Ley.*

North. 12. Shirl wood, near Eardisland, in abundance; *Ley.*

This is a handsome plant, strikingly different in aspect from ordinary Herefordshire *R. pyramidalis*, and equally so from the type.

31. Rubus leucostachys, *Schleich.* *Flora*, p. 88.

The account of this bramble in the *Flora* is fairly accurate as regards the distribution of typical *R. leucostachys* in Herefordshire; but the plant there called *var. b. vestitus* is in the main our present *R. argentatus*, P. J. Muell.

With its great abundance, *R. leucostachys* also runs into innumerable abnormal forms in Herefordshire, the most remarkable of which are those in which the stem and rachis bear numerous acicles and stalked glands. These may possibly, after further study, prove to deserve a varietal name. Such forms have occurred on a rough bank near St. Woolstan's farm, Welsh Newton, (D. 1), and in the Frith wood, Ledbury (D. 4). Another curious form occurs about the base of May hill, above Longhope station, in which the fruiting sepals ascend and are clasping. Less worthy of note is the variety, rare in Herefordshire, (Whitecliffe wood, near Ludlow, D. 10), which bears handsome flowers with deep red petals and stamens (*R. conspicuus*, Auct.) It also varies often with white flowers in Herefordshire. Another variety with very large and exceedingly soft leaves, occurs in the Little Doward hill (D. 2), and at Troy, Monmouth.

Var b. gymnostachys, *(Genev.)*

Hab. Rough banks and woods, rare.

Loc. *South.* 2. Hill side, Walford, above Kerne Bridge, 1891; *Rogers! ! !* Lodge Grove, Bishopswood; *Ley.* Probably occurring in other parts of the county, but I believe, rare.

First found, 1891; first notice, *Journal of Botany*, 1895, p. 80.

Var. c. angustifolius, *Rogers.* *Flora*, p. 90.

Hab. Woods and hedges; locally abundant.

Loc. *South.* 1. Mynde wood; hedge near Garway Common; *Ley.* 2. Abundant on the Great and Little Doward hills; *Ley.* Lane side, Hope Mansel; *Ley.*

Central. 8. Hell Hole, Hampton Court; and in Dinmore woods; *Ley.*

North. 12. Abundant near Brilley. Wood Eaves, near Eardisley; *Ley.* A very well-marked variety, which will probably prove widely distributed in the county.

First notice, *Flora*, 1887.

Many hybrids occur in which *R. leucostachys* clearly forms one parent; the other is not always easy of determination; but the following have been traced with some certainty:—

R. leucostachys × rusticanus.
× pyramidalis.
× mucronatus.
× oigoclados.
× foliosus.
× infecundus.

32. Rubus curvidens, *A. Ley.* See *Flora*, pp. 90, 91 (under *R. Salteri*, Bab.); 94, 95 (under *R. Schlechtendalii*, W.)

Shrub; July and August.

Hab. Native in woods and thickets, rather rare.

Loc. *South.* 2. Abundant in Castle meadow wood, Caradoc; brake under Athelstane's wood; Held wood, Aconbury; *Ley.* 3. Border of Newent wood, May hill; *Ley.*

Central. 7. Belmont, Broomy Rise and Ruckhall in Clehonger parish; *Ley.* 8. Rough field, Dinmore: thicket near Wormesley Grange; *Ley.*

North. 10. Wood border near Limebrook Abbey; *Ley.*

West. 13. Criseley and Thruxton vallets; *Ley.* 14. Wood near Dulas Court; *Ley.*

Of these stations, that at Caradoc, Broomy Rise, Ruckhall, and Dinmore, are alluded to in the *Flora.*

For a description of this bramble, see *Journal of Botany*, 1894, p. 143.

33. Rubus mucronatus, *Blox.* *Flora*, p. 95 *(R. mucronulatus).*

The account of this bramble in the *Flora* gives a good idea of its distribution in Herefordshire; but the setose plant growing at Trolloway brook, D. 1, is now placed under *R. Radula, var. anglicanus.*

The following localities should be added :—

South. 3. In the Haugh wood, fine and typical; *Ley.* Hedges near Sharpnage well, *teste Rogers; Ley.*

East. 6. Shucknell hill; *Ley.*

Central. 7. Wood border at Wareham; wood borders at Belmont and Broomy Rise, Clehonger; *Ley.*

North. 9. Brooches copse, Berrington; *Ley.* 10. Lingen vallets, and on the Lugg under Shobdon hill; *Ley.* Ludford Park, and Downton gorge; *Ley.*

Two, if not three, strains of this bramble are found in Herefordshire (1) a plant with long-stalked single flowers in the panicle, approaching *R. glabratus*, Bab., and often with difficulty separated from it, unless by the stalked glands of the stem and panicle (2) a plant with nearly all ternate leaves, making an equally near approach to *R. pulcherrimus*, Neum. (3) a plant with thick, densely woolly leaves, approaching *R. leucostachys*, Schleich. I have however the authority of Rev. W. M. Rogers for uniting all these plants under *R. mucronatus*, Blox.

Hybrid. *Mucronatus* × *infecundus.* With both parents in a wood border at Belmont (7).

34. **Rubus Gelertii**, *Frider. Var. b. criniger*, Linton.

Shrub; July.

HAB. Native, in woods, rare.

LOC. *South.* 2. Wood border, Little Doward, 1894; *Purchas, Ley.*

North. 10. Lingen vallets, 1892; *Ley.*

In both these cases the plant has been named by Rev. W. M. Rogers. When better known, its distribution in the county is likely to be extended.

First found, 1892; first notice, *Journal of Botany*, 1895, p. 81.

35. **Rubus anglosaxonicus**, *Gelert.* *Flora*, p. 94 (under *R. macrophyllus*, W.)

Shrub; July.

HAB. Native in thickets and open woods, rare.

LOC. *South.* 2. Puttridge quarry in the Chase wood; Penyard Park wood in several places; *Purchas.* Harewood; *Ley.*

Var. b. raduloides, *Rogers.*

HAB. Native in woods and thickets; rare.

South. 2. Puttridge quarry, Chase wood, with the type; *Rogers.*

East. 6. Wood border, Westhide wood; *Ley.*

First notice; *Journal of Botany*, 1895, p. 81.

Var. c. setulosus, *Rogers.* *Flora*, p. 100 (as *R. Koehleri*, W., *var. infestus).*

HAB. Thickets and woods, locally abundant.

LOC. *South.* 1. Abundant in woods near Callow farm, Welsh Newton; *Ley.* 2. Puttridge quarry, Chase wood; very abundant on Howle hill, and in Harechurch woods, Hope Mansel; *Purchas, Rogers, Ley.*

Central. 7. Wood border at Belmont; *Ley.*

North. 9. Berrington wood; *Ley.*

West. 13. Rough bank near Thruxton vallets; *Ley.*

The Herefordshire plant here indicated seems to be quite as near to *R. Khoehleri*, or even to *R. infestus*, W., as to *R. anglosaxonicus*, Gelert. See the remarks of Rev. W. M. Rogers in *Journal of Botany*, 1895, p. 81.

36. **Rubus infestus**, *W.*

Shrub; July.

HAB. Native; in open woods and rough ground; rare and local.

LOC. *North.* 11. Hill side above Kington on the Kingswood road, 1895; *Ley.*

More frequent northwards, in Shropshire, than with us.

First found, 1895; first record, the present paper.

37. **Rubus Borreri**, *Bell Salt.* Exclude *R. Sprengelii*, W., *var. Borreri*, *Flora*, p. 96.

Low shrub; July and August.

HAB. Native, in woods and open ground, especially such as is hilly and heathy? Rare and very local in Herefordshire.

LOC. *South.* 1. In the Mynde woods plentifully; also in an adjoining larch plantation and in Scudamore wood, Orcop, 1894, 1895; *Ley.*

This bramble is very abundant in the large woods to the east and south-east of the Mynde, but has not been found elsewhere in the county. At the time the *Flora* was published it was identified by English batologists with the small ternate-leaved form of *R. Sprengelii*, W. Fortunately the existence of Bell Salter's original specimens has proved that the plant he described is quite a distinct species.

First found in 1894; first record, the present paper.

Var. c. virgultorum, *A. Ley.* See *Flora*, p. 93, under *R. umbrosus.*

Low shrub; July and August.

HAB. Native in thickets and open ground: rare and local.

East. 5. Open bushy ground near Thornbury; *Ley.*

LOC. *North.* 9. Damp alder copse called Far Heath coppice, Kimbolton, 1884; *Ley.* Wood near Leysters; Yells wood, Berrington; open common at Tomlinshill; *Ley.* 10. Pedwardine wood, Brampton Bryan; *Ley.* Ludford park, Ludlow; *Rogers, Ley.*

This bramble appears, from a fine series collected by Mr. R. de G. Benson, to be more frequent in Shropshire than with us, and to develop there a great similarity to forms of *R. infestus*, W., between which and *R. Borreri*, Bell Salt, it seems to form a link. It occurs also at Hanley Heath in Worcestershire.

For a description, see *Journal of Botany*, 1894, p. 143.

38. Rubus Leyanus, *Rogers. Flora*, p. 520 (as *R. Purchasii*, Blox.)

Arching shrub; July, August.

Hab. Native in woods and on rough banks; widely distributed in the county and locally abundant.

Loc. *South.* 1. Wood at St. Woolstan's farm, Welsh Newton; *Ley.* 2. Suff wood, Howle hill; Harechurch and Cockshot woods, Hope Mansel; *Ley.* Lord's wood, Great Doward; *Ley.* 3. In the Haugh wood, at many spots; *Ley.*

East. 5. Edwin wood, but rare; *Ley.* 6. Plentiful in Westhide wood; *Ley.* Wood near Docklow; *Ley.*

Central. 7. Rotherwas park wood, Dinedor, plentifully; *Ley.*

North. 11. Lyonshall park wood; *Ley.*

West. 13. Thruxton vallets; *Ley.*

R. Purchasii, Blox., with which this plant was supposed, at the time of writing the *Flora*, to be identical, is a form much nearer to *R. mucronatus*, Blox. *R. Drejeri*, G. Jensen, which was subsequently suggested by Dr. Focke, is different, and has not yet been certainly found in Britain.

39. Rubus regillus, *n. sp.*. *Flora*, p. 522 (as *R. debilis*, Boul.)

Stem bluntly angled, thick and branched below, forming a low arch, yellow-green or pink-green in exposure, hairy, glaucous, with slender, declining, rather scattered and unequal prickles from enlarged bases, numerous acicles and *unequal* stalked glands, *very leafy.*

Leaves 3-5nate-pedate, *leaflets large*, green on both sides, upper surface nearly smooth, under slightly hairy. Serration coarse and uneven. Terminal leaflet with *short* stalk, *oblong* flat, *suddenly contracting into a conspicuous acumen;* lateral similar, rather smaller, nearly sessile.

Panicle lax, hairy, with declining prickles, and stalked glands more numerous upwards, *leafy nearly to the top, with short ascending racemose branches* below, and a nearly racemose top. Panicle leaves ternate, similar to those of the stem.

Sepals ovate-acuminate, with long hair externally, reflexed in flower and fruit. Petals white, obovate, ciliate: stamens white, exceeding the green styles. Fruit well formed.

Woods and hedges. Abundant in Queen's wood and Linton wood, Herefordshire, District 3. Haywood, West Gloucester.

The above localities all adjoin, and form a large woodland area, in which the plant grows at intervals, often abundantly, both in woods and hedges, over an area of at least three square miles.

See the remarks of Rev. W. M. Rogers on this bramble in the *Journal of Botany*, 1892, pp. 302, 303 under *R. cognatus*, N. E. Br.

The mostly ternate leaves, with nearly equal leaflets, the narrow lax panicle, and the yellow-green of the whole plant are conspicuous features.

40. Rubus Radula, *(sp. collect.), var. a. R. Radula*, W. *Flora*, pp. 99, 522.

Shrub; July and August.

Hab. Woods and thickets, rare.

Loc. *South.* 1. In the Buckholt, Welsh Newton; *Ley.* 2. Hedge and rough place at the Welland, Peterstow; *Ley.* Baynton's Grove, Fawley: wood border, Holme Lacey park; *Ley.* 3. Gorstley quarries; *Ley.*

The plant has been seen and verified from each of the above localities by Rev. W. M. Rogers.

Var. b. anglicanus, *Rogers. Flora*, pp. 96 (under *R. mucronulatus*, Blox.): 99 (as *R. Radula*, W.)

Shrub; July and August.

Hab. Native, in woods and thickets; rare.

Loc. *South.* 1. Hedge, near woods, at Wyaston Leys, Ganarew; *Ley.* Hedge between the Caisty wood and Trolloway, St. Weonards; *Ley.* 2. Carey wood and Brockhampton; *Ley.*

First notice; *Journal of Botany*, 1895, p. 82.

Var. c. echinatoides, *Rogers.*

Shrub: July.

Hab. In woods and thickets; very rare?

Loc. *South.* 2. Bull's hill, Walford, 1891, *teste Rogers*; *Ley.* 3. Edge of Boldings wood, Gorstley, 1893; *Ley.*

First found, 1891; first notice, *Journal of Botany*, 1895, p. 82.

Var. d. sertiflorus *(P. J. Muell.). Flora*, pp. 94 (under *R. macrophyllus*, W.); 522.

Shrub; July and August.

Hab. Native, in woods; locally abundant.

Loc. *South.* 2. Penyard park wood, Ross; *Purchas.* Rigg's wood and Pengethly Gorse, Sellack, plentifully; Carey wood, Harewood woods, Athelstane's wood, all plentifully; *Ley.* Thicket at Hoarwithy; thicket at Peterstow; *Ley.*

East. 6. Shucknell hill; *Ley.*

Central. 7. Rotherwas park wood, plentifully; Williams' wood near Aconbury; *Ley.*

Hybrid: *sertiflorus* × *Purchasianus;* Rigg's wood (2).

41. Rubus podophyllus, *P. J. Muell.*

Small shrub; July.

Hab. Native; in heathy woods; rare?

Loc. *South.* 2. Summit of Cockshot wood, Hope Mansel; July, 1895; *Ley.*

This bramble has also been found this year on Beacon hill, Monmouthshire; Mr. Benson moreover finds it in Shropshire. It is therefore probable that when better known it may prove to be of more general distribution in Herefordshire.

First found, 1895; first notice, the present paper.

42. Rubus echinatus, *Lindl.* *Flora*, p. 99 (as *R. rudis*, W.)

The following localities for this abundant bramble may be added :—

South. 3. Haugh wood, and other places near Woolhope ; *Ley.*

East. 5. Hedges at Upper Sapey, in abundance ; *Ley.* 6. Westhide wood ; *Ley.*

Central. 8. Dinmore woods, but scarce ; *Ley.*

North. 9. Hedge near Kimbolton, the *forma microphylla ; Ley.*

West. 13. Near Dulas Court, in small quantity ; *Ley.*

43. Rubus oigoclados, *Muell and Lefv.*

Shrub ; July and August.

Hab. Native, in woods ; very local.

Loc. *South.* 2. Chase wood, Ross ; *Ley.* 3. Queen's wood, in more than one spot, but scarce ; *Ley.*

Central. 8. Woods near Dinmore, in some abundance ; *Ley.* Foxley and Wormesley woods, very abundant ; *Ley.*

North. 11. Wood at Titley (noticed, *Flora*, p. 96, under *R. mucronulatus*, Blox.) ; *Ley.* 12. Woods between Whitney and Brilley ; wood at Pentrecoed, Eardisley ; *Ley.*

West. 13. Rough bank near Thruxton vallets ; *Ley.*

First notice ; *Journal of Botany*, 1895, p. 82.

Var. b. Newbouldii, *Bab.*

Shrub ; July and August.

Hab. Woods ; rare.

Loc. *Central.* 7. Shrubberies and woods at Belmont ; wood border at Wareham near Hereford ; *Ley.* 8. Wood near Dinmore station ; *Focke, Ley.*

North. 12. Winforton wood ; *Ley.*

It is extremely probable that most of the plants referred to in the *Flora*, p. 96, as "setose forms of *R. mucronulatus*, Blox." are to be referred to *R. oigoclados*, and its *var. R. Newbouldii.* This is certainly the case with some of the Dinmore plants.

First notice ; *Journal of Botany*, 1895, p. 82.

44. Rubus rudis, *W. & N.* Exclude *R. rudis*, W., *Flora*, p. 99.

Shrub ; July and August.

Hab. Native, in hedges and thickets, very rare.

Loc. *West.* 13 and 14. In several spots near Dulas Court, 1892 ; *Ley.*

This very well marked species will probably be found in the south of the county, since it exists *(Rogers ! ! !)* at Symond's Yat in West Gloucester, within a few yards of the county boundary. It recurs at Flaxley Abbey in the Forest of Dean. It must, however, be extremely rare in the south of Herefordshire, or it would not have escaped detection up to the present time.

First found, 1892 ; first notice, *Journal of Botany*, 1895, p. 100.

Note.—Since the above was written, *R. rudis*, W. & N., has been found abundantly in Lodge Grove, D. 2 ; *Ley.*

45. Rubus præruptorum, *Boulay.*

Shrub ; July and August.

Hab. Native ; in woods ; scattered and rare.

Loc. *South.* 2. Harechurch woods, Hope Mansel, at a single spot, 1895 ; *Ley.*

Central. 8. Dinmore, in a thicket near the Church, 1885, *Ley.* Wood near Wormesley Grange, 1893 ; *Ley.*

The Herefordshire bramble growing in the above localities is clearly a *form* of *R. præruptorum*, Boulay ; it comes very near the *R. Griffithianus*, Rogers, of Carnarvonshire (see *Flora* of Carnarvonshire and Anglesea, 1895, p. 48), but is not identical in Mr. Rogers' opinion, either with this or with the *R. præruptorum* of Dorset.

First found, 1885 ; first record, the present paper.

46. Rubus Babingtonii, *Bell Salt.*

Shrub ; July.

Hab. Native in woods ; rare.

Loc. *South.* 2. Bull's hill, Walford, 1892 ; *Rogers, Purchas, Ley.* 3. Yatton wood, in more than one spot, 1894, 1895 ; *Ley.*

Central. 7. Belmont wood, 1894 ; *Rogers, Ley.*

North. 10. Wood at the northern base of Wapley hill ; wood and rough bank at Corton, near Presteign, 1895 ; *Ley.* 12. Wood near the Apostles farm, Eardisley, 1895 ; *Ley.*

Of the above localities, all except that at Belmont have the authority of Rev. W. M. Rogers, and may be regarded with confidence : the Belmont plant needs more careful investigation another year. The plant at Wapley Corton and Eardisley exists in great abundance.

First found, 1892 ; first record, the present paper.

47. Rubus Lejeunei, *W. & N. Var. b. ericetorum, Lefv. Flora*, pp. 99, 522 (under *R. Radula*, W.)

Shrub ; July and August.

Hab. Native in woods, very local.

Loc. *Central.* 8. Lawton's Hope, near Dinmore ; *Ley.* Credenhill woods, scarce ; *Ley.*

North. 12. Thickets and woods near Eardisley in great abundance ; *Ley.* Woods at Whitney, abundantly ; *Ley.*

West. 13. Open wood near Clifford ; *Ley.*

Upon examination it will be found that the above stations all indicate a single central area for this bramble in Herefordshire ; outside which it has not been found in the county. Its abundance in the neighbourhood of Eardisley constitutes a marked feature in the bramble flora of the district.

First notice, under the present name ; *Journal of Botany*, 1895, p. 100.

48. Rubus cavatifolius, *P. J. Muell. Flora*, p. 101.

Large shrub; July and August.

Hab. Native in thickets and open woods; very scarce.

Loc. *South.* 2. One bush at Howle hill; *Purchas, Ley.* One bush in Long Close wood, Little Doward; *Ley.*

This beautiful bramble is abundant a few miles to the south-west of us, in the district of Monmouthshire bordering on the Wye valley, where it was first discovered to belong to the British Flora. It appears to reach into Herefordshire only in a few isolated outliers.

49. Rubus mutabilis, *Genev. Var. b. nemorosus, Genev.*

Shrub; July and August.

Hab. Native in woods; rare and local.

Loc. *North.* 10. Wood near Stapleton: hedge and wood bank near Willey Lodge: Pedwardine wood and Berkly Knoll; Lingen vallets wood; *E. F. Linton; Ley.*

First found, 1896; first notice, the present paper.

This bramble is an interesting addition to our *Flora*, having been previously detected only in Surrey.

50. Rubus scaber, *W. & N.* Exclude *R. scaber, Flora*, p. 521.

Low shrub; July and August.

Hab. Native, in woods; rare.

Loc. *South.* 1. Wood at the Slip, Ganarew, 1884; *Ley.*

West. 13. Criseley vallets near St. Devereux, 1894; *Ley.*

The plant at Ganarew, D. 1, was determined for me as *R. scaber*, W. & N. by Dr. Focke in 1894: that in D. 13 is, I think, undoubtedly the same.

First notice; *Journal of Botany*, 1895, p. 101.

Var. pseudo-Bellardi. *Flora*, p. 105 (under *R. Bellardi, W. & N.*)

A plant much resembling *R. Bellardi*, W. & N. in its leaves, and mentioned under this name in the *Flora*, grows in the Tintern neighbourhood, and has been, no doubt correctly, attributed to *R. scaber*, W. & N. by Dr. Focke. It re-appears in Herefordshire at the following stations:—

South. 2. Lord's wood, Great Doward, on sandstone; *Ley.* 3. Queen's wood, Upton Bishop, I believe the same plant; *Ley.*

51. Rubus obscurus, *Kalt.*

Shrub; July and August.

Hab. In woods; very rare.

Loc. *Central.* 7. Abundant in Belmont woods, Hereford, 1893; *E. F. Linton, Focke, Ley.* Not yet detected elsewhere.

This is a striking bramble, from its bright red petals, stamens and styles, and its clasping sepals. It has been seen in situ by Dr. Focke, and pronounced by him to be identical with the typical *R. obscurus*, Kalt., of the continent.

First found, 1893; first notice, *Journal of Botany*, 1895, p. 101.

Hybrid: *obscurus* × *leucostachys*. With both parents in a wood hedge at Belmont.

52. Rubus fuscus, *W. & N. Flora*, pp. 97 (as *R. Bloxamii*, Lees), 104 (as *R. foliosus*, W.), 521 (as *R. thyrsiflorus*, W. & N.) and 523 (as *R. fuscus*, W. & N.)

Shrub; July and August.

Hab. Native, in woods and thickets: locally abundant.

Loc. *South.* 1. In great abundance in woods and thickets in Welsh Newton parish; a softly hairy form with few glands; *Ley.* 2. Lodge Grove, Bishopswood, abundantly; "identical with the German plant," Dr. Focke; *Ley.* Woods in Hope Mansel parish; Chase wood, Ross; *Ley.* 3. Hill above Grendon park; *Ley.*

East. 4. Cowleigh park, Malvern; *Lees*, in *Malvern Botany; Ley.* Storridge, and at Mooral's well, Colwall; *Ley.* 5. Whitbourne; *Ley.*

Central. 7. Thicket by the pathway between Hereford and Belmont; *Ley.* 8. Dinmore woods, scarce; *Ley.*

North. 10. In great abundance in Croft park and on Croft Ambrey; *Ley.* Aymestry; and in the Mary Knowl valley, near Ludlow; *Ley.* 11. Lane side near Vallets wood, Titley; *Ley.*

West. 13. Abundant in Deepwell, and other woods near Moccas: wood near Dorstone; *Ley.*

Most of the above material has passed through the hands of Dr. Focke and Rev. W. M. Rogers, and exhibits a single fairly uniform species. The Moccas and Malvern plants were uniformly named *R. thyrsiflorus*, W. & N., by the late Professor Babington, and present a very robust form of the species, in which the opening panicle is nodding in bud, as in the New Forest plant named *var. nutans* by Mr. Rogers. The Welsh Newton plant is a very peculiar form, upon which Dr. Focke's comment is "*forma hirsutissima, parce glandulosa.*" It has been suggested that it is a hybrid with *R. leucostachys*, Schleich., but in view of its great abundance upon the Welsh Newton hills, this suggestion cannot be entertained.

Hybrid: *fuscus* × *foliosus*, Athelstane's wood, D. 2.

Var. c. macrostachys (*P. J. Muell.*)

In woods.

Loc. *South.* 2. Rigg's wood (*teste Focke*), and Pengethly Gorse, Sellack; *Ley.* 3. Yatton and Coldborough park woods; *Rogers, Ley.*

Central. 7. Belmont wood, near Hereford; *Focke* and *Rogers!*

North. 10. Croft Ambrey; *Ley.*

I am not yet clear as to the limits between this plant and type *R. fuscus*: and it is possible that one or two of the stations given for the type may belong rather to the variety.

First found, *Focke*, 1894; first notice, *Journal of Botany*, 1895, p. 101.

53. Rubus Loehri, *Wirtg.*

Low shrub: July and August.

Hab. Native, in hilly woods: locally abundant.

Loc. *South.* 2. Very abundant in Harechurch woods, Hope Mansel; *Ley.* Abundant in Suff wood, Howle hill; *Rogers, Purchas, Ley.* Abundant in Lodge Grove, Bishopswood; Bull's hill and Warren wood, Walford; Lord's wood, Great Doward, Chase wood, Ross; *Ley.* 3. Abundant in Linton wood and Boldingswood, and at the quarries, Gorstley; *Ley.* On the county boundary, Newent wood, May hill; *Ley.*

First record; *Botanical Exchange Club Report*, 1888, p. 209.

Dr. Focke in 1894, on seeing this plant in situ, withdrew his suggestion made in 1888, that it was *R. Loehri*, Wirtg. An inspection, however, of authentic continental specimens in the herbarium of Rev. W. M. Rogers, leaves no doubt that our plant is identical with *R. Loehri*, Wirtg.

This bramble crosses our boundaries into the vice-county of West Gloucestershire and is widely spread in the Forest of Dean, and in Newent wood. I am not aware that it has been as yet found in any other county. Its nearest alliance, among British brambles, seems to be with *R. fuscus*, W. & N., and *R. pallidus*, W. & N., especially perhaps with the latter. The very leafy stem, very densely clothed with stalked glands; the thin texture of the shouldered ovate-acuminate leaflets, which are green on both sides, and have coarse toothing; and the short, broad panicle, much branched, with slender branches, are characteristic.

Specimens of *R. Loehri*, Wirtg., from Linton wood, Herefordshire, were issued in Rogers' and Linton's sets (No. 18) under the name of *R. fuscus*, W. & N.

Hybrid: *Loehri* × *fuscus*, Bull's hill (2).

54. Rubus pallidus, *W. & N.*

Low trailing shrub: July and August.

Hab. Native, in woods; rare in Herefordshire.

Loc. *North.* 10. Barnes' vallets, and Lingen vallets, Lingen, 1891; *Ley.* 11. Vallets wood near Titley, 1893; *Ley.* 12. Winforton wood in abundance, 1895; *Ley.*

West. 13. Criseley vallets, St. Devereux, 1894; *Ley.*

First found, 1891: first notice, *Journal of Botany*, 1895, p. 101.

55. Rubus longithyrsiger, *Lees.* *Flora*, p. 103 (as *R. pyramidalis*, Bab.)

Add the following localities to the account of this plant given in the *Flora*:—

South. 2. Rough bank, Harewood; *Ley.* 3. Lynedor and Queen's wood, Upton Bishop, and near Gorstley; *Ley.* Coldborough park wood; *Ley.*

East. Still unrecorded for Districts 4 and 5.

North. 9. Berrington wood; *Ley.* 10. Shobdon hill wood; Corton and Wapley woods near Presteign; *Ley.* 11. Vallets wood near Titley; *Ley.* 12. Winforton wood, abundantly; *Ley.*

West. Unrecorded for District 14.

56. Rubus foliosus, *W. & N.* *Flora*, p. 103 (as *R. Guentheri*, W.) Exclude *R. foliosus*, W. & N., pp. 104, 522.

Add the following localities:—

South. 2. Rigg's wood, Harewood and Bolston woods; *Ley.* 3. Plentiful in Queen's wood, Upton Bishop; plentiful in all the woods near Gorstley; Yatton wood; plentiful in the Haugh wood; *Ley.*

East. 5. Crump End, Storridge, both in this District and in D. 4; *Ley.* 6. Westhide wood; *Ley.*

Central. 8. "Under the Scaur, Moccas"; *Ridley*, in *Journal of Botany*, 1885, p. 370. Dinmore woods; *Ley.*

North. 9. Berrington wood; *Ley.* 10. Abundant in the Mary Knowl valley, near Ludlow; *Ley.*

Unrecorded as yet for either of the western Districts.

57. Rubus rosaceus (*sp. collect.*) Var. a. rosaceus (*W. & N.*)

Low trailing shrub; July.

Hab. Native in woods; rare and scattered.

Loc. *South.* 2. Wood at Wyaston Leys; *Ley.* Athelstane wood; *Ley.* 3. Linton wood, Gorstley, abundant at one spot; *Rogers, Purchas, Ley.* Gorstley quarries, 1887; *Ley.*

North. 10. Open wood, Stapleton near Presteign; *Ley.* 11. Wood bank in the railway cutting at Titley junction; *Ley.* 12. Winforton wood; *Ley.*

First found, 1887; first record, the present paper.

Var. b. hystrix (*W. & N.*). *Flora*, p. 97 (exclude all except the Titley station).

Low shrub; July and August.

Hab. Native, in woods: rare in Herefordshire.

Loc. *North.* 11. River side near Titley, 1884; *Ley.* Vallets wood near Titley, 1891, 1893; *Ley.*

Var. d. Purchasianus, *Rogers.* *Flora*, p. 105, 106 (as *R. Reuteri*, Merc.)

Very local.

Add the following localities:—

South. 2. Wallbrook wood, Aconbury, and in a hedge at Aconbury Common; *Ley.* 3. Yatton wood, 1894; *Ley.*

It will be seen that the above stations only extend the range of this bramble a few miles to the north and east.

Forma pseudo-hirta. *Flora*, p. 105 (as *R. hirtus*, Bab.)

Growing in company with *R. Purchasianus*, Rog., in many of its stations. Undoubtedly very near to *R. Purchasianus*, but uniformly distinguished by its fewer and weaker prickles, and its more abundant hair on the stem and rachis.

Loc. *South.* 2. Penyard park wood, Ross; *Purchas.* Great Doward, under conglomerate rocks on the north-east side; *Ley.* Pengethly Grove, and other places in Sellack parish; *Ley.*

R. Purchasianus, Rogers, was issued in Rogers' and Linton's Sets, No. 22, as *R. obscurus*, Kalt.

Var. e. infecundus, *Rogers. Flora*, p. 97 (as *R. hystrix*, W.; exclude the Titley station); p. 98 (as *R. rosaceus*, W.; exclude the Wyaston Leys and Great Doward plant).

R. infecundus, Rogers, includes the whole of the plants described in the *Flora* as *R. hystrix*, W., and *R. rosaceus*, W. with the exceptions above named, and is abundant almost throughout the whole county, although the Leominster and Kington Districts (9 and 11) have at present no recorded stations. In many Herefordshire woods it forms a large proportion of the bramble vegetation. Special record of stations seems therefore unnecessary. Although ripening its fruit shyly and irregularly, *R. infecundus* is one of our species most readily hybridising with others. The fruit, when well formed, is round, and of a full black.

Hybrids :—

Infecundus × *argentatus.* Scudamore wood, Ganarew (D. 1): Rigg's wood, Sellack (D. 2).

Infecundus × *leucostachys.* Queen's wood, Upton Bishop (D. 3).

Infecundus × *sertiflorus.* Rigg's wood, Sellack (D. 2).

Infecundus × *Purchasianus?* Bull's hill, Walford (D. 2).

58. Rubus adornatus, *P. J. Muell. Flora*, pp. 102 (under *R. Lejeunei*, W.): 522 (as *R. foliosus*, W.).

Shrub; July and August.

Hab. Native, in woods and thickets; local.

Loc. *South.* 2. Bull's hill, Walford, 1892; *Purchas, Rogers, Ley.* 3. May hill, near the county boundary; *Ley.* Boldings wood; Linton wood; Gorstley quarries, and other spots near Gorstley; *Ley.* Coldborough park wood; *Ley.*

North. 10. Wood on the right bank of the Lugg, above Aymestry; *Ley.* 12. Shirl wood near Eardisland; *Ley.*

59. Rubus Koehleri (*sp. collect.*). **Var. a. Koehleri,** *W. & N.*

Shrub; July and August.

Hab. Native, in woods and thickets; rare and local.

Loc. *South.* 2. Bull's hill, Walford, 1892; *Rogers, Purchas, Ley.* Lodge Grove and Drybrook, Bishopswood, 1893; *Rogers, Ley.* Harechurch woods, Hope Mansel; *Focke, Ley.*

Unknown hitherto in any other District of Herefordshire, but crossing the county boundary at Hope Mansel into the Lea Bailey plantations, West Gloucestershire.

The plant above mentioned is named type *Kochleri*, W. & N., on the authority of Dr. Focke, who saw it *in situ* in 1894, and pronounced it without hesitation to be identical with the typical *R. Koehleri* of continental Europe. At the same time it must be observed that our plant is a far more slender, less armed form than any of those which English batologists had been accustomed to name *R. Koehleri.*

First found in 1891; first record, the present paper.

Var. b. pallidus, *Bab. Flora*, p. 100.

One of the most widely spread of British brambles, both in Herefordshire and throughout Great Britain.

Add the following localities :—

South. 3. Near Sollershope, plentifully; *Ley.*

East. 5. Common near Upper Sapey; *Ley.* 6. Westhide wood; *Ley.*

West. 13. Near Dulas Court, but not abundant; *Ley.*

Var. c. cognatus (*N. E. Br.*). *Flora*, pp. 102 (under *R. Lejeunei*, W.; Rigg's wood and Athelstane's wood stations); 521 (as *R. Bloxamii*, Lees).

Tall shrub; July and August.

Hab. Native in woods and thickets, locally abundant.

Loc. *South.* 1. Larch plantation at the Cockbrook wood, Orcop; *Ley.* Woods near St. Woolstan's farm, Welsh Newton; *Ley.* 2. Longclose wood, Little Doward; *Ley.* Rigg's wood, Athelstane's wood, Carey wood, Bolston wood, Aconbury camp and Wallbrook wood, Aconbury; in all these woods abundantly; *Ley.* 3 Canwood near Woolhope; *Ley.*

East. 6. Westhide wood, abundantly; *Ley.*

Central. 7. Haywood forest and Belmont woods, abundantly; Wellington copse, and other woods near Callow, abundantly: northern slope of Dinedor hill; *Ley.*

The plant growing in the above localities is in my judgment all referrible to a single species: it is very constant in general aspect, in the shape of the leaves and of the panicle, but it varies greatly in the *amount*, though not so much in the *character*, of the armature, both of the stem and rachis. It does not exactly tally with the Surrey plant for which the name of *R. cognatus* was first coined by Mr. Browne.

I wish to state that the responsibility of ranging all the above together under the name of *R. cognatus* lies solely with myself; the plants brought together here having long been subjects of much controversy. They were separated in the *Flora of Herefordshire* between *R. Lejeunei*, *R. Bloxamii*, and *R. Koehleri*: they were assigned by Dr. Focke partly to *R. fuscus*, partly to *R. Kochleri;* and by Rev. W. M. Rogers partly to *R. fuscus*, partly to *R. cognatus.*

First notice; *Journal of Botany*, 1895, p. 102.

60. Rubus Marshalli, *Focke* and *Rogers.*

Shrub; July and August.

HAB. Native, in woods and thickets; not common (at least in a typical form).

LOC. *South.* 2. Harechurch woods, Hope Mansel, *teste Focke* and *Rogers; Focke, Ley.* Lodge Grove, Bishopswood; *Ley.*

North. 9. Rough bank at Tomlinshill, but not so well marked; *Ley.* 10. Coxwall Knoll, Brampton Bryan; *Ley.* Wood hedge near Aymestry; *Ley.* 11. Kingswood near Kington; *Ley.*

West. 13. Snodhill park near Dorstone; *Ley.* It is probable that many other plants, for the present left over as doubtful, will have to be ranged under this species, when its limits are better understood.

First notice; *Journal of Botany*, 1895, p. 103.

61. Rubus fuscoater, *W. Flora*, p. 101 (*ex parte*).

Low shrub; end of June, July.

HAB. Native in thickets; very rare.

LOC. *South.* 1. Thickets and plantations on Welsh Newton Common abundant at one place; *Ley.*

It will be seen from the above that the Welsh Newton plant is the only one of those placed under *R. fuscoater*, W. in the *Flora of Herefordshire* which is now retained under this name. The late Professor Babington uniformly gave the name of *R. fuscoater*, W. to this plant; and although it does not precisely agree with the Derbyshire plant to which this name was given by Dr. Focke, Rev. W. M. Rogers is inclined to keep it under this name. No other name has been suggested for or assigned to our plant by any of the leading batologists.

First found, 1879; first record, *Botanical Exchange Club Report*, 1880, p. 30.

62. Rubus viridis, *Kalt.*

Low shrub: July and August.

HAB. Native, in woods; very rare.

LOC. *North.* 12. Winforton wood, abundantly, September, 1895: *Ley.*

Known in single stations in the counties of Radnor (Allt-goch), Brecon (Glyn Tarell), Monmouth (near Tintern), and I believe West Gloucester.

First found, 1895; first record; the present paper.

63. Rubus divexiramus, *P. J. Muell. Flora*, pp. 98 (under *R. rosaceus*, W.); 522 (as *R. humifusus*, W.).

Low shrub; July and August.

HAB. Native, in hilly woods, very local.

LOC. *South.* 1. St. Woolstan's wood, Welsh Newton; *Ley.* Wood at the Slip, Ganarew, in abundance, both in Districts 1 and 2; *Ley.* 2. Abundant on the sandstone conglomerate, on both the Great and Little Doward hills; *Ley.*

This interesting bramble extends from the south-western angle of Herefordshire into the adjoining parts of Monmouth and West Gloucestershires, and was

first found in Britain in 1873, at the Buckstone, West Gloucestershire, but was not recognised as *R. divexiramus*, P. J. Muell. until sent to Dr. Focke in 1892.

First record, *Journal of Botany*, 1893, p. 4.

64. Rubus acutifrons, *A. Ley.*

Shrub; July and August.

HAB. Native, in woods and thickets; local.

LOC. *South.* 2. Howle hill, in two spots; Penyard park wood; Rigg's wood, Sellack; *Ley.* 3. Coldborough park wood; Haugh wood; *Ley.*

Central. 7. Abundant in woods near Belmont; wood at Ruckhall mill, Clehonger; *Ley.*

West. 13. Thruxton vallets wood, St. Devereux; *Ley.*

R. acutifrons extends into Worcestershire, in the neighbourhood of Upper Sapey, where it occurs at Southstone's Rock; *Ley.*

First described; *Journal of Botany*, 1893, p. 13.

65. Rubus Bellardi, *W. & N. Flora*, p. 105.

Low shrub; July and August.

HAB. Native in woods; rare or very rare.

LOC. *East.* 4 and 5. Woods and thickets near Storridge; *Ley.*

I exclude for the present all plants from other Herefordshire localities, which have been placed under this name by various authorities, but which have not been admitted by Dr. Focke or Rev. W. M. Rogers. The Storridge plant was seen *in situ* by Rev. W. M. Rogers, and considered by him to be true *R. Bellardi*, W. & N.

Districts 4 and 5 are joined together above, the locality where the plant grows being a single one, divided by the turnpike road, which here forms the boundary of the two Districts.

66. Rubus serpens, *W. Flora*, p. 523 (*R. serpens*, W. & N., and *R. hirtus*, W. & N.)

Shrub; either trailing or arching; July and August.

HAB. Native, in woods, rare and local.

East. 5. In great abundance in Edwin wood near Bromyard, *teste* Rogers and Focke; *Ley.* Stanford Park near Upper Sapey, both in Hereford and Worcestershires; *Ley.* 6. Very abundant in Westhide wood, *teste Rogers* and *Focke; Ley.*

[Var. c. Kaltenbachii (*Metsch.*) is in all probability a Herefordshire plant, since it grows abundantly in the neighbouring counties of Brecon and Glamorgan, and occurs also in the Forest of Dean, West Gloucestershire.]

Var. e. rubiginosus (*P. J. Muell.*)

Hab. In open woods and rough ground, rare.

Loc. *South.* 2. Cockshot wood, Hope Mansel, in small quantity, 1894; *Ley.* 3. Rough pastures on the edge of Queen's wood, 1895; *Ley.*

North. 9. Gorsty hill coppice, Kimbolton, 1894; *Ley.*

The name here given to this plant was independently suggested for it both by Dr. Focke and Rev. W. M. Rogers.

First found, 1894; first notice, *Journal of Botany*, 1895, p. 104.

67. Rubus ochrodermis, *A. Ley. Flora*, p. 520 (under *R. mucronulatus*, Blox.)

Shrub; July and August.

Hab. Native, in woods and rough open ground. Widely spread in the county.

Loc. *South.* 3. Coldborough park wood; Haugh wood, in many places; *Ley.*

East. 6. Westhide wood; *Ley.*

Central. 7. Wareham wood near Hereford; Belmont woods; *Ley.* 8. Woods, in several spots near Dinmore Station; *Ley.*

North. 10. Stapleton and Barnes vallets woods; *Ley.* 12. Shirl wood near Eardisland; *Ley.* Rough place at Whitney; *Ley.*

For the first description of this very well marked bramble, see *Journal of Botany*, 1893, p. 15.

68. Rubus velatus, *Lefv. Flora*, p. 101 (under *R. cavatifolius*, Muell.)

Small shrub; July.

Hab. Native in woods and thickets; rare.

Loc. *South.* 2. Suff wood, Howle hill; Cockshot wood, Hope Mansel; *Ley.*

East. 4. Thicket in Cowleigh park, Malvern, 1887, 1893; *Rogers, Ley.*

North. 11. Thicket and railway cutting, near Titley junction, in fair abundance, 1884; *Ley:* 1893; *Purchas, Ley.*

First named as a British plant in 1889 or 1890, by the late Professor Babington, from Cowleigh park specimens. First notice, *Journal of Botany*, 1893, p. 7; 1895, p. 104.

69. Rubus dumetorum, *W. & N. Flora*, pp. 107 (as *R. corylifolias*, Sm., *var. purpureus)*, 108.

I am not possessed of the knowledge requisite to add anything to the account given in the *Flora* of this bramble. Taken collectively it is an extremely abundant species, perhaps the most abundant of all our species, almost throughout the county; chiefly in hedges, but also in woods and wood borders. Far the most common form throughout Herefordshire is the *var. a. ferox*, W.: but *var. b. diversifolius*, (Lindl.) has been certified by Rev. W. M. Rogers for Great Doward (2), Broadmore Common (3), and for Bullingham (7). *Var. e. tuberculatus*, Bab. is, I believe, common: *Var. f. concinnus*, Warren, is the name given to a plant growing at Rigg's wood (2): *Var. g. fasciculatus*, P. J. Muell. occurs in several spots in the Ross district.

70. Rubus corylifolius, *Sm. Flora*, pp. 106, 107. Var. a. sublustris *(Lees).*

Rare in Herefordshire.

Loc. *South.* 2. Thicket by the brook near Rudhall, Ross; an abnormal state, but clearly this; *Ley.*

North. 9. Hedge at Pudlestone, 1894, good and characteristic; *Ley.*

Var. b. cyclophyllus, *Lindeb. Flora*, p. 107 (as *R. conjungens*, Bab.)

Locally abundant.

Rubus commixtus, *Frid. & Gel. Bot. Tidsskrift*, 1890.

Shrub; July.

Hab. On a damp wood border.

Loc. *South.* 3. Wood border, Coldborough park, 1888, and again 1895; *Ley.*

The above species is closely related to *R. corylifolius*, Sm., and may be best placed, at least for the present and until better understood, as a variety under that plant. The Herefordshire specimens, which were submitted to Dr. Focke and named by him, present the appearance of a remarkable variety of *R. corylifolius*, differing from its ordinary forms in having an assurgent fruiting calyx, and a rachis bearing numerous stalked glands, besides other particulars. So far as I know, *R. commixtus*, Frid. and Gel. has not previously been recorded for Britain.

71. Rubus Balfourianus, *Blox.*

The plants mentioned under this name in the *Flora*, p. 106; and under the name of *R. althœifolius*, Host. at p. 108, are all now treated as hybrids, by Rev. W. M. Rogers, and are therefore here excluded.

Shrub; July and August.

Hab. Native in wood hedges and thickets, very rare?

Loc. *South.* 3. Wood hedge at Yatton, 1895; *Ley.* Quarry, Littlehope, near Mordiford; *Ley.*

First record; the present paper; the inclusion of Herefordshire in the list of vice-counties for this plant in the *Journal of Botany*, 1895, p. 105, being founded on some of the plants now excluded as hybrids.

72. Rubus cæsius, *L. Flora*, p. 110.

With regard to *R. cæsius*, L., and its varieties, I have nothing to add to the account given in the *Flora:* but the *var. c. hispidus* must be excluded from the county list as an unnamed variety of *R. corylifolius*, Sm.

Plants intermediate between *R. dumetorum*, W. & N., *R. corylifolius*, Sm., *R. Balfourianus*, Blox., and *R. cæsius*, L. are of extremely frequent occurrence, and are now treated by the leading authorities as hybrids: if this is really their origin, they often far exceed in abundance the parents from which they are supposed to have sprung.

The hybrid *cæsius* × *idæus* has occurred in Herefordshire (stream side, Leominster, D. 9).

ERRATA AND CORRIGENDA TO THE ADDITIONS TO THE FLORA OF HEREFORDSHIRE.

Page 73, line 5, for *R. Khoehleri* read *R. Kochleri.*

Page 85, line 4 from bottom. Insert

67. Rubus hirtus, *W. & K.* (*sp. collect.*) and make the requisite corrections in the numbers prefixed to the subsequent species.

Page 86, last line, and page 87, four first lines.

The following names should be printed in Egyptian type. Var. a ferox, *W.* Var. b. diversifolius, *Lindl.* Var. e. tuberculatus, *Bab.* Var. f. concinnus, *Warren.* Var. g. fasciculatus, *P. J. Muell.*

INDEX

OF

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CONTENTS.

[*Those marked with an asterisk * are now for the first time included in the index, the others are continuations from the indexes of* 1891 *and* 1892.]

The following had not been issued in time for this index :—

William Salt Archæological Society for Staffordshire, vol. xiv.
Berwickshire Naturalists' Field Club, vol. xiv.
Lancashire and Cheshire Archæological Society, vol. x.

NOTICE.

Societies whose transactions are not indexed in this part, or the preceding parts for 1892 and 1891, are requested to communicate with

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Care of W. H. ST. JOHN HOPE, Esq.,
Society of Antiquaries,
Burlington House, W.

Societies in union with the Society of Antiquaries, and other societies, may obtain single copies of the yearly index or a sufficient number of copies to bind up with their transactions for issue to each of their members. The value of the index for purposes of research and as a record of each year's archæological work is so well recognised that many societies have adopted the latter system, and the more this is extended the less will be the cost to each society. For particulars of this and other works now being carried on by the associated societies application should be made to W. H. St. John Hope, Esq., addressed as above.

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NOTE.

The value of this Index to archæologists is now recognised. Every effort is made to keep its contents up to date and continuous, but it is obvious that the difficulties are great unless the assistance of the societies is obtained. If for any reason the papers of a society are not indexed in the year to which they properly belong the plan is to include them in the following year; and whenever the papers of societies are brought into the Index for the first time they are then indexed from the year 1891.

By this means it will be seen that the year 1891 is treated as the commencing year for the Index and that all transactions published in and since that year will find their place in the series.

To make this work complete an index of the transactions from the beginning of archæological societies down to the year 1890 needs to be published. This Index is already completed in MS. form and it will be printed as soon as arrangements can be made.

Societies will greatly oblige by communicating any omissions or suggestions to

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Single copies of the yearly Index may be obtained. Many of the societies in union with the Society of Antiquaries take a sufficient number of copies to issue with their transactions to each of their members. The more this plan is extended the less will be the cost of the Index to each society. For particulars of this and other works now being carried on by the societies in union application should be made to the Honorary Secretary

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