WOOLHOPE NATURALISTS' FIELD CLUB 1851

TRANSACTIONS

OF THE

WOOLHOPE

NATURALISTS' FIELD CLUB.

[ESTABLISHED 1851.]

1905, 1906, 1907.

"HOPE ON."  "HOPE EVER."

HEREFORD:
PRINTED BY JAKEMAN AND CARVER.

ISSUED APRIL, 1911.

EDITOR'S PREFACE.

Owing to various circumstances the issue of the present Volume of Transactions has been unavoidably delayed, much to the regret of the Editorial Committee. The death of the late accomplished Editor, Dr. Cecil Moore, deprived the Club of the services of one whose long experience and extensive acquaintance with the subjects which engage the interests of its members made him a difficult man to follow, and some time elapsed before arrangements could be made to take up his work.

A great quantity of matter, manuscript and printed, had accumulated in Dr. Moore's hands, and at his death was deposited in the Woolhope Library. To sift and prepare for the press what Dr. Moore had intended for publication has been necessarily a work of time, but it is hoped that the Volume now in the hands of members will justify the delay in publication, and prove not altogether unworthy of its predecessors. Owing to the size of the present Volume several interesting papers are held over to the next Volume.

For the carefully prepared Index to the Volume the Club is indebted to Mr. Sledmere.

TRANSACTIONS FOR THE YEARS 1905, 1906, 1907.

Table of Contents.

CONTENTS (*Continued*).

1907.

ILLUSTRATIONS, DIAGRAMS, TABLES, &c.

OFFICERS FOR 1905.

President :—Mr. Philip Baylis, LL.M., F.Z.S.

Vice-Presidents :—Mr. R. Clarke.
Mr. T. Hutchinson.
Mr. C. J. Lilwall.
Rev. R. Hyett Warner.

Central Committee :—Mr. C. P. Bird.
Mr. J. Carless.
Mr. R. Clarke.
Rev. Preb. William H. Lambert.
Mr. A. Watkins.

Editorial Committee :—Rev. A. Ley.
Mr. H. Cecil Moore.
Rev. M. G. Watkins.

Honorary Treasurer :—Mr. H. C. Beddoe.

Honorary Auditor :—Mr. James Davies.

Honorary Secretaries :—Mr. Thomas Hutchinson.
Mr. H. Cecil Moore.

Assistant Secretary :—Mr. James B. Pilley.

OFFICERS FOR 1906.

President :—Rev. R. Hyett Warner.

Vice-Presidents :—Mr. Philip Baylis.
Rev. C. H. Binstead.
Mr. J. Carless
Rev. Dr. E. Harris.

Central Committee and other Officers were re-elected as in 1905.

OFFICERS FOR 1907.

President—Sir James Rankin, Bart.

Vice-Presidents—Mr. Herbert E. Jones.
Mr. R. A. Swayne.
Rev. R. Hyett Warner.
Rev. Preb. H. Trevor Williamson.

Central Committee—Mr. C. P. Bird.
Mr. J. Carless.
Mr. R. Clarke.
Rev. Preb. William H. Lambert.
Mr. A. Watkins.

Editorial Committee—Rev. A. Ley.
Mr. H. Cecil Moore.

Honorary Treasurer—Mr. H. C. Beddoe.

Honorary Auditor—Mr. James Davies.

Honorary Secretaries—Mr. Thomas Hutchinson.
Mr. H. Cecil Moore.

Assistant Secretary—Mr. James B. Pilley.

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., B.D.
1856 Wheatley, Mr. Hewitt.
1857 Lingen, Mr. Charles.
1858 Brown, G. P., M.D.
1859 Crouch, Rev. J. F., B.D.
1860 Banks, Mr. R. W.
1861 Lightbody, Mr. Robert.
1862 Hoskyns, Mr. Chandos Wren.
1863 Hoskyns, Mr. Chandos Wren.
1864 Crouch, Rev. J. F., B.D.
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, M.A.
1870 Cooper-Key, Rev. H., M.A.
1871 Cam, Mr. Thomas.
1872 Steele, Mr. Elmes Y.
1873 Davies, Rev. James, M.A.
1874 Davies, Rev. James, M.A.
1875 Robinson, Rev. C. J.
1876 Chapman, T. A., M.D.
1877 Morris, Mr. J. Griffith.
1878 Phillott, Rev. H.W., M.A.
1879 Armitage, Mr. Arthur.
1880 Knight, Mr. J. H.
1881 Ley, Rev. Augustin, M.A.
1882 Blashill, Mr. Thomas, F.R.I.B.A.
1883 Piper, Mr. George H., F.G.S.
1884 Burrough, Rev. Charles, M.A.
1885 Martin, Mr. C. G.
1886 Piper, Mr. George H., F.G.S.
1887 Elliot, Rev. William, M.A.
1888 Elliot, Rev. William, M.A.
1889 Southall, Mr. H., F.R. Met. Soc.
1890 Croft, Sir Herbert, Bart., M.A.
1891 Cornewall, Rev. Sir George H., Bart., M.A.
1892 Barneby, Mr. William Henry.
1893 Lambert, Rev. Preb. William H., M.A.
1894 Davies, Mr. James.
1895 Watkins, Rev. M. G., M.A.
1896 Moore, Mr. H. Cecil.
1897 Moore, Mr. H. Cecil.
1898 Marshall, Rev. H. B. D., M.A.
1899 Beddoe, Mr. H. C.
1900 Leigh, The Very Rev. The Hon. J. W., D.D.
1901 Blashill, Mr. Thomas, F.Z.S.
1902 Cornewall, Rev. Sir George H., Bart., M.A.
1903 Southall, Mr. H., F.R. Met. Soc
1904 Hutchinson, Mr. T.
1905 Baylis, Mr. Philip, M.A., LLM., F.Z.S.
1906 Warner, Rev. R. Hyett.
1907 Rankin, Sir James, Bart.

LIST OF MEMBERS

DECEMBER 31ST, 1907.

HONORARY MEMBERS.

Bevan, Ven. W. Latham, M.A., Archdeacon of Brecon, Brecon.

Bevan, Rev. J. O., M.A., F.G.S., F.R. Met. Soc., Chillenden Rectory, Dover.

Callaway, Mr. Charles, M.A., D.Sc., F.G.S., 16, Montpellier Villas, Cheltenham.

Cockcroft, Mr. James, Free Libary and Museum, Hereford.

Cooke, Mr. M. C., A.L.S., LL.D., 53, Castle road, Kentish Town, N.W.

Groom, Mr. Theo. T., M.A., D.Sc., F.G.S., The Poplars, South Bank Road, Hereford.

Haverfield, Mr. F., M.A., F.S.A., Christ Church, Oxford.

Howse, Mr. T., F.L.S., Glebefields, Edgeborough Road, Guildford.

Leighton, Mr. Gerald R., M.D., F.R.S.E., 17, Hartington Place, Edinburgh.

Percival, Mr. Cecil H. Sp., Henbury, near Clifton, Bristol.

Phillips, Mr. Wm., F.L.S., Canonbury, Shrewsbury.

Phillips, Mr. E. Cambridge, F.L.S., Member of the Permanent International Ornithological Committee, The Rock, Bwlch, Breconshire.

Plowright, Mr. C. B., M.D., F.R.C.S., F.L.S., King's Lynn, Norfolk.

Smith, Mr. Worthington G., F.L.S., 121, High Street, South Dunstable.

Sorby, Mr. H. C., LL.D., F.R.S., &c., Broomfield, Sheffield.

Vize, Rev. J. E., M.A., F.R.M.S., Forden Vicarage, Welshpool.

Wood. Mr. James G., M.A., LL.B., F.S.A., F.G.S., F.R.M.S., 7, New Square, Lincoln's Inn, W. C., and 115, Sutherland Avenue. London, W.

CORRESPONDING SOCIETIES.

Birmingham Archæological Society—President: Mr. J. A. Cossins. Hon. Librarian: Mr. F. B. Andrews, A.R.I.B.A. Secretary: Mr. Alfred Hayes, Midland Institute, Birmingham.

Bristol Naturalists' Society—Hon. Sec.: Mr. S. H. Reynolds, University College, Bristol.

British Association for the Advancement of Science, Burlington House, London, W.

British Mycological Society—Hon. Secretary: Mr. Carleton Rea, M.A., B.C.L., 34, Foregate Street, Worcester.

Caradoc and Severn Valley Field Club—President: Mr. W. E. Garnett-Botfield, Bishop's Castle. Hon. Secretary and Treasurer: Rev. J. A. Panter, St. George's Vicarage, Wellington, Salop. Hon. Local Secretary and Curator: Mr. H. E. Forrest, 37, Castle Street, Shrewsbury.

Cardiff Naturalists' Society—President: Dr. P. Rhys-Griffiths, M.B. Hon. Secretary: Mr. William Sheen, F.R.C.S., 2, St. Andrews' Crescent, Cardiff. Hon. Librarian: Dr. P. Rhys-Griffiths, M.B.

Clifton Antiquarian Club—President: Professor C. Lloyd Morgan, F.R.S., F.G.S., LL.D. Hon. Secretary: Mr. Alfred E. Hudd, F.S.A., 94, Pembroke Road, Clifton.

Cotteswold Naturalists' Field Club—President: Rev. Walter Butt, Kempsford Vicarage, Fairford, Gloucestershire. Hon. Secretary and Hon. Librarian: Mr. L. Richardson, F.G.S., 10, Oxford Parade, Cheltenham.

Geologists' Association, London—President: A. Smith Woodward, LL.D., F.R.S. Secretary: Mr. Percy Emary, F.G.S., 12, Alwyne Square, Canonbury, London, N.

Geological Society of London—President: J. E. Marr, D.Sc., F.G.S. Secretaries: Mr. R. S. Herries and Professor W. W. Watts, M.Sc., F.R.S. Librarian and Curator: Mr. L. L. Belinfante, M. Sc., Burlington House, London, W.

North Staffordshire Naturalists' Field Club—President: Mr. Alex. Scrivener, The Mount, Endon, Stoke-on-Trent. Hon. Secretary: Mr. W. Wells Bladen, Stone, Staffordshire.

Worcestershire Naturalists' Club—President: Mr. Carleton Rea, M.A., B.C.L., 34, Foregate Street, Worcester. Hon. Secretary: Mr. J. Hill White, F.R.H.S., 51, Broad Street, Worcester.

Yorkshire Naturalists' Union—President: Mr. G. W. Lamplugh, F.R.S., of H.M. Geological Survey. Hon. Secretary and Librarian: Mr. T. Sheppard, F.G.S., Municipal Museum, Hull.

Dudley and Midland Geological and Scientific Society and Field Club.

Malvern Naturalists' Field Club, The College, Malvern.

Marlborough College Natural History Society.

ORDINARY MEMBERS.

1907.

Abbott, Rev. D. Wigley, Summerville, Hereford Road, Monmouth.

Acton, Mr. J. Arthur, Regent Street, Wrexham.

Alston, Mr. R. S., Marclecote, Ross.

Apperley, Mr. H. W., Sandlin, Leigh Sinton, Malvern.

Armitage, Mr. C. M., Birmingham District and Counties Banking Co., Hereford.

Baker, Mr. E. J., Rosslyn, Bodenham Road, Hereford.

Ballard, Mr. Ernest, Colwall, Malvern.

Ballard, Mr. John Edy, Abbey House, Ledbury.

Bamford, Mr. R. L., Hampton Park, Hereford.

Banks, Mr. W. H., Hergest Croft, Kington.

Bannister, Rev. A. T., M.A., Ewyas Harold, Hereford

Barneby, Mr P. B., Trewyn, Abergavenny.

Barneby, Mr. W. Henry, Longworth, Hereford (*Ex-President*).

Barneby, Mr. W. Theodore, Saltmarshe Castle, Bromyard.

Bargrave-Wyborn, Mr. S., The Grange, Whitchurch, Ross.

Barratt, Mr. John Harold, Hillfield, Red Marley, near Gloucester.

Baylis, Mr. Philip, M.A., LL.M., F.Z.S., H.M.'s Deputy Surveyor, Royal Forest of Dean, Whitemead Park, Lydney, Gloucestershire (*President*).

Baylis, Mr. Wm. Mortimer, The Court, Whitney-on-Wye.

Beddoe, Mr. H. C., Castle Street, Hereford (*Ex-President. Honorary Treasurer*).

Bellerby, Mr. E., Broad Street, Hereford.

Bennett, Rev. H., The Rectory, Berwick, Sussex.

Bickham, Mr. Spencer H., F.L.S., Underdown, Ledbury.

Binstead, Rev. C. H., M.A., Whitbourne Rectory, Worcester.

Bird, Mr. C. P., Drybridge House, Hereford.

Bishop, Mr. Lewis C., Letton Rectory, Hereford.

Black, Rev. C., M.A., Colwall, Malvern.

Boulton, Mr. F. J., Summerhayes, Aylstone Hill, Hereford.

Boycott, Mr. W. J., The Grange, Broomy Hill, Hereford.

Bradney, Mr. J. A., F.S.A., Talycoed Court, Monmouth.

Brierley, Mr. George M., The Quinta, Letton, Hereford.

Brown, Mr. F. C., Churchdown, Cheltenham.

Brown, Mr. William, Whitchurch, Ross.

Bull, Mr. Ernest Henry, St. John Street, Hereford.

Bulmer, Mr. E. F., Fayre Oakes Cottage, Hereford.

Bulmer, Mr. H. P., Long Meadow, Breinton, Hereford.

Burrough, Rev. Charles, M.A., Eaton Bishop, Hereford (*Ex-President*).

Butt, Rev. W., Kempsford Vicarage, Fairford, Gloucestershire.

Caddick, Mr. Edward, Wellington Road, Edgbaston.

Caldicott, Rev. Cecil B., Rock Cottage, Kimbolton, Leominster.

Caldicott, Mr. J. U., Netherwood, Hereford.

Campbell, Lieut.-Col. J. E. R., Tillington Court, Hereford.

Campbell, Mr. A. J., Chepstow House, Ross.

Capel, Rev. Canon Bury, M.A., 7, Clifton Hill, Clifton.

Capel, Rev. A. J., M.A., The College, Hereford.

Capes, Rev. Canon W. W., The Close, Hereford.

Carless, Mr. Joseph, Aylstone Hill, Hereford.

Carver, Mr. Thomas, Meyrick House, Whitecross Road, Hereford.

Cave, Mr. E. L., Felsingham, Bromyard.

Chapman, T. A., M.D., Betula, Reigate (*Ex-President*).

Child, Mr. George, Nunnington, Hereford.

Child, Mr. Herbert H., Rudhall, Ross.

Clarke, Rev. W. S., M.A., The Thorn, Ross.

Clarke, Mr. John, Ashfield, Ross.

Clarke, Mr. Robert, 4, Portland Street, Hereford.

Clarke, Mr. W. E. H., 4, Portland Street, Hereford.

Conder, Mr. E., New Court, Colwall, Malvern.

Cook, Mr. Truman J., Rydal Mount, South Bank, Hereford.

Cooke, Mr. C. W. R., M.A., Hellens, Much Marcle, Dymock, Gloucestershire.

Corner, Mr. Arthur J., Newstead House, Hereford.

Corner, Mr. James, Holmer Park, Hereford.

Cornewall, Rev. Sir G. H., Bart., M.A., Moccas Court, Hereford (*Ex-President*).

Cotterell, Sir John Geers, Bart., Garnons, Hereford: also 10, Hertford Street, Mayfair, W.

Craft, Rev. R. H., Sutton Rectory, Hereford.

Crespi, Dr. A. J. H., M.R.C.P.I., Cooma, Wimborne.

Cresswell, Mr. G., Ocle Court, Hereford.

Cutfield, Mr. Arthur, Merton House, Ross.

Davies, Mr. James, Broomy Hill, Hereford (*Ex-President. Hon. Auditor*).

Davies, Rev. Gilbert, 25, Bruce Grove, Walford.

Davies, Mr. John E. P., Beech Grove, Titley, R.S.O.

Davis, Mr. Luther, Abergavenny.

Davis, Rev. R. A., Broxwood, Pembridge.

Deakin, Mr. S. H., Weir End, Ross.
De Winton, Rev. J. Jeffreys, The Vicarage, Hay.
Doddridge, Rev. S. S., Thornbury, Bromyard.
Doughty, Major Chester, Pembroke House, Aldeburgh-on-Sea, Suffolk.
Douse, Col. E. C., Duxmere, Ross.
Dryland, Mr. A., The Poplars, Aylstone Hill, Hereford.
Duncombe, Rev. W. D. V., M.A., The College, Hereford.
Du Buisson, Mr. Edward, Castle Street, Hereford.
Earle, Mr. P. Leighton, St. Owen Street, Hereford.
Easton, Mr. H., Corn Square, Leominster.
Elgar, Sir Edward, LL.D., Plâs Gwyn, Hereford.
Ellwood, Mr. M. J., 25, Draper's Lane, Leominster.
Evans, Mr. Robert H., Eyton Hall, Leominster.
Evill, Rev. H. M., St. Martin's Vicarage, Hereford.
Fernandez, Rev. P. H., M.A.
Fitzsimons, J. B., M.D., The Cottage, Lympstone, South Devon.
Fortey, Mr. Charles, Abbey Villa, Ludlow.
Foster, Mr. Arthur W., Brockhampton Court, Ross.
Gardner, Mr. Iltyd, Nevill Street, Abergavenny.
Gedge, Rev. E., Marden Vicarage, Hereford.
George, Mr. R. H., Croftmead, Kingsland, Leominster.
Glendinning, J., M.D., Larchfield, Abergavenny.
Gowring, Mr. E. A., Tre-Evan, Llangarren, Ross.
Grasett, Rev. J. E., Allensmore, Hereford.
Green, Rev. Preb. C. E. Maddison, M.A., Ledbury.
Green, Mr. Arthur R., L.R.C.P., The Yews, Ledbury.
Greenly, Mr. E. Howorth, M.A., Titley Court, Titley, R.S.O.
Griffiths, Mr. R. T., Trewern, Hay.
Grindley, Rev. H. E., M.A., The Palace, Hereford.
Gurney, Mr. R. G., Eastnor House, Ledbury.
Hadfield, Mr. G. H., Moraston, Ross.
Hall, Mr. H. S., Dormington Court, Hereford.
Hanson, Mr. C. O., Latimer Lodge, Cinderford.
Harington, Sir Richard, Bart., M.A., B.C.L., Whitbourne Court, Worcester.
Harington, Rev. Robert, M.A., Peterstow Rectory, Ross.
Harris, Rev. Edward, D.D., Upper Bullinghope, Hereford.
Hatton, Mr. E. J., Aylstone Hill, Hereford.
Hawkins, Mr. J. F., County Offices, Reading.
Haywood, Mr. W. M., Westfield House, Hereford.
Hereford, Mr. J. Tuder, Sufton Court, Hereford.
Hewitt, Rev. J. B., Upper Sapey Rectory, Clifton-on-Teme, Worcester.
Hinckes, Mr. Ralph P., Foxley, Hereford
Holloway, Rev. E. J., M.A., Clehonger, Hereford.
Hopton, Rev. Preb. M., M.A., Holmer Hall, Hereford.
Hopton, Major-General Sir Edward, K.C.B., Homend, Ledbury.
Horton, Rev. A. W., M.A., Dewsall, Hereford.

Hovil, Mr. F. Saunders, Grafton Lodge, Hereford.
Howell, Mr. W., M.B., Watton House, Brecon.
Hudson, Mr. A. G., South Street, Leominster.
Humfrys, Mr. W. J., Bridge Street, Hereford.
Hutchinson, Mr. T., Aylstone Hill, Hereford (*Ex-President*), *Co-Honorary Secretary*.
Ingham, His Honour Judge, R. W., Sugwas Court, Hereford.
Ireland, Rev. W., M.A., Lucton, Kingsland, R.S.O., Herefordshire.
Jackson, Mr. J. J., Hafod Road, Hereford.
James, Mr. F. R., Lifton House, Bodenham Road, Hereford.
Johnson, Mr. Arthur, Broomy Hill, Hereford.
Jones, Rev. A. G., M.A., Yarkhill, Hereford.
Jones, Mr. Herbert, 119, St. Owen Street, Hereford.
Jones, Mr. Herbert E., Ewyas Harold, Herefordshire.
Jones, Rev. John, The Chantry, Garway Hill, Hereford.
Kempson, Mr. F. R., 16, High Street, Cardiff.
King-King, Rev. E., Lower Wilcroft, Hereford.
Lambe, Mr. John, Bridge Street, Hereford.
Lambert, Rev. Preb. W. H., M.A., Stoke Edith Rectory, Hereford (*Ex-President*).
Lamont, Mr. A. H., 9, Castle Street, Hereford.
Lea, His Honour Judge Harris, Broadlands, Hereford.
Le Brocq, Mr. W. P. J., B.A., F.L.S., Brecon.
Ledger, Rev. C. G., Tupsley Vicarage, Hereford.
Leigh, The Very Rev. the Hon. J.W., D.D., The Deanery, Hereford (*Ex-President*).
Levason, Mr. Peyton, Wallington House, Ross Road, Hereford.
Ley, Rev. A., M.A., Sellack Vicarage, Ross (*Ex-President*).
Lighton, Rev. Claud, B.A., Mordiford Rectory, Hereford.
Lilley, Mr. Charles E., Bodenham Road, Hereford.
Lilley, H., M.D., 34, Castle Street, Hereford.
Lilwall, Mr. Charles James, Llydyadyway, Cusop, Hay, R.S.O.
Littledale, Mr. F., St. Laurence, Clehonger, Hereford.
Littledale, Mr. T. A. R., Wilton Dale, Ross
Lloyd, Mr. W. G., Bodenham Road, Hereford.
Lubienski-Bodenham, Count Louis, Manor House, Lower Bullingham, Hereford.
Marshall, Rev. H. B. D., M.A., Norton Canon, Weobley, R.S.O. (*Ex-President*).
Marshall, Rev. W., Sarnesfield Vicarage, Weobley, R.S.O.
Marshall, Mr. George, The Batch, Weobley.
Marshall, Mr. H. J., Gayton Hall, Ross.
McLaughlin, Rev. A. H., Much Birch, Hereford.
Merrick, Mr. F. H., Goodrich House, Hereford.
Money-Kyrle, Rev. R. T. A., Kentish Town Vicarage, London, N.W.
Money-Kyrle, Rev. C. A., Much Marcle, Dymock.
Moody, Mr. C. E., Breinton, Hereford.
Moore, Mr. Charles E. A., Fairlawn, Leominster.
Moore, Mr. H. Cecil, 26, Broad Street, Hereford (*Ex-President*), *Co-Honorary Secretary*.
Morgan, Captain T. L., The Pool, Hereford.

Morgan, Mr. T. D., Vaga Villas, Hereford.
Morgan, Rev. W. E. T., Llanigon, Hay, R.S.O.
Morris, Mr. Edgar F., St. Owen Street, Hereford.
Morris, Mr. T. W., Woraston Lodge, Coleford.
Morrison, Mr. C. S., Firbank, Burghill, Hereford.
Neild, Mr. Theodore, The Vista, Leominster.
Oldham, Capt. C. Dansey, Bellamour Lodge, Colton, Staffordshire.
Onslow, Rev. M. R. S., Stoke Edith Rectory, Hereford.
O'Neill, Rev. K., Mansel Lacy, Hereford.
Parker, Mr. Alfred, Kington.
Parker, Mr. H. J., 6, St. John Street, Hereford.
Parker, Mr. John, Nelson Street, Hereford.
Paris, Mr. T. C., Hampton Lodge, Hereford.
Parry, Mr. J. H., Harewood Park, Ross.
Phillott, Mr. G. H., Plas Trevor, Charlton Kings, Cheltenham.
Phillpots, Mr. G. H., Bredon, Tewkesbury.
Pilley, Mr. James B., 2, High Town, Hereford (*Assistant Secretary*).
Pilley, Mr. Walter, Barton Villas, Hereford.
Phelps, Rev. H. H., Withington, Hereford.
Pope, Rev. A., Upton Bishop Vicarage, Ross.
Popert, Mr. E. P., Braceland, Coleford.
Powell, Mr. Scudamore, M.D., Cagedale, Clehonger, Hereford.
Prescott, Mr. Charles Warre, M.A., King's Pyon House, Weobley, R.S.O.
Pulley, Colonel Charles, commanding 2nd Ghoorkas.
Pumphrey, Mr. Henry H., Highwell, Bromyard.
Purchas, Mr. H. M., Broad Street, Ross.
Purser, Col. T. H., Bird's Eye, Bromyard.
Ragg, Rev. W. H. Murray, M.A., Cathedral School, Hereford.
Rankin, Sir James, Bart., M.P., M.A., Bryngwyn, Hereford, and 35, Ennismore Gardens, Princes Gate, London, S.W. (*Ex-President*).
Riley, Mr. John, M.A., Putley Court, Ledbury.
Robinson, Mr. Stephen, Lynhales, Kington.
Robinson, Mr. W. W., King Street, Hereford.
Rootes, Mr. Charles, St. Owen Street, Hereford.
Scobie, Mr. M. J. G., Armadale, Hereford.
Scudamore, Colonel E. S. Lucas, The Cap House, Pontrilas.
Shepherd, Rev. W. R., Preston-on-Wye, Hereford.
Simpson, Mr. Albert, Burghill Grange, Hereford.
Sinclair, Mr. G. Robertson, Mus. Doc., The Close, Hereford.
Small, Mr. A. P., St. Mary Street, Ross.
Southall, Mr. Henry, F.R.Met.Soc., The Graig, Ashfield, Ross (*Ex-President*).
Stanhope, The Ven. the Hon. B. L. S., M.A., Byford, Archdeacon of Hereford.
Stephens, Mr. Edwin, Carlton Villa, Whitecross, Hereford.
Stephens, Mr. J. W., Womaston, Kington.
Steward, Mr. Walter H., Pontrilas, R.S.O., Herefordshire.
Stoker, Rev. C. H., Brinsop Vicarage, Hereford.

Stooke, Mr. Edwin, Aylstone Hill, Hereford.
Stooke, Mr. J. E. H., 2, Palace Yard, Hereford.
Stooke-Vaughan, Rev. F. S., M.A., Wellington Heath, Ledbury.
Stuart, Capt. R. Kilbee, Evendine, Colwall, Malvern.
Sugden, Mr. J. P., The Cottage, Ledbury.
Swayne, Mr. Robert A., Tarrington House, Hereford.
Symonds, Mr. J. F., Broomy Hill, Hereford.
Symonds, Mr. J. Reginald, 15, Bridge Street, Hereford.
Symonds-Tayler, Captain, Beechwood, Hereford.
Thomas, Lieut.-Colonel Evan, Over Ross, Ross.
Trafford, Mr. Guy R., Hill Court, Ross.
Treherne, Rev. C. A., M.A., All Saints' Vicarage, Hereford.
Turner, Mr. Thomas, F.R.C.S., St. Owen Street, Hereford.
Wadworth, Mr. H. A., F.R.G.S., Breinton Court, Hereford.
Walker, Mr. Philip, F.G.S., Belmont, Hereford, and 36, Princes Gardens, S.W.
Wallis, Mr. E. L., Hampton Park, Hereford.
Walpole, Rev. A. H. S., Dyndor Rectory, Hereford.
Warner, Rev. R., Hyett, M.A., Almeley, Eardisley, R.S.O.
Watkins, Mr. Alfred, Hampton Park, Hereford.
Weare, Mr. Edwin, Hampton Bishop, Hereford.
Weyman, Mr. Arthur W., Broad Street, Ludlow.
Wheeler, Mr. G. W., Shrub Hill Villas, Tupsley, Hereford.
Wilmot, Rev. F. E. W., Monnington-on-Wye, Hereford.
Williamson, Rev. Preb. H. Trevor, M.A., Bredwardine, Hereford.
Winnington-Ingram, Rev. Preb. E. H., M.A., Ross.
Wood, Mr. J. H., M.B., Tarrington, Hereford.
Woodhouse, Mr. Howorth, Kilpeck, Hereford.
Woodward, Mr. Ernest T., Daffaluke, Ross.

Members Elected in 1905.

Alston, Mr. R. S., Marclecote, Ross.
Bargrave-Wyborn, Dr. S., The Grange, Whitchurch, Ross.
Barneby, Mr. P. B., Trewyn, Abergavenny.
Brown, Mr. F. C., Churchdown, Cheltenham.
Bulmer, Mr. H. P., Longmeadow, Breinton, Hereford.
Butt, Rev. Walter, Kempsford Vicarage, Fairford, Gloucestershire.
Capes, Rev. Canon W. W., The Close, Hereford.
Clarke, Mr. W. E. H., 4, Portland Street, Hereford.
Cockcroft, Mr. E. F., Tyglyn, Hay, Hereford.
Douse, Col. E. Cecil, Firs Cottage, Duxmere, Ross.
Drayton, Mr. T. D. Grimpi, Clifford Manor, Newent.
Earle, Mr. P. Leighton, St. Owen Street, Hereford.
Elgar, Sir Edward, LL.D., Plas Gwyn, Hereford.
George, Mr. R. H., Croftmead, Kingsland, Leominster.
Griffiths, Mr. R. T., Trewern, Hay, Breconshire.

Gurney, Mr. R. G., Eastnor House, Ledbury.
Hanson, Mr. C. O., Latimer Lodge, Cinderford.
Jones, Rev. John, The Chantry, Garway Hill, Hereford.
Littledale, Mr. F., St. Laurence, Clehonger, Hereford.
Stoker, Rev. C. H., Brinsop Vicarage, Hereford.
Walpole, Rev. A. H. S., Dyndor Rectory, Hereford.
Weedon, Rev. E. St. C., Canon Frome Vicarage, Ledbury.
Whitehouse, Rev. George, St. Weonard's, Hereford.

Members Elected in 1906.

Bishop, Mr. Lewis C., Letton Rectory, Hereford.
Child, Mr. Herbert H., Rudhall, Ross.
Davis, Rev. R. A., Broxwood, Pembridge.
Doddridge, Rev. Sidney S., Thornbury, Bromyard.
Littledale, Mr. T. A. R., Wiltondale, Ross.
Marshall, Rev. W., Sarnesfield, Weobley.
Onslow, Rev. M. R. S., Stoke Edith Rectory, Hereford.
Phelps, Rev. H. H., Withington, Hereford.
Stuart, Capt. R. Kilbee, Evendale, Colwall, Ledbury.

Members Elected in 1907.

Campbell, Rev. J. M., Eardisley Rectory, Hereford.
Durham, Mr. H. E., F.R.C.S., Clovelly, Tower Road, Hereford.
Dury, Mr. W. Francis, Wolferlow, Bodenham Road, Hereford.
Farn, Mr. A. B., Breinton Lodge, Hereford.
Hewitt, Capt. J. G., Dilkhush, Colwall, Ledbury.
Jack, Mr. G. H., Red House, Bodenham Road, Hereford.
Marshall, Rev. H. S., Winforton Rectory, Hereford.
Symonds, Dr. G. H. H., Drybridge House, Hereford.
Watkins, Rev. S. Cornish, Staunton-on-Arrow, Hereford.
Wootton, Mr. John, Byford, Hereford.

Obituary.

1905.

Blashill, Mr. Thomas. Llanwarne, Mr. Thomas.
Brierley, Mr. J. C. Marshall, Dr. G. W.
Powell, Rev. T. Prosser.

1906.

Davies, Mr. John E. P. Lloyd, Mr. James W.
Probert, Mr. John.

1907.

Baylis, Mr. Philip. Burrough, Rev. Charles.
Stephens, Mr. Edwin.

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 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 to 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 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 any Member, whose Annual Subscription is twelve months in arrear, shall not be entitled to any of the rights and privileges of membership, and that any Member whose Annual Subscription is *two* years in arrear, may be removed from the Club by the Central Committee.

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.

THE WOOLHOPE CLUB.

The Account of HENRY CHILD BEDDOE, Hon. Treasurer, for the Year ended 31st December, 1904.

1904.		£	s.	d.
To	Balance in hand brought forward from last Account	88	3	10
,,	Entrance Fees received	7	0	0
,,	Subscriptions for 1904	101	0	0
,,	Arrears of Subscriptions received for 1903	1	10	0
,,	Excess of Subscriptions, 6d.	0	0	6
		£197	14	4

1904.		£	s.	d.
	By Subscriptions to Congress		1	0
Feb. 11.	—By paid Jakeman & Carver, for Printing ..		1	19
		£	s.	d.
Apr. 26.	—By paid Hon. Sec. for Annual Payments	4	19	1
	By paid Editorial Expenses	3	5	5
,, ,,	,, for Volumes 1852, 1866	0	17	9
,, ,,	Incidentals connected with Field Meetings ..	2	15	9
,, ,,	Correspondence, Telegrams, &c. ..	1	2	0
		13	0	6
,,	Warner for Photographic Prints ..	5	0	0
		3	4	3
		8	4	3
,,	J. B. Pilley, Assistant Secretary, one year's salary	10	0	0
,,	Ditto, for sundry expenses and postages	5	5	6
,,	Jakeman & Carver, for printing Reports, &c.	17	3	0
,,	Joseph Jones, for Stationery ..	1	11	8
		58	2	11
,,	In hands of Assistant Secretary ..	0	10	0
,,	Balance in hands of Treasurer ..	139	1	5
		£197	14	4

Bank Pass Book, 31st December, balance .. 140 1 5
Less—Two Subscriptions for 1905 .. 1 0 0
£139 1 5

Examined and found correct, 22nd April, 1905.

JAMES DAVIES, HONORARY AUDITOR.

The Woolhope Club.

The Account of HENRY CHILD BEDDOE, Hon. Treasurer, for the Year ended 31st December, 1905.

RECEIPTS.	£	s.	d.
1905.			
To Balance in hand brought forward from last Account	139	1	5
,, Entrance Fees received	10	10	0
,, Subscriptions for 1905	113	10	0
,, Arrears of Subscriptions received for 1905 ..	13	10	0
,, Excess of Subscriptions from Dr. Harris, Dr. Glendenning and E. Stooke..	0	1	6
	£276	12	11

EXPENDITURE.	£	s.	d.
1905.			
May 2.—By paid Jakeman & Carver, for Printing ..	4	12	6
,, ,, Hon. Sec. for Annual Payments ..	3	9	6
,, ,, Ditto for incidentals connected with Field Meetings	2	2	6
,, ,, Ditto, Editorial Expenses ..	2	12	0
,, ,, Ditto—Correspondence, Postages, &c.	1	16	0
Nov. 30.— ,, ,, Jakeman & Carver, for Printing *Transactions*, &c.	186	18	0
Dec. 14.— ,, ,, James B. Pilley, Assistant Secretary, one year's salary	10	0	0
,, 30.— ,, ,, Ditto—Sundry Expenses, Postages, &c.	6	18	0
	218	8	6
,, Balance in hands of Assistant Secretary .. 0 10 0			
,, ,, ,, Treasurer 57 14 5	58	4	5
	£276	12	11
Balance as per Bank Book 58 4 5			
Less—Subs. for 1906, per Capt. Symonds-Tayler 0 10 0			
	£57	14	5

Examined and found correct, 26th April, 1906.

JAMES DAVIES, Honorary Auditor.

The Woolhope Club.

The Account of HENRY CHILD BEDDOE, Hon. Treasurer, for the Year ending 31st December, 1906.

RECEIPTS.	£	s.	d.
1906.			
To Balance in hand, brought over from last Account ..	58	4	5
,, Entrance Fees Received	3	0	0
,, Subscriptions for 1906	104	10	0
,, Arrears of Subscriptions received for 1906 ..	6	0	0
,, Excess of Subscriptions from Dr. Harris and Mr. E. Stooke	0	1	0
,, Volumes of Transactions sold	3	15	0
	£175	10	5

EXPENDITURE.	£	s.	d.
1906.			
Jan. 6.—By paid Joseph Jones for Stationery ..	1	10	6
May 22. ,, ,, Hon. Sec. on Account, for Out of pocket Expenses	5	0	0
Dec. 15. ,, ,, Cheque Book	0	2	0
,, 17. ,, ,, James B. Pilley, Assistant Secretary, one year's salary ..	10	0	0
,, 17. ,, ,, Joseph Jones, for Stationery ..	1	15	8
,, 17. ,, ,, Hon. Sec., for Incidental Expenses, postages, &c., &c.	9	19	8
,, 31. ,, ,, Assist. Sec., for Incidental Expenses, Postages, &c., &c. ..	6	1	0
,, Balance in hands of Hon. Treasurer ..	141	1	7
	£175	10	5
To Balance as per Bank Book .. 141 11 7			
Less—Subscriptions for 1907, per Capt. Symonds Tayler .. 0 10 0			
	£141	1	7

Audited and found correct, April 2nd, 1907

JAMES DAVIES, Honorary Auditor.

IN MEMORIAM.

MRS. EMMA SARAH HUTCHINSON, AN ARDENT NATURALIST.

[By J. H. Wood.]

On December 10th, 1905, passed away Mrs. Hutchinson, of Grantsfield, an interesting personality, and one whose name will always be associated with the entomology of Herefordshire and with the work and records of the Woolhope Club.

Born at Llyswen Vicarage, Breconshire, on March 7th, 1820, she had at the time of her death reached the great age of 85 years. Her father was Commander Thos. Gill, a distinguished officer under Nelson and Collingwood. Originally in the Merchant Service, he had suffered shipwreck on the coast of Anglesea, and was on his way through London to take ship to the Isle of Wight—where his father was Vicar of Newchurch—when he was seized on London Bridge by the press-gang. However, family influence enabled him at once to obtain a commission. Twice afterwards he suffered shipwreck, once when the "Colossus" was lost off the Scilly Isles, and again when the "Anson" went down at the Lizard, on which occasion he was the only officer saved. Having removed with her family from Breconshire, Emma Sarah Gill, as she then was, finally came to Kimbolton in 1832; here, in 1847, she was married to the Rev. Thos. Hutchinson, the vicar of the parish, who continued to hold the living till his death in the summer of 1903, at the advanced age of 88, and after an incumbency of 62 years, having been able to take a service every Sunday up to within a few weeks of his decease. At one time he had been an ardent botanist, and the pages of the "Flora of Herefordshire" bear testimony to his zeal and industry in the early days of our Club, of which he was for many years a member. In the absence of a Vicarage house, the Vicar lived at Grantsfield. Here Mrs. Hutchinson spent the rest of her long life, here, too, her children (three sons and four daughters) were born, all, like their parents, devoted to natural history.

Botany, as in the case of her husband, was at first Mrs. Hutchinson's favourite pursuit, and to the last her garden remained a source of unfailing delight; whilst it was not till the year 1853 that her attention was turned to entomology, the occasion being the

capture of an *Ourapteryx sambucata*, a large and handsome moth, by her eldest son, then a boy of 5. Her home, situated on high ground overlooking Leominster and the broad valley of the Lugg, was an ideal spot for a lepidopterist, while scarcely more than a stone's throw from the garden was the famous orchard dingle with its tall old-fashioned hedgerows, where so many of her great captures were made, as the pugs *consignata* and *irriguata* (taken by searching the trunks and larger boughs of apple and oak), *Cerostoma asperella*, and *Peroneæ umbrana*. Other notable captures at Grantsfield or its neighbourhood (to mention only a few) were *Deiephilæ galii* in the garden, *Camptogramma fluviata*, *Sterrha sacraria* indoors, *Agrotis cinerea* and *obelisca*, both at light, and *Plusea bractea*, knocked down by her husband's botanical trowel in 1855; the four last still remain records for the county. Then at one time the garden used to be visited almost yearly by that grand insect *Spinx convolvuli*, and in the hot season of 1868 no less than 27 were netted, as recorded in "Herefordshire Lepidoptera."

Altogether the most remarkable discovery was undoubtedly that of the *Cerostoma*, mentioned above. This lovely little moth owed its inclusion in the British Fauna to six specimens taken by the elder Dale at Glanvilles Wootton, in 1831. From that time it was not again seen anywhere in this country until its capture in the orchard dingle at Grantsfield, in 1865. This first specimen was beaten by Mrs. Hutchinson herself out of a maple on October 5th. Others were met with in subsequent years, so that between 1865 and 1886 no less than 18 were obtained. Of these three were Spring captures, the dates being April 4th, 1867, April 14th, 1868, and May 5th, 1886. The rest were taken in the Autumn, the great catch being made in 1881. In that year the younger Dale (C.W.), with the instinct of a born naturalist, wrote and asked to be allowed to come down and look for the moth, as he felt sure it would be a good year for it. With her usual generosity leave was granted. He came, and between August 30th and September 1st took three. After he had left, ten more fell to the share of Mrs. Hutchinson and her children, between September 7th and 27th. The method adopted was to tap the boughs of the apple trees, when the moth would fly out in zigzag fashion to the ground and bury itself in the herbage, if the net failed to intercept it. It is not, however, as a collecter that Mrs. Hutchinson will be chiefly remembered, but rather by the valuable biological work she did in connection with the rearing and breeding of her pets, which brought her into constant communication with the leading lepidopterists of her day—Doubleday, Newman, Stainton, Hellins, Buckler, &c. With two insects especially her name will always be associated, namely, *Grapta C-album* and *Enpithecia consignata*. By the extensive breeding of the former

she did more than anyone else to elucidate its two-seasonal forms, the summer form being named *Hutchinsonii*, in her honour.

More remarkable still is the story of *consignata*. A female was taken in 1874, which laid some eggs, a brood was reared, and from the start then made the breed has been kept up without a break to the present time, and without any introduction of fresh blood, except once in 1888, when it is possible, though by no means certain, that a cross was effected with a male bred from a wild larva which the writer had sent Mrs. Hutchinson the previous summer. Thus the race has already seen over 30 generations. Yet its fertility remains undiminished; no failure is apparent in the size of the moths or in the beauty of their colouring, neither is any tendency shown to malformations. The only effect seems to be that the insect has become more domesticated; that is, it has grown sluggish, does not resent handling, and can be taken up on the finger and moved to another position without attempting to fly. The extensive distribution at the present day of both these insects in British collections is due entirely to the skill and generosity of Mrs. Hutchinson.

The Grantsfield rearing, for the most part, was all done indoors. The apparatus used was somewhat complex and peculiar, but it kept the larvæ in thorough health, and at the same time allowed their habits to be observed without disturbing them. So proverbial was the success achieved, that the eggs or young larvæ of rare species were frequently entrusted to her care.

The Grantsfield collection is a general one, very rich in many of the families, and abounding in long and beautiful series of bred species. The writer, however, has more than once heard Mrs. Hutchinson's regret that she had never kept her Herefordshire insects separate. Still her memory was so good that she always knew them again and took a pride in pointing them out. To look through the collection under her guidance was always an enjoyment. Her knowledge was so wide and accurate, that some information, new and interesting, was sure to be gathered, whilst a special charm was added by the little bursts of exultation as she pointed to some triumph of the breeding cage or the field, tempered always by a fine old-fashioned courtesy which was peculiarly her own.

The study of natural history remained a passion to the end, and must in some measure have tended to mitigate the deep anxieties and distress, which the long and painful illnesses in her family brought upon her in later years. Of her seven children, only three survive (two sons and a daughter). Her eldest son, Mr. Thomas

Hutchinson (Coroner for Herefordshire), is one of our excellent hon. secretaries, and has contributed many important papers on a variety of subjects to our Transactions. John Monkhouse, the youngest son, has lived for many years in Natal. Following in the steps of his mother, he has solved, by rearing from the egg, many interesting problems connected with the seasonal forms of South African butterflies, proving that what were considered at one time to be distinct species are only the summer and winter forms of the same insect. His large collection, comprising about 100 cases, has recently been presented to the Maritzburgh Museum.

Woolhope Naturalists' Field Club.

AN OUTLINE

OF THE

GEOLOGY OF HEREFORDSHIRE.

By L. RICHARDSON, F.G.S.,

Honorary Secretary of the Cotteswold Naturalists' Field Club, and Honorary Secretary of the Cheltenham Natural Science Society.

[Plates - - I.—VI.]

CONTENTS.

I.—PREFACE.

The Geology of Herefordshire remains to be written. The illuminating rays of modern methods of research have as yet been brought to bear on the rocks of only small portions of the county first studied in detail by the "Silurian Chief" himself—Sir Roderick Impey Murchison.

In the present essay an attempt has been made to summarize what is known concerning the rocks of Herefordshire. A number of papers and books have been consulted, but it is very probable that some have been inadvertently overlooked. Its compilation, however, has shown the writer that much remains to be done in the land of the Old Red Sandstone before we can be said to possess anything like an adequate knowledge of its geology.

The Pre-Cambrian rocks have received much attention, probably sufficient, certainly for the present. The same may be said of those Cambrian Beds that are present. The Silurian rocks of the Ludlow district have recently been very thoroughly investigated, but of those of the Malvern, Woolhope, May-Hill, Shucknall, and Hagley districts, little up-to-date information is available. The rocks of these parts require searching for graptolites, and local workers can do much in this direction. With regard to the Old Red Sandstone, it is perfectly true that many fish and crustacean remains have been obtained therefrom; but more systematic work is necessary. Palæontological evidence as yet obtained points to the recognition of two great divisions of the Old Red of the county, as is usually the case elsewhere. What one requires to know is whether there is a continuous passage from the Lower Division into the Upper, or whether—as in Scotland—there is a great break between the two. In Herefordshire there is only a small area where Carboniferous rocks occur. Dr. A. Vaughan, whose zonal work on these beds is epoch-making in the annals of Palæozoic Geology, has briefly inspected the principal sections, and has shown that the faunal succession is the same as in the neighbourhood of Bristol, but that the lithic structure of the rocks differs somewhat. Local geologists might fill in the details as far as Herefordshire is concerned. The tracts in the county where "solid" Neozoic rocks occur are so small that little good would probably come of their re-examination; but of the "superficial" rocks the opposite must be said. Here there is virgin ground, but judging from the Rev. H. E. Grindley's recent work it is probable that it will not remain so for long. River-development is another subject well worthy of attention, and is certainly not the least interesting.

Plate 1A. To face page 3.

II.—INTRODUCTION.

Herefordshire is 40 miles in length, and 35 in breadth. Of its surface-extent of 833 square miles about four-fifths has for its rock-floor the Old Red Sandstone. Obviously then this is the rock-formation of the county *par excellence*. In Mr. W. J. Harrison's "Geology of the Counties of England and Wales" (page 114) will be found the statement that the Old Red occupies nine-tenths of the surface-extent. That was when certain "Passage-Beds," now grouped with the Silurian System, were classed with the Old Red Sandstone.

The fact that the various rocks which form the crust of the globe are not thrown together without order, but are arranged in a regular series of beds lying one upon another, was first discovered in the region between the Hartz and Thuringerwald. The famous Werner developed the idea, and made four main divisions of the rocks of the globe, namely, the Primitive, Transition, Stratified, and Alluvial rocks. These terms were moulded and extended in France and England according to the geological requirements. In France a "terrain tertiare" was added; in England it was soon discovered that certain of the sedimentary rocks were very different from any in Saxony and Thuringia. For these the terms "Chalk" and "Oolite" were suggested. But while the knowledge of the Secondary rocks made rapid progress both in this country and on the Continent, mainly because William Smith by a study of these rocks had been able to demonstrate that beds could be identified by their organic remains whatever their lithic structure, there was not the same advance made in the knowledge of the deposits between the Primitive rocks and the Lias. In this country, until about the year 1830, these intervening beds comprised in descending order only the divisions, Red Sandstone, Coal, and Grauwacke.

In 1831 Murchison commenced his investigation of the rocks of the Border Counties of England and Wales, the matured results of which—dealt with, with characteristic comprehensiveness—found expression in that monumental work entitled, "The Silurian System."

"The order of succession seen in the ridges on the left bank of the Wye between Hay, in Herefordshire, and Builth, in Radnorshire," led Sir Roderick to suspect that he had "met with a district containing a good part of the evidence required to lead to a systematic study of our older formations." This surmise he found to be correct when he extended his observations into the Ludlow district where he found the beds "much expanded."

In Germany the Cambrian and Silurian rocks are very poorly represented, and in France matters are not much better. In England and Wales, however, they are well developed, and since it was here that the subdivisions of the Palæozoic Group were first worked out, the British names have been adopted. Murchison commenced his work near Hay, in Herefordshire, and prosecuted it throughout this and the adjacent counties.

In the same year that Murchison commenced these researches, which were destined to be epoch-making in the annals of geology, Adam Sedgwick began his no less important work in unravelling the succession of the oldest fossiliferous rocks of North Wales. Sir Roderick Murchison proposed the term "Silurian" in 1835, a few months earlier than Sedgwick proposed his term "Cambrian." Not for several years later was it discovered that the lower portion of Murchison's Silurian System included beds which properly belonged to the upper portion of Sedgwick's Cambrian. Much confusion followed, but because Murchison became Director-General of the Geological Survey his classification was adopted. Both geologists, however, had included too great a series of deposits in their respective systems. Each had a right to name one system, but in 1879 Prof. Charles Lapworth demonstrated that the fossils showed that an intermediate formation could be recognized, and for this he proposed the now generally accepted name of "Ordovician."[1]

The Protozoic division of the Palæozoic Group therefore now embraces three systems—the Cambrian, Ordovician, and Silurian.

Although the term "Old Red Sandstone" was used by Conybeare in 1822, until 1838 these rocks were included in the Carboniferous System. But in that year Sir Charles Lyell separated them therefrom.[2] Murchison claimed for the Old Red Sandstone the rank of a "system,"[3] and retained Conybeare's name for it as it distinguished the rocks composing that system from the "New Red" group which comes above the Carboniferous System.

Murchison divided the "New Red" into two systems, applying the name "Permian" to the lower, and restricting the designation "New Red" to the upper. Thus the Deuterozoic division of the Palæozoic Group is also divisible into three systems—the Devonian (Old Red Sandstone), Carboniferous, and Permian.

The Old Red Sandstone of Herefordshire occupies in plan a /|-shaped syncline, the limbs of which converge to the north in Shropshire, and diverge to the south—the south-western one trending through the north-western portion of Herefordshire, and obliquely through Brecknockshire, Carmarthenshire, and Pembrokeshire; the eastern one southwards through the eastern portion of Herefordshire, part of Gloucestershire, and Monmouthshire. This /|-shaped tract has also a southerly tilt, and therefore as the rocks are followed in that direction successively younger strata should be encountered. Newer strata, however, do not extend uninterruptedly from east to west across the broad end of the syncline, because there has been another puckering of the earth's crust at Usk, dividing the /|-shaped synclinal area at its southern end into two synclines. The top of the intervening fold has been removed by denudation and the rocks below the Old Red, the Silurian, have been revealed. In the syncline on the west lies the great South Wales Coalfield, under which the higher beds of the Old Red Sandstone (whose truncated strata form the escarpment of the Black Mountains and Brecknock Beacons) dip; while in that on the east is situated the smaller, but no less perfect, Forest of Dean Coalfield. The Carboniferous rocks forming the northern fringe of the latter basin come just within the county boundary and take part in the formation of the picturesque cliffs in a portion of the Wye Valley.

1 Geol. Mag., 1879, p. 14.
2 "Elements of Geology" (1838), p. 452.
3 "Silurian System" (1839), p. 169.

In the South-Malvern district, on the east side of the Herefordshire syncline, there rise up first the Silurian and then the Cambrian Beds, while the Archæan mass of the Malvern Hills forms the natural eastern limit of the county. Westwards stretches the expanse of Old Red Sandstone, from beneath which in the district between Ludlow and Huntington appear the Silurian rocks. Cambrian Shales are visible at Pedwardine, near Brampton Bryan, on the north-west confines of the county, and rocks identified with the Longmyndian at Old Radnor.

Although the general structure of the county is that of a synclinal of Old Red with rocks of greater antiquity appearing on the east and north-west from beneath, the perfection of this great syncline is marred in four distinct areas, namely, at Hagley Park, Shucknall Hill, Woolhope, and around Aston Ingham (a portion of the May-Hill area), by rocks older than the Old Red Sandstone protruding through. These inliers, together with the domical disposition of the Silurian Beds in the neighbourhood of Wigmore, and the occurrence of outliers of Old Red farther to the north-west, all point to there having occurred at some time subsequent to the formation of the Sandstone crust-pressures which effected a flexuring of the rocks. Prof. T. T. Groom has satisfactorily shown that the main folding most probably took place in that comparatively short period which elapsed between the time of formation of the "older" and Upper Coal-Measures. In many coal-mining centres of Great Britain, and more particularly on the Continent, there is unmis-

takable evidence that movements resulting in the production of mountain-chains, collectively called the Hercynian System, did take place. In Herefordshire and the adjacent counties Prof. Groom has observed that the axes of the folds may be grouped in two sets according as to whether their alignment is (1) north and south (Malvernian) or north-west and south-east (Woolhope or Charnian), or (2) at right angles to these. In the case of the folds of both sets the crust-pressures were sufficiently severe to cause either overfold, or to render the dip of the limb of the fold farthest from the direction from which the force acted the greater. Prof. Groom sees no reason to believe that the two sets of foldings were caused at different times. Where an axis belonging to one set was crossed by the corresponding axis of the other the stress found relief in causing the rocks to assume a domical disposition. Mr. T. Mellard Reade, speaking of the Woolhope dome, recognized in it the expression of peripheral stress. This peripheral stress was caused by crust-pressures, acting from southerly and easterly directions. From the time of this flexuring until the deposits of clay, sand, and gravel, were strewn over a much sculptured surface late in the Neogene Period, there elapsed a vast interval of time, during which the Permian, Triassic, Jurassic, Cretaceous, and Palæogene Systems were formed. In Herefordshire only some very small patches of certain Permian and Triassic deposits are left on its eastern border, and so, precisely what took place in this county during that long period will never be known.

The scenery of any tract is the result principally of the differential action of denudation. It is easy to see that the more diverse the stratal composition the more varied will be the scenery. If a district were composed of one kind of rock its scenery would be tame in the extreme. Therefore, that period in the geological history of a district during which crust-pressures effected a flexuring and dislocating of its component strata is of prime interest to the student of physical geography. As we have remarked, the main crumpling of the rocks of Herefordshire took place between the times of formation of the "older" and Upper Coal-Measures. It is almost needless to add that closely connected with the distribution of the rocks is the distribution of the flora.[4]

The River Wye, the history of which is more interesting than that of most British rivers, has contributed much to the present configuration of the county. Directed in the first place by the lie of the rocks, it became almost independent thereof by its continual growth, although it lost as well as gained tributaries. By the net-

4 Edwin Lees, Trans. Woolhope Nat. F.C., Vol. for 1853, pp. 57-62, and Trans. Malvern Nat. F.C., 1853-1870 (1870), pt. 1., pp. 15-26.

work of streams thus evolved has been developed that undulating expanse which is the glory of Herefordshire scenery.

Upon the moulded and sculptured surface the Superficial Deposits, consisting of sand, gravel, and clay, have been accumulated in patches of varying thickness and extent. During the later phases of the development of the Wye System these deposits have been somewhat redistributed in places or cut through by the streams and rivers. Bordering these are the latest deposits of the present rivers in the form of mud, known as Alluvium, and gravel; the level stretches which they make furnishing some of the richest meadow-land in the county.

Such in brief are some of the geologic and resulting scenic aspects of Herefordshire history.

III.—THE PRE-CAMBRIAN ROCKS.

(i.) General Remarks.—The oldest rocks in Herefordshire belong to the Pre-Cambrian Group and are amongst the oldest known. They take part in the formation of that grand and sharply-sculptured serrated ridge known as the Malvern Hills. Chase-End Hill is in Gloucestershire, but thence northwards to a short distance beyond the Wyche cutting the embanked ditch, said to have been made by the "Red Earl" of Gloucester to prevent his deer from wandering from the Malvern Chase into the Bishop of Hereford's domain on the western side, almost equally divides the hill-mass between the counties of Worcester and Hereford. The Herefordshire county-boundary leaves the hills a little over a quarter-of-a-mile to the north of the Wyche, and, speaking approximately, runs west, north, and then east again as far as the axis of the range, so that it takes in a small area of Pre-Cambrian rocks before turning northwards.

The Pre-Cambrian rocks of Britain comprise crystalline, volcanic, and sedimentary rocks, which belong respectively to the Malvernian, Uriconian, and Longmyndian Systems. It seems improbable that the Archæan rocks of the Malvern Hills formed part of the original crust. Their mineralogical characters, so far as can be judged, indicate that they must have consolidated and crystallized under the pressure of a covering of rock of considerable thickness. Of this original covering nothing is definitely known at present, but at a certain locality in Norway there are some unaltered sedimentary rocks, pierced by tongues of Archæan, which it has been hinted may have formed part of it.

Long before the Longmyndian Beds were accumulated the Archæan plutonic rocks had been changed into gneisses and schists by mechanical stresses of inconceivable intensity set up by crust-pressure. The Archæan gneisses and schists of the Malvern Hills, which form a group known in this and contiguous areas as the Malvernian, present innumerable varieties as regards their lithic structure. Dr. C. Callaway, however is of opinion that all these were formed from a granite, two or three varieties of diorite, a felsite, and rarely a dolerite.[5] These rocks were intruded into each other in veins, dykes, and masses, forming a complex of igneous rocks. The dark-green diorite of medium-grain Dr. Callaway regards as probably the oldest in the district. Into it is often intruded a coarser or granitoid diorite, and into these again, in veins and dykes, a granite composed of quartz and flesh-coloured potash-felspar. Sometimes the injection-veins are so thin that a gneissic rock is produced, which, on account of its origin, is called an "injection-gneiss." The granite, however, not infrequently occurs in conspicuous masses hundreds of yards in diameter.

It was after all the rocks of this complex had consolidated or the greater part of them, that crust-pressures, acting for the most part along a north-east or south-west line, caused them to shear and slide over each other. Thus, although the original rocks were non-foliated, so great was the mechanical stress and deformation consequent upon these movements, that out of the igneous complex were produced gneisses and schists resembling so closely metamorphosed sedimentary deposits, that in the early days of the science they were regarded as such.

The most generally accepted view at the present time, as has been pointed out, is precisely the opposite to that which once obtained.

It was not until the greater part of this dynamo-metamorphism had been effected that the Longmyndian deposits were accumulated, for in their basement-beds at many localities rolled pebbles of perfectly altered Archæan rocks occur.

There must obviously have been a great interval of time between the metamorphism of the Malvernian and the formation of the basal Longmyndian deposits. In the interval, as far as can be seen at present, somewhat numerous volcanic vents were established, and the material then ejected and the lava then outpoured constitute what is now known as the Uriconian Group—essentially a volcanic series.

5 See papers in Q.J.G.S., xliii. (1887), pp. 525-536; *id.*, xlv. (1889), pp. 475-501; *id.*, xlix. (1893), pp. 398-423; Proc. Liverpool Geol. Soc., 1895-1896 (1896), pp. 453-460; and Proc. Cotteswold Nat. F.C., xii., pt. 3 (1898), pp. 239-247.

Uriconian rocks occur on the confines of Hereford and Worcester, and form the rocky spurs which project from the eastern base of the Herefordshire Beacon into the Severn Valley. They comprise rhyolites, andesites, basalts, and tuffs, not differing materially from the products of recent volcanoes, and were first identified as Uriconian by Dr. Callaway, who paralleled them with the similar rocks of Lilleshall Hill in Shropshire.

There are no exposures of the Longmyndian in the county. Beds belonging to this system may be present far below the surface, flanking, but separated by fault-planes from, the Pre-Cambrian "massif" of the Malvern Hills, and underlying the Palæozoic rocks of the whole of Herefordshire. The Longmyndian is essentially a system of sedimentary deposits, which were laid down during a period of comparative quiescence, and eventually in most places altogether obscured the rocks of the two preceding periods.

As already remarked, the Pre-Cambrian rocks of the Malvern Hills belong to two systems—the Malvernian and Uriconian. The most generally accepted view as to the origin of the crystalline schists, first propounded for this district by Dr. Callaway, has likewise been noticed. These views have been endorsed by Prof. T. T. Groom in two masterly papers dealing with these and the neighbouring Abberley Hills;[6] while the volcanic rocks (Uriconian) have been studied by Dr. C. Callaway,[7] A. H. Green,[8] Mr. F. Rutley,[9] Mr. A. Harker,[10] and Mr. H. D. Acland.[11]

During, however, the nearly sixty years which preceded the promulgation of the present ideas as to their structure the Malvern Hills formed the subject of much geological investigation. Leonard Horner described them as a granitic mass intruded into the associated beds,[12] and Murchison also regarded them as essentially of igneous origin, but included in the "igneous" mass the strata which had been altered by the intrusion.[13] Prof. John Phillips thought that the Protozoic beds associated with the range had been laid down against a shore-line composed of the crystalline rocks;[14] and H. B. Holl that the Cambrian and Silurian rocks overlapped the metamorphic series, which he considered was composed of altered sedimentary and igneous rocks of Pre-Cambrian age.[15] The Rev.

6 Q.J.G S., lv. (1899), pp. 129-168; *id.*, lvi. (1900), pp. 138-195
7 *Id.*, xxxvi. (1880), pp. 536-538.
8 *Id.*, li. (1895), pp. 1-8.
9 *Id.*, xliv. (1888), p. 740.
10 "Petrology for Students," 1895, pp. 55, 143, etc.
11 Q.J.G.S., liv. (1898), pp. 556-562.
12 Trans. Geol. Soc., ser. 1 (1811), p. 281.
13 "Silurian System" (1839), pp. 417, *et seqq.*; "Siluria" (1854), pp. 92, *et seqq.*
14 Mag. and Journ. Sci., xxi. (1842); Mem. Geol. Surv., ii. pt. 1 (1848), pp. 66, *et seqq.*, pp. 125-126.
15 Q.J.G.S. xxi. (1865), pp. 89, 92, 97, etc.; see also Trans. Woolhope Nat. F.C., 1866 (1867), pp. 273-274; Trans. Malvern Nat. F.C., pt. 3 (1853-1870), p. 51.

W. S. Symonds, who published many articles and several books devoted in part or whole to a general account of the rocks of Siluria, believed that the Malvern rocks were metamorphosed sediments.[16] Mr. Rutley has expressed the opinion that the schistose and gneissic rocks are formed from altered tuffs, grits, and sandstones, as well as from volcanic and other igneous rocks.[17]

Chase-End Hill is in Gloucestershire. The next hill to the north, the Raggedstone, is bifid owing to the excavation of a valley along a dislocation which traverses the hill from north to south, on the line of which an outlier of Hollybush Conglomerate has been preserved. The depression between the masses of Archæan rocks forming the Midsummer and Hollybush Hills also marks a line of fault, as does also the pass known as "The Gullet," which separates the twin Midsummer and Hollybush Hills from the narrower Swinyard Hill. The Archæan rocks are well exposed in a quarry on Swinyard Hill, but their actual junction with the flanking May-Hill Sandstone is obscure.

The Herefordshire Beacon is one of the most imposing hills in the range and is of great interest both geologically and historically. Its eastern and lower shoulder is composed of Uriconian rocks; its western, scarred with the parallel ramparts of the British Camp, of massive rather than of schistose rocks. Near at hand, excavated out of the volcanic (Uriconian) rocks, is Clutter's Cave—a hermit's retreat, weird in its associations with the dark doings of the Middle Ages.

Faulting again probably accounts for the hollow between the Herefordshire Beacon and the Black Hill, for the schists of the two hills differ markedly in strike. The structure of the range between the latter hill and the Wyche is distinctly "plagioclinal" (see below) and comparatively simple, the Pre-Cambrian rocks being of the normal facies.

That portion of the north-west corner of the North Hill that is in Herefordshire is composed of Malvernian rocks—diorite and the well-known haplite.

The Malvern Hills are a good example of a "plagioclinal range." Investigation has shown that the prevalent strike of the Malvernian rocks is from north-east to south-west and is, therefore, oblique to the axis of the range which runs north and south. This is a feature shared by most other hills composed of these ancient rocks.

16 See "The Flora of Herefordshire"; pt. 1 Trans. Woolhope Nat. F.C., 1866 (1867), pp. 1-25.
17 Q.J.G.S., xliii. (1887), p. 508.

The explanation is that the crust-pressures which caused the apparent stratification so acted as to produce a north-east and south-west "strike." At a much later period, after having been buried beneath a great thickness of other deposits, the Archæan rocks, together with the overlying beds, were affected by crust-pressure, which produced in the Malvern district a great fold having a north and south alignment, and also faults with a similar direction.

Between two such faults the Archæan mass of the Malvern Hills was upraised in sections, proceeding, according to Prof. Groom, from north to south. On the east the Malvern Hills are bounded by the Trias, along an irregular line of fault, and on the west by a series of highly-inclined and in places even inverted Cambrian and Silurian rocks.

On the other side of the great Herefordshire syncline, on the borders of Herefordshire and Radnorshire, are five prominent hills. Two, Old Radnor and Yat Hills, are on one axis trending north-east and south-west; and three, Stanner (noticed by T. Curley as a "remarkable eruption"), Worsel-Wood, and Hanter Hills, on another parallel to the first.

A portion only of Stanner Hill is in Herefordshire. Dr. Callaway has suggested the possibility of the Stanner rocks being of Pre-Cambrian age. They comprise gabbros, dolerites, felsites, and granitoid rocks. "The felsite suggests Uriconian itself; the granitoid rock is almost certainly of still greater antiquity, and they are quite unlike the known post-Silurian eruptives of the region."[18]

Mr. F. Raw has given a short but interesting paper on the igneous rocks of Stanner and Hanter.[19]

The most accessible exposures are at Stanner Railway Station, where the dominant rock is a fairly coarse gabbro, which is cut into by veins of dolerite, andesite, and white felspar rock. Mr. Raw remarks that among the fine dolerites are some very similar to those of the Clee Hills. The Clee-Hill intrusions are certainly not of pre-Coal-Measure date, and Mr. Raw inclines to the view that the Stanner rocks are of late Coal-Measure date and of the same age as the great folding. That, according to Prof. Groom's idea, would be between the time of deposition of the "older" and Upper Coal-Measures. Mr. Raw's reason for so thinking is because the rock appears to be of the nature of a great laccolite, which originally measured in the thickest part at least 800 feet. When the contact of the igneous and the enveloping sedimentary rocks can be seen it

18 Q.J.G.S., lvi. (1900), p. 517.
19 Proc. Geol. Assoc., xviii. (1904), p. 460.

is found that the latter have been much baked. Hence Mr. Raw concludes that the igneous magma was squeezed into a vast arch-shaped cavity caused by the crust-pressures (about the time stated) which thrust the Lower Ludlow Shales and Aymestry Limestone against the "Archæan ridge of Old Radnor"—the shales yielding, but the limestone bending.

The Rev. W. Elliot believed in the Archæan age of the Stanner rocks.[20] Richard Banks placed the date of their eruption at Downtonian, "from the character of the waterworn pebbles and other fragments that are found in the Downton Sandstone of Bradnor."[21] And last, Prof. W. W. Watts thinks that it is desirable to consider the possibility of their being of yet later date—of Tertiary age.[22] He draws attention to the fact that both Murchison and Prof. G. A. Cole[23] found the majority of their comparisons for these rocks in Skye.

IV.—CAMBRIAN SYSTEM.

(i.) General Remarks.—Throughout the Cambrian Period the tract now called Herefordshire was beneath the sea. The coast-line of a continental land was situated to the north-west. Eastwards into Sweden and Russia the Cambrian Beds become thinner and thinner. They have been estimated at 11,000 feet in Wales, possibly 3,000 feet in Warwickshire, 1,000 feet in Sweden, and only 800 feet in Russia. But all the zones which have been recognized in the Welsh Cambrians have been discovered in the Swedish. This easterly attenuation means that the deeper sea lay in that direction. To the north-west of Herefordshire the Cambrian Beds become more arenaceous, the lower deposits of the system thin out, and eventually the Tremadoc Beds overstep the *Lingula*-Flags and rest unconformably upon the Pre-Cambrian rocks of Anglesey.

Anglesey, it may be inferred then was dry land throughout the greater part of the Cambrian Period. The coast-line ran thence south-westwards to a point somewhere about half-way between New Quay and Cape Clear, whence it turned east-south-east, trending through Cornwall and Devon, across the present Channel into north-eastern France.

Differential movements set in towards the close of the Cambrian Period, and eventually caused the formation of a land-surface, probably an island, in what is now the Midland Counties.

20 Trans. Woolhope Nat. F.C., 1888, p. 210.
21 *Id.*, p. 208.
22 Proc. Geol. Assoc., xix. (1905), p. 179.
23 Geol. Mag., dec. 3, vol. iii. (1886), p. 219

Speaking generally, in the Midland Counties a sand-deposit was made in the earlier part of the Cambrian Period, and a dark coloured shale-deposit in the later, that is, of course, until the uplift of that area took place. Thus the Cambrian as developed in the Midlands may be divided into a Lower or Arenaceous Division, and an Upper or Shaly Division.

Cambrian rocks occur in two parts of Herefordshire, the one part being the small but picturesque tract on the western slopes of the South Malverns, and the other the still smaller tract at Pedwardine, near Brampton Bryan, on the north-west confines of the county.

(ii.) South Malverns.—In the South Malverns the Arenaceous Division is represented by what is locally called the Malvern Quartzite and the Hollybush Sandstone; the Shaly, by the "Malvern Shales." Intrusive in both divisions are numerous sills and dykes of several kinds of igneous rocks.

The Hollybush Sandstone and Malvern Quartzite occupy a narrow area to the west of the Raggedstone and Midsummer Hills, the Ledbury and Tewkesbury Road crossing the beds where their superficial extent is greatest. A small outlier of similar beds occurs worked in by folding into the Pre-Cambrian "massif" of the Raggedstone, its softer strata amid the hard plutonic rocks mainly accounting for the hollow known as Winter Combe.

(a) Malvern Quartzite.—This Quartzite, which may be paralleled with the Wrekin Quartzite and the lower portion of the Hartshill Quartzite has been thus named,[24] its geographical extent mapped,[25] and minutely described by Prof. T. T. Groom. He has observed it immediately south of the Gullet Pass, on the west flanks and in the depression traversing the Midsummer and Raggedstone Hills, and at the hamlet of the White-Leaved Oak. Some of the quartzites are conglomeratic, containing fragments of Malvernian and Uriconian rocks. Such beds were noticed by Horner,[26] Murchison,[27] Phillips,[28] Holl[29], and Symonds.[30] But although these conglomerates would seem to point to the denudation of a land-surface containing both these rock-types situated not far from the present range,[31] Prof. Groom is of opinion that none of the patches now seen resting directly upon the Pre-Cambrian rocks of the hills are the basement-beds of the Hollybush-Sandstone Series. He holds

24 Q.J.G.S.. lviii. (1902), p. 90.
25 *Id.*, lv. (1899) fig. 1, and p. 132, and pl. xiii.; *id.*, lvi. (1900), pl. xv.
26 Trans. Geol. Soc., i. (1811), p. 302.
27 "Silurian System" (1839), pp. 415-416.
28 Mem. Geol. Surv., ii. pt. 1 (1848), p. 52.
29 Q.J.G.S., xxi. (1865), pp. 87 and 100.
30 "Flora of Herefordshire" (1889), pp. xiii.-xiv.
31 Rep. British Assoc., 1900 (Bradford), p. 739.

that all the present junctions are fault-planes.[32] The Malvern Quartzite is probably only sandstone similar to Hollybush Sandstone that has been cemented together to form a homogeneous whole by infiltrated silica. Consequently it is not surprising to find that the Malvern Quartzite is intimately connected with the overlying sandstone, both as regards its faunal and lithic characters. It enjoys the distinction, however, of being the only British quartzite of this age that has yielded fossils other than worm-tracks.

(B) HOLYBUSH SANDSTONE.—The Hollybush Sandstone was first observed by Murchison,[33] was also noticed by Sir H. De la Beche,[34] and received its present appellation from Phillips.[35] Holl, who searched it for fossils, also attempted to determine the true succession of its component beds.[36] Prof. Groom has mapped and described the beds in detail,[37] including the intrusive andesitic basalts. One of these dykes is particularly well seen by the side of the by-road leading from Hollybush to Upper-House Farm, its intrusive nature having been long ago recognized by Phillips.

The Hollybush Sandstone has been divided into two main groups (see Table), but there are few really good exposures, and Prof. Groom remarks that the succession which he has indicated (and is here quoted) is only tentative. A quarry on the south side of the Tewkesbury and Ledbury road, just before it enters the Hollybush Pass, affords the best section.

The representatives of the Shaly Division occupy a roughly semi-lunar area extending from near the Obelisk in Eastnor Park to the Raggedstone, where they are faulted against the plutonic rocks of the range. They comprise black and grey shales, collectively called by Phillips the "Malvern Shales," and are veined with intrusive igneous rocks—not contemporaneous lava-flows as has usually been taught. Holl[36] made a dual division of Phillips' "Malvern Shales," namely, a lower or Black-Shale division, and an upper or Grey-Shale division for which Prof. Groom later substituted the terms of "White-Leaved-Oak" and "Bronsil Shales."[37]

(C) THE BLACK SHALES.—These appear to have been first observed by Conybeare.[38] They were recognized by Murchison and doubtfully paralleled by him with the Llandeilo Beds.[39] Phillips searched them for fossils, and amongst the trilobites that he found

32 Q.J.G.S., lviii. (1902), p. 91.
33 "Silurian System," p. 416.
34 Mem. Geol. Surv. i. (1846), p. 21.
35 *Id.*, ii. pt. 1 (1848), pp. 51-54.
36 Q.J.G.S., xxi. (1865), pp. 87-89.
37 *Id.*, lviii. (1902), pp. 94-98.
38 "Annals of Philosophy," n.s., iv. (1822), p. 337.
39 "Silurian System" (1839), p. 416.

was an *Agnostus*[40]—a record which caused Barrande to refer the beds to the horizon of the *Lingula*-Flags.[41] Symonds settled the question as to their great antiquity by finding the *Dictyonema*, called by J. W. Salter, *D. sociale*, in the overlying Grey Shales.[42] Prof. Groom has made four divisions of the Black or White-Leaved-Oak Shales (*vide* Table).

THE LOWER WHITE-LEAVED-OAK IGNEOUS BAND, at least 30 feet thick, comprises black shales with several seams of grit in addition to its one or two sills of igneous rock. *Polymorphina Lapworthi*, an ostracod—first discovered in this region, and described by Prof. Groom[43]—is the zonal fossil. A few other fossils have been found, but in order to obtain anything like a satisfactory exposure it is necessary to excavate.

THE LOWER BLACK SHALES, were the oldest portions of the "Malvern Shales" known previous[44] to Prof. Groom's researches, and measure some 250 feet. They are exposed at the hamlet of the White-Leaved-Oak, in the fields immediately to the north-west, "where they have served for many years the chief hunting-ground for collectors,"[45] and along the footpath leading to Fowlet Farm.

THE UPPER WHITE-LEAVED-OAK IGNEOUS BAND.—(300 feet) consists largely of olivine-basalts interbanded with dark shales. The shales are best exposed in the road at White-Leaved-Oak, but they may also be seen along the footpath to Fowlet Farm, where Symonds[46] and Groom have both found trilobites, and the latter geologist, in fragments of a peculiar limestone, minute organisms which Mr. F. Chapman pronounced to be foraminifera.

THE UPPER BLACK SHALES.—(150 feet) are best exposed in the same road as the immediately subjacent igneous band—that leading south from the hamlet. No fossils, however, have been found as yet in this division.

Sphærophthalmus alatus occurs in the Lower and Upper Black Shales and in the sedimentary deposits associated with the intervening igneous band. Consequently, all these beds belong to one zone. The *Polymorphina-Lapworthi*-Zone, Prof. Groom regards as the uppermost of the Middle Cambrian, and that of *S. alatus* as the top-zone of the Upper Cambrian, holding that the *Dictyonema*-Shales which succeed are best grouped with the Ordovician. Deposits

40 Lond., Edin. and Dubl. Phil. Mag. and Journ. Sci., xxii. (1843), p. 384.
41 Bull. Soc. Geol. France, ser. 2, viii. (1851), pp. 211-212.
42 "Old Stones" (1884), p. 27.
43 Q.J.G.S., lviii. (1902), pp. 83-88.
44 See "Old Stones" (1884), p. 27; [G. H. Piper] Trans. Woolhope Nat F.C., 1893-94, p. 22; "Siluria," 1st ed. (1854), p. 92.
45 Q.J.G.S., lviii. (1902), p. 101.
46 "Old Stones" (1884), p. 30.

equivalent to zones which have been identified between the *P. Lapworthi*- and *S. alatus*-Zones in other parts are not necessarily absent from the South Malvern region. The paucity of sections and probable faulting make it best to say that no evidence of them has yet been obtained.

(D) THE GREY SHALES.—The Grey or Bronsil Shales occupy a greater area to the west of the South Malverns than Holl thought. They have been mapped, described, and—like the under-lying "Black Shales"—separated into four divisions by Prof. Groom.[48]

The shales associated with the lower or "*Middle*" *Igneous Band* are nowhere actually exposed, but the division is thought to be about 300 feet thick. Neither are the overlying *Lower Grey Shales* (250 feet) anywhere satisfactorily seen. The shales of the *Coal-Hill Igneous Band* crop out in the garden of the cottage at Coal Hill—a name which perpetuates the memory of a ridiculous search for coal in the Cambrian Shales! The *Upper Grey Shales* (500 feet) crop out in the bed of the stream to the south of Bronsil, and it was here that Symonds discovered the first specimens of *Dictyonema sociale*. The *Dictyonema*-Shales are also exposed to view at Chase-End Hill.

The fossils from the Cambrian of the South Malverns have received a very satisfactory amount of attention from Prof. Groom,[49] Mr. F. Chapman,[50] Mr. P. Lake,[51] and Dr. C. A. Matley,[52] and in earlier years from Salter (in Murchison's "Siluria"),[53] and Holl.[54]

(iii.) PEDWARDINE.—In the north-west of Herefordshire, in a lane at Pedwardine, near Brampton Bryan, beneath the May Hill Sandstone, are some olive-green, fissile shales, with *Dictyonema sociale* and *Lingulella Nicholsoni*.[55] These shales are of the same age as the Shineton Shales of Shropshire and the *Dictyonema*-Shales of Malvern.

(iv.) THE IGNEOUS ROCKS ASSOCIATED WITH THE CAMBRIAN OF THE SOUTH MALVERNS.—Prof. Groom, whose essays on the stratigraphy, petrology, and palæontology of the Malvern rocks will be the classics of future students of the geology of the district, has also written "On the Igneous Rocks associated with the Cambrian Rocks of Malvern."[56]

47 Q.J.G.S., xxi. (1865), p. 92.
48 *Id.*, lviii. (1902), p. 105.
49 Q.J.G.S., lviii. (1902), pp. 83-88; *id.*, pp. 111-119.
50 Q.J.G.S., lvi. (1900), pp. 257, *et seqq.*
51 *Id.*, lvi. (1902), pp. 119-128.
52 *Id.*, pp. 135-147.
53 See also Mem. Geol. Surv., dec. xi. (1864), p. 10.
54 Q.J.G.S., xxi. (1865), p. 102.
55 Q.J.G.S., xxxiii. (1877), p. 659; Trans. Woolhope Nat. F.C., 1882 (1888), p. 197; "Flora of Herefordshire" (1889), p. xxvii.

According to Prof. Groom, the numerous sills and dykes of several rock-types (camptonites, augite, and olivine-basalts, and olivine-diabase) are all intrusive and of pre-May-Hill-Sandstone date. Prof. Watts, however, thinks it possible that "while certain of the rocks are of this date, some of the series, as elsewhere, may be younger."[57]

Until the days[58] of Phillips it was thought that the Malvern plutonic rocks had been intruded into the Palæozoic rocks. But this author adduced strong reasons for believing that this was not so,[59] and recognized "felspathic dykes" and "interposed masses," in the Hollybush Sandstone, and igneous rocks, "which, erupted from below, have flowed in limited streams over the surface of the Black Shales."[60] Phillips and De la Beche[61] both held that some of these igneous rocks were contemporaneous. H. E. Strickland thought that the great movements which elevated the Malvern Hills were connected with this igneous action.[62] Symonds connected most of the evidence of vulcanicity in these Cambrian Beds with a volcano situated in the present position of the Raggedstone,[63] but did not hold that all the igneous rocks were of the same age. Holl described the rocks as a series of contemporaneous ashes, grits, and lavas.[64] Timins analysed many of them,[65] and Mr. J. J. H. Teall discovered ophitic diabases.[66] Prof. C. Lapworth considered the majority to be intrusive,[67] and as we have seen, Prof. Groom claims this to be the nature of all of them.

V.—ORDOVICIAN SYSTEM.

Where the geological succession is complete the Cambrian System is succeeded by the Ordovician, and the latter by the Silurian. At Pedwardine and in the South Malverns, however, the Cambrian Shales are succeeded by the May-Hill Sandstone—no Ordovician or Lower-Llandovery rocks intervene. Their absence seems best explained on the supposition that they were never deposited at these localities.

56 Q.J.G.S., lvii. (1901), pp. 156-183.
57 Proc. Geol. Assoc., xix. (1905), p. 180.
58 Trans. Geol. Soc., i. (1811), p. 281; "Silurian System," pp. 416-418.
59 Phil. Mag., xxi. (1842), p. 288.
60 Mem. Geol. Surv., ii. pt. 1 (1848), pp. 52, 53, 56.
61 *Id.*, i. (1846), p. 38.
62 Phil. Mag., ser. 4, ii. (1851), p. 359.
63 "Old Stones,' 2nd ed. (1884), pp. 25, 26, 30; see also Trans. Woolhope Nat. F.C., 1869 (1870), p. 6; "Old Stones," 1st ed. (1855), pp. 31 and 43; Proc. Geol. Assoc. iii. (1874), p. 271; and "Flora of Herefordshire" (1889).
64 Q.J.G.S., xxi. (1865), p. 87.
65 Edin. New Phil. Journ., ser. 2, xv. (1862), p. 1; Q.J.G.S., xxiii. (1867), p. 352.
66 "British Petrography" (1888), p. 245.
67 Proc. Geol. Assoc., xv. (1898), p. 338.

A study of the geologic structure of the Midland and Border Counties suggests that the Cambrian Period was brought to a close by the gradual rise of the sea-floor in these parts, and the formation of an island. It may be presumed that the western coast-line of this island trended from south to north, from the direction of May Hill to the north-eastern confines of the county, and then curved round to the neighbourhood of Old Radnor before turning in a northerly direction to include in its land-mass the uplands of the Longmynds.

VI.—SILURIAN SYSTEM.

(i.) General Remarks.—Towards the close of the Ordovician Period subsidence set in, and the occurrence of May-Hill Sandstone above the *Dictyonema*-Shales in the Herefordshire sections demonstrates that the land-surface of the island had appreciably diminished, for that rock is a littoral accumulation composed of material derived mainly from the rocks of the island and spread out round its western shores.

The succeeding Tarannon Shales, or their probable equivalents, point to the recedence of the coast-line, and if not to the disappearance of the island, except for certain portions of its higher hills, certainly to a great reduction in its land-area.

In Herefordshire, Silurian rocks occur in six well-separated areas, namely, (1) between Huntington and Ludlow, (2) in the Malvern district, (3) in the neighbourhood of Woolhope, (4) around Aston Ingham, (5) at Hagley, and (6) at Shucknall Hill. Most of these tracts are classic ground to the student of the Silurian rocks from the fact that Murchison investigated them when collecting data for establishing the Silurian System.

In this county, owing to the great unconformity between the Silurian and older rocks, there is no difficulty in finding the base of the System. But it has been otherwise with the upper limit, because the top-beds pass so gradually as regards their lithic structure into the basal Old-Red deposits.

Above the rocks which have always been admitted to be Silurian are the Downton Sandstones, which, together with the succeeding Temeside Shales, are now regarded as forming the uppermost stage of the Silurian—the Temeside Stage. At first Murchison called this stage the "Tilestone," grouping it with the Old Red Sandstone,[68] but later he gave the Downton-Castle Sandstones to the Silurian, restricting the term "Tilestones" to the present Temeside Shales.[69] The Downton-Castle Sandstones he regarded as

68 See Proc. Geol. Soc., ii. (1834), p. 12.
69 Silurian System (1839), p. 197.

"Passage-Beds," and applied this term to them. Certain subsequent authors have not understood this, and as they held that the Temeside Shales were equally "Passage-Beds," called both the present Temeside Shales and Downton Sandstones by this name.[70] At Ledbury, the equivalents of the Temeside Shales were called the "Ledbury Shales" by Salter. These, Sir Charles Lyell grouped in his "Principles of Geology" with the Old Red Sandstone, in accordance with the views of Murchison. Symonds, however, was always opposed to this classification, believing that in addition to the palæontological evidence prohibiting such a conclusion, he had clear indications of a break between the Ledbury Shales and the Old Red.[71] On the other hand, G. H. Piper, the contemporary of Symonds, held that the "Passage-Beds" partook much more of the Old Red Sandstone than of the Silurian. The most recent work in the Ludlow district has confirmed the view held by Symonds, and there a layer with plant-remains, called the "Fragment-Bed," is regarded as the top-bed of the Silurian.

When the Government Geological Survey-Maps of Herefordshire were made, now many years ago, the upper limit of the Silurian was not taken so high up as the "Fragment-Bed." Consequently, the Silurians occupy a greater area than they are represented to do on these maps.

The fact that the earlier geologists felt compelled to recognise "Passage-Beds" is sufficient proof of the very gradual transition that obtains from the Silurian to the Old Red. The crust-pressures causing the oscillations of the land and the changes in the sea-level acted slowly. Consequently, the climate changed slowly, the conditions of deposition, and the fauna and flora. Corals, hydrozoans, echinoderms, crustaceans, brachiopods, pelecypods, gastropods, and cephalopods, all flourished in the warm waters of the Silurian sea. The earliest known fossils which can be referred with certainty to plants occur in the Silurian rocks,[72] and towards the close of the period the first fish made their appearance, and graptolites died out.

The divisions of the Silurian System that have been made are shown in the Table of Strata. Like the Ordovician, these rocks admit of subdivision into zones by means of their graptolite-fauna from the Mocktree Shales downwards; but, except in the neighbourhood of Ludlow, not much progress has been made in zoning in Herefordshire. Where limestones replace the shale-deposits in Shropshire it has been noticed that the graptolites are less in evidence, and this being so, some difficulty may be anticipated in forwarding this most interesting piece of work in the classic regions of Woolhope,

70 See Trans. Woolhope Nat. F.C., 1869 (1870), p. 61.
71 Records of the Rocks (1872), p. 213.
72 Proc. Geol. Assoc., xviii. (1904), p. 458. Cf. sections in "Records of the Rocks," pp. 152 and 195.

May Hill, and the Malverns, where the limestones on the whole are much in evidence.

Llandovery Series.—Murchison grouped the beds thus designated with the present Bala Beds, and called them the "Caradoc Group." Sedgwick and M'Coy, however, pointed out that the Llandovery Beds had neither palæontological nor lithological affinities with the Bala Beds, but constituted the true base of Murchison's "Upper Silurian." Murchison admitted this, and separated them from the Caradoc series, and gave to them the name "Llandovery"; but, loath to abandon altogether his previous classification, said they were transitional between his Upper and Lower Silurian. Sedgwick, Jukes, and some other geologists, however, objected to this classification, holding that because there was a break in some parts between the upper and lower divisions of the series, the line of demarcation was best drawn at that break. But later work has shown that the Tarannon Shales, May-Hill Sandstone, and the Lower Llandovery, make up a group well-defined palæontologically from the beds above and below. For this group Prof. Charles Lapworth, F.R.S., has suggested the term "Valentian." In Herefordshire there are no Lower-Llandovery rocks exposed. The Upper Llandovery has been divided into two parts: an upper, composed of shales and sandstones; and a lower, comprising yellowish, grey, and purple sandstones and conglomerates.

Wenlock Series.—This term, first used by Murchison in 1833, is applied to the great mass of shales and limestones intervening between the Llandovery and Ludlow Series, which is typically developed in the Woolhope district, and at Wenlock Edge in Shropshire. In Herefordshire, limestone-beds are developed at the top and bottom; out to the west and north-west of the county they gradually disappear, and not only the limestone-beds of this series, but those of the Ludlow as well. Before Miss Elles, Miss Woods, and Miss Slater, following Prof. Lapworth and certain Continental geologists, took graptolites for zonal fossils, it was very difficult, if not impossible, to identify the equivalents of the limestone-beds of the Herefordshire sections in those parts where the series is shale from top to bottom. Now, six graptolite-zones have been defined, namely, those characterized by *Cyrtograptus Lundgreni*, *C. rigidus*, *C. Linnarssoni*, *C. symmetricus*, *Monograptus riccartonensis*, and *C. Murchisoni*—the first-named graptolite being the zonal fossil of the Wenlock Limestone.

Ludlow Series.—The term "Ludlow Series" is also Murchison's. The series is divided into four parts, in descending order: (1) Temeside Stage, (2) Upper Ludlow Shales, (3) Aymestry Limestone, and (4) Lower Ludlow Shales. The Lower Ludlow

Shales are more argillaceous and less sandy and calcareous than the Upper-Ludlow rocks, and in the words of Murchison "they constitute, in fact, a great argillaceous mass, strictly entitled to the provincial name of 'mudstone.'" The beds immediately below the Aymestry Limestone are occasionally worked for flags, and are locally called "pendles." Separating these flags in some parts are the peculiar deposits of clay termed by the country-people "Walker's Earth" or "Soap"—a kind of Fullers' Earth. The Aymestry Limestone is made up of more or less flaggy beds of a bluish-grey colour, frequently traversed by veins of calcite, and is much inferior in quality to the Wenlock Limestone. Murchison records that "its earthy character renders it, however, of very great value as a *cement*, particularly in subaqueous operations, and in ceiling and plastering, the mortar which is made of it setting rapidly under water." (*Silurian System*, p. 204). *Conchidium Knighti* is the characteristic fossil, and abounds in almost every quarry in the neighbourhood of the village of Aymestry—or "Aymestrey," as it is now spelt. The Upper-Ludlow beds comprise thin-bedded, pale-coloured, and somewhat micaceous sandstones, in some places highly argillaceous, in others equally calcareous. The top-bed is the well-known Ludlow Bone-Bed.

Temeside Stage.—This embraces those beds concerning which there was for many years doubt as to whether they should be classed with the Old Red or with the Silurian. Now they are by common consent regarded as Silurian. The Stage comprises sandstones (Downton-Castle Sandstones) in the lower portion, replete at certain horizons with fish and crustacean remains and *Lingula minima*; and shales, in which Eurypterid remains predominate, and through which *Lingula cornea* ranges, in the upper.

(ii.) Local Details.

(a) Ludlow-Huntington District.—In the distribution of its rocks this district somewhat resembles that of Woolhope. The pyriform area that the beds occupy, however, is not anything like so symmetrical, neither do Old-Red rocks surround it. They occur on the south-eastern side and are faulted against the Silurians for a space on the north, but the western boundary of the district is a fault—a continuation of that which plays so important a part in the structure of the Church-Stretton district. Forces acting from easterly and southerly directions no doubt caused the domical disposition of the beds, while the proximity of a rigid mass, probably the Longmynds, prohibited greater symmetry being obtained. But even as it is the broad end of the pyriform area has been hollowed out into what Murchison called "a valley of elevation," and through it meanders the River Teme.

MAY-HILL SANDSTONE.—Close to the great fault on the west is a small introduced patch of this rock overlying unconformally the *Dictyonema*-Shales.[73] Except for this small introduced mass near Pedwardine, the Wigmore Valley is floored with the soft Wenlock Shales, which are obscured in many places by Superficial Deposits.

WENLOCK SHALES.—These are rarely seen, but *Phacops longicaudatus* has been obtained from an exposure in the bed of the Teme near Burrington.[74]

WENLOCK LIMESTONE.—This limestone constitutes an ill-defined ridge skirting the lowlands of the Wigmore Valley. It is exposed in two quarries at the foot of Elton Lane and in a road-cutting between Elton and Ludlow.[75]

LOWER LUDLOW SHALES.—The most important section in the Herefordshire portion of the Ludlow district is at Elton Lane. Between the brook and where the road bifurcates is a small exposure of shale crowded with brachiopods, corals, and trilobites ; then up the lane to the left exposures in the Zones of *Monograptus Nilssoni*, *M. scanicus*, and *M. tumescens* ; while the Aymestry Limestone, a deposit of *M.-leintwardinensis* date, crops out higher up and forms the capping to the hill. Returning, and taking the turning to the right, a similar succession of shale-beds is seen.[76] The Zones of *M. Nilssoni* and *M. scanicus* are seen in the road from Elton to Ludlow, and that of *M. tumescens*, comprising hard flaggy beds, the local "Pendles," in a quarry on the hill-top near Gorsty Farm. A section of shales, possibly lower in the series than those seen in the preceding exposures, is obtained in the lane south of Stormer Hall, near Leintwardine, and it was here that the type-specimen of *M. Salweyi*, Hopkinson, was obtained.[77] Near Leintwardine Church is an old quarry in the flaggy top-beds of the Lower Ludlow.[78] This is the classic section which as early as 1857 had yielded no less than ten species of star-fish.[79] Since then, as the Rev. J. D. La Touche has remarked,[80] it is possible that many more species might be added. It was here that A. Marston worked with so much success, as the slabs in the Ludlow Museum, covered with *Palæocoma Marstoni*, testify, and that J. E. Lee obtained the earliest known fish, *Scaphaspis ludensis*.[81] Here also were procured *Pterygotus arcuatus*,[82] Salter,

73 Q.J.G.S., xxxiii. (1877), p. 660.
74 Proc. Geol. Assoc. iii. (1873), p. 125.
75 Q.J.G.S., lvi. (1900), p. 425.
76 *Id.*, p. 427.
77 Rep. Brit. Assoc., Bradford, p. 83.
78 See also Proc. Geol. Assoc., xviii. (1904), p. 491.
79 Ann. and Mag. Nat. Hist., 2 ser., xx. (1857), p. 321 ; see also H. Woodward, Q.J.G.S., xxi. (1865), p. 490.
80 Trans. Woolhope Nat. F.C , 1890 (1894), p. 36.
81 Salter, Ann. and Mag. Nat. Hist., 3 ser., iv. (1859), p. 45 ; Lee, "Note-book of an Amateur Geologist" (1881), p. 46.
82 Mem. Geol. Surv., Monogr. 1 (1859), p. 95.

MARY KNOWL (ON THE LEFT) AND HIGH VINNALS ON THE RIGHT, AS SEEN FROM THE HEAD OF MARY KNOWL DINGLE.

A. Watkins, Photo.

Eurypterus punctatus, Salter,[83] *Hemiaspis limuloides*, H. Woodward,[84] *H. speratus* [85] H. Woodw., and *Necrogammarus Salweyi*, H. Woodw.[86] Near Kington the Lower Ludlow Shales are exposed in Bradnor Wood.

AYMESTRY LIMESTONE AND UPPER LUDLOW SHALES.—In the Ludlow district these beds have been exhaustively studied by Miss G. L. Elles and Miss I. L. Slater.[87]

The Aymestry Limestone is worked by the road-side in Wassell Wood to the north-west of Lugwardine,[88] and in a large quarry near "The Briery." At the latter place the Mocktree Shales are faulted against the Aymestry Limestones, which is full of *Conchidium Knighti*,[89] and the top-portion of the limestone seems to have been subjected to pene-contemporaneous erosion. This phenomenon, first described by Lightbody,[90] has been studied in later years by the Woolhope Club[91] and Geologists' Association.[92] In a quarry by the side of the lane called "The Old Road," near Leintwardine, of which a sketch made by Marston has been reproduced by Symonds,[93] remains of *Pterygoti* are said to have been found in shales associated with limestones containing *C. Knighti*.

On the top of the hill near Mary-Knoll Farm, to the south-west of Ludlow, there are openings in the Aymestry Limestone, and the road thence to Ludlow passes over Mocktree Shales and Lower and Upper Whitecliffe-Flags. The finest section, however, in the district is that in the banks of the Teme between Downton and Downton-Castle Bridge. Here the complete succession from the Aymestry Limestone, which is worked at Bow Bridge, through the Mocktree Shales, Lower and Upper Whitecliffe-Flags, to the Downton-Castle Sandstones, is magnificently displayed. The Upper Whitecliffe- or *Chonetes*-Flags are exposed by the side of the main road north of Downton Castle, and similar beds form the core of the Downton inlier, being visible at several places near the river. The Ludlow Bone-Bed, for which this district is well known and of which an interesting general account has been published by Dr. G. J. Hinde,[94] is seen in the side of the lane leading down to Forge Bridge, along the tract to Forge Rough, and again farther to the north-east close to the cottage by Old Millrace-weir.

83 *Id.*, p. 99; see also Q.J.G.S., xxiv. (1868), p. 290.
84 Rep. Brit. Assoc., 1864, Bath; Q.J.G.S., xx. (1864), p. 490.
85 Monogr. Brit. Foss. Crustacea, Order Merostomata, Pal. Soc., p. 178.
86 Trans. Woolhope Nat. F.C., 1870 (1871), pp. 271-272; Huxley and Salter Mem. Geol. Surv. Monogr. 1 (1859), p. 25.
87 Q.J.G.S., lxii. (1906), pp. 195-222.
88 Q.J.G.S., lxii. (1906), p. 214.
89 Proc. Geol. Assoc., iii. (1873), p. 125.
90 Q.J.G.S., xix. (1863), pp. 368-371.
91 Trans. Woolhope Nat. F.C., 1890 (1894), p. 27.
92 Proc. Geol. Assoc., xviii. (1904), p. 491.
93 In Dr. H. Woodward's Monograph, p. 94.
94 Proc. Geol. Assoc., xviii., pp. 443-446.

In the neighbourhood of Aymestry there are many sections in the limestone to which the village gave the name. The principal are those in the banks of the Lugg at Aymestry, in Grayley Wood, Pyon Wood, at Lyepool and Lower Lye, where the rock is of poorer quality, at the west end of Mere-Hall Wood, and at the back of the Crown Inn at the Rock-Hall Quarry, where the face of rock is some 90 feet deep. At the last place fossils are very common,[95] and Miss E. M. R. Wood found *M. leintwardinensis* here.[96]

At Aymestry lived and laboured the Rev. T. T. Lewis, whose information concerning the rocks of the neighbourhood so helped Murchison in establishing his Silurian System.

The Ludlow Bone-Bed is exposed at Bradnor Hill, near Kington, and from it Richard Banks obtained many fossils.[97] From the beds above, *Platyschisma helicites* and *Orthonota* have been recorded, and *Lingula cornea* from the base of the more massive Downton-Castle Sandstones. Near Quarry House the Mocktree Shales are well exposed,[98] and have yielded some graptolites.[99]

TEMESIDE SERIES.—These beds form the lower slopes of the hills between Richard's Castle and Huntington. The other parts where they occur, owing partly to the tectonics of the district and partly to the trend of the county-boundary, are disconnected.

In the Downton-Castle-Sandstone division the most important bed is that characterized by the gastropod, *Platyschisma helicites*, or the Downton Bone-Bed. In spite of much field-work on the part of Murchison,[100] Marston,[101] G. Harley,[102] and Brodie,[103] it was not realized for a long time that the *Platyschisma*-Bed passed laterally into a bone-bed. But such certainly seems to be the case,[104] and in one form or the other the bed is persistent over a considerable area, usually at 3 feet above the Ludlow Bone-Bed. Together with the more massive basement-beds of the Downton-Castle Sandstone proper, it is seen in the road leading down to Forge Bridge,[105] and near the cottage at the Old Millrace-weir. The upper beds of Downton Sandstone cap the cliff on the north bank of the river, but are more accessible in some quarries by the road-side. Similar strata are worked in Tin-Mill Wood, where their passage into the

95 Trans. Woolhope Nat. F.C. 1895 (1897), p. 127.
96 Q.J.G.S., lvi. (1904), p. 428.
97 *Id.*, xii. (1856), p. 94.
98 *Idem.*
99 Proc. Geol Assoc., xviii., p. 487.
100 "Silurian System"; "Siluria"; Q.J.G.S., ix. (1853), p. 16. *Id.*, xiii. (1857), p. 290.
101 Geol. Mag., vii. (1869), p. 353.
102 Q.J.G.S., xvii. (1861), p. 542.
103 *Id.*, xxv. (1869), p. 236.
104 Q.J.G.S., lxii. (1906), pp. 195-220.
105 Trans. Woolhope Nat. F.C., 1890 (1894), pp. 27-28.

basement-beds of the Temeside Shale is visible.[106] A little farther to the north-east, owing to the way the domically arranged strata have been cut into by the river, higher beds are seen at a lower level. The top-beds of the last section crop out in the bed of the water-course. In the cliff above, a hard bed of grit is seen running along the whole section, and is parted from the Temeside Bone-Bed by "Olive Shales" 3 feet thick. To this Bone-Bed succeed more "Olive Shales," which are capped with a band of grit, the top-layer of which is the Fragment-Bed. The cliff on the south side of the river at Downton Bridge is capped with Downton Sandstone, and the basal beds of the Temeside Shales are exposed at the commencement of the river-path on the eastern side of the road.

The "Transition-Beds" have been observed at Richard's Castle, Ashley Moor, near Orleton,[107] Mortimer's Cross,[108] Croft Park,[109] and at Bradnor Hill. The exposure at Croft Park is at the southern end of the grounds, and here *Onchus* and other fossils have been found.

R. Banks has studied the beds in the neighbourhood of Kington, and particularly at Bradnor Hill, where he obtained a large number of fish and crustacean remains. Banks has communicated papers on the stratigraphy of the beds,[110] noticing sections between Bradnor Farm and Quarry House, at Ivy Chimney, and a little lower down the hill near the iron-foundry. At Barn Farm, near Kington, strata corresponding to the basement-beds in the first-mentioned section, which is often called the "Bradnor-Hill Quarry," were formerly exposed, and there was also a section farther south at Lodge Farm, Huntington, which yielded to Banks *Pterygotus* and *Scaphaspis truncatus*. At Ivy-Chimney Quarry, near Kington, he procured the *P. truncatus* and *P. Banksi* that Huxley and Salter figured.[111] Quite recently, remains of eurypterids, and of *Cyathaspis Banksi*, have been obtained here.[112]

Banks obtained most of his specimens from the Bradnor-Hill Quarry. They included *Cyathaspis Banksi; Pterygotus Banksi* (Salter), which occurred in association with *Platyschisma helicites*,[113] *P. gigas*, Salter,[114] *P.* (?) *stylops*, Salter,[115] *Eurypterus pygmæus*,

106 See J. E. Lee, "Note-Book of an Amateur Geologist" (1881), pl. lvi.
107 "Silurian System," p. 197.
108 *Id.* and Q.J.G.S., xii. (1856), p. 96.
109 Trans. Woolhope Nat. F.C., 1895 (1897), p. 129.
110 Q.J.G.S., xii., pp. 93-100; Edin. New Phil. Journ., 1856, p. 240; see also Symonds in Woodward's Monograph, p. 96.
111 Q.J.G.S., xii., pp. 93-100, Appendix.
112 Proc. Geol. Assoc., xviii. (1904), p. 481.
113 Q.J.G.S., xii., pp. 32, 33, and 99; "Siluria," 2nd ed. (1856), p. 266; Trans. Woolhope Nat. F.C., 1866 (1867), p. 171.
114 *P. problematicus*, Banks.
115 Mem. Geol. Surv., Monogr. 1, p. 55.

Salter ;[116] E. *abbreviatus*, Salter ;[117] *Lingula cornea*, and an imperfect cast of a species of *Leperditia*.[118] Remains of *P. Banksi* have been found here as recently as 1904.[112] Beds containing the same species of *Lingula* as the *Auchenaspis*-Beds of Ledbury have been observed at Kingswood, Kington.[119]

The Herefordshire county-boundary takes in about half the area of two outliers of Temeside Beds lying to the west of the great fault. The larger is situated to the north of Presteign and is said to consist of thin-bedded sandstones and deep-red clayey marls inclined at a high angle and striking north-north-east and south-south-west. The sandstone-beds have been worked in places. The smaller outlier, to the south of Presteign, is of similar formation.[120]

(B) MALVERN DISTRICT.—Silurian rocks extend southwards from the Abberley Hills, by way of Cradley, and between the plutonic rocks of the Malvern Hills and the Old Red around Colwall, to the neighbourhood of Eastnor, where their superficial extent considerably expands. Owing to a patch of country around Mathon belonging to Worcestershire, the Malvern district, as far as Herefordshire is concerned, comprises two areas—the Eastnor and the Cradley.

Murchison originally described the geographical extent and chief sections of the Silurian Beds in this district,[121] and on behalf of the Geological Survey, J. Phillips contributed a much more elaborate account.[122] Additions to the subject have been made by Symonds, Salter, and recently by Prof. Groom, while the collections made by Dr. Grindrod are well known.

MAY-HILL SANDSTONE.—The escarpment of these beds overlooks the Cambrian-Shale tract of the South Malverns. By Phillips the beds were divided into two parts, (i.) a lower, comprising conglomerates and thick-bedded sandstones, and (ii.) an upper, consisting of thinner-bedded sandstones, with interstratifications of shale. These more shaly beds may be compared in a general way with the Tarannon Shales.

The basal conglomerates at Howler's Heath contain fragments of Malvernian rocks and a few fossils. Beds belonging to the upper division were proved in a well in the same neighbourhood, and yielded specimens of *Stricklandinia* and *Pentamerus*, and at the present time are seen in the lane leading off the heath in the direction of Bromesberrow; while the top-beds have been observed at Wain Street, Stump's Wood, and below the Obelisk in Eastnor Park.

116 Q.J.G.S., xii., p. 99.
117 *Id.*, xv. (1859), p. 234.
118 Ann. and Mag. Nat. Hist., 1856, p. 95
119 "Flora of Herefordshire," (1889), p. xxix.
120 "Silurian System," pp. 191-192; "Records of the Rocks," p. 217
121 "Silurian System," (1839), pp. 410-414.
122 Mem. Geol. Surv., ii. pt. 1 (1848), pp. 57-101.

At the last locality the beds are very fossiliferous at certain horizons,[123] and it was here that J. Burrow obtained fragments of the oldest known *Pterygotus*—the *P. problematicus*.[124] The May-Hill Beds were observed by Phillips between the Obelisk and Midsummer Hill,[125] and hereabouts Prof. Groom has found many fossils.[126]

In the Eastnor district the trend of the May-Hill Beds is very easy to see, but such is not the case to the north of the Obelisk, where they occupy a very narrow tract fringing the Malvernian rocks. Prof. Groom, however, in addition to having mapped and described the peculiar patches of May-Hill Sandstone in the Bronsil district and the main escarpment, has also mapped them all along this narrow tract.[127]

Near the Wyche Miss Phillips discovered the peculiar conglomerate, containing May-Hill Sandstone fossils, which is sometimes spoken of as "Miss Phillips's Conglomerate."[128]

In the Cradley district the superficial extent of the May-Hill beds has increased, and near Cowleigh Park small patches of Archæan rock occur faulted in amid them. The beds in this neighbourhood are very much disturbed, but Prof. Groom, by mapping them in great detail, has been able to indicate their relationships.[129] Phillips says that the succession of the upper beds of the Llandovery Series is much more complete here than farther south.

Murchison records the occurrence of *Pentamerus* and corals at Storridge Hill.

WOOLHOPE LIMESTONE.—This rock usually forms the eastern side of the valleys in the Wenlock Shales, of which the western is made by the hard Wenlock Limestone. It has been quarried near Gold Hill and at Stump's Wood. Near Walm's Well, instead of dipping to the west it is inclined to the east, and this fact is interesting in connection with the overfolding which took place in Coal-Measure times, and to which reference has been made at an earlier page. North of Walm's Well its course is very clear, and it has been quarried at several localities. In the Cradley district it crops out along a fairly regular line west of the core of May-Hill rocks, but on the east side it occurs only in two small outliers.

WENLOCK SHALE.—These beds, as their name implies, being essentially shaly, are easily denuded, and so give rise to valleys.

123 *Id.*, p. 61; "Silurian System; p. 415.
124 See Symonds in Woodward's "Monogr. Brit. Foss. Crustacea, Order *Merostomata*," Pal. Soc., p. 92; and "Siluria," 4th Ed., p. 96; "Memoirs of H. E. Strickland," p. 7; "Records of the Rocks," p. 152.
125 Mem. Geol. Surv., ii., pt. 1 (1848), p. 54.
126 Q.J.G.S., lv. (1899), pp. 139, 143-145, 153.
127 *Id.*, pt. xiii., and vi. (1900), pt. viii.
128 Mem. Geol. Surv., ii. pt. 1 (1848), p. 64.
129 Q.J.G.S., lvi. (900), pp. 156-163.

The Glynch Brook follows their outcrop from near its source at Walm's Well to Clincher's Mill, and the ornamental sheet of water at Eastnor Castle is situated upon the deposits. Being of no commercial value they are rarely exposed, but they can be seen at Brand Green (about a mile to the north of Walm's Well), at Linden—where Prof. Groom has obtained from them many fossils[130]—and in the Cradley district in the lane-sides around Storridge.

Wenlock Limestone.—This division is either made up of two or three limestone-beds parted by shale, or else of one bed, with nodules in shale above and below it, and owing to its hardness can easily be traced in the field. The rock has been largely quarried near Clincher's Mill, and, in addition to occupying a tongue-shaped area to the west, rises up as an inlier through the Ludlow Beds. The rock of this inlier has been much worked, and two beds of the limestone, collectively only 18 inches thick, are locally known as "Ledbury Marble."[131] Fossils are very common here, and indeed wherever the limestone is seen. The main escarpment runs north from Clincher's Mill. There are quarries at Gold Hill, and to the north-west of Netherton, while the Ridgeway owes its existence to the presence of this limestone between the less weather-resisting Wenlock Shales below and the Lower Ludlow Shales above. The beds worked in Colwall Copse are interesting as being coarsely oolitic. In the Cradley district the limestone forms a regular ridge to the west of the May-Hill-Sandstone area, but on the eastern side it occurs only in the little outlier near Cowleigh-Park Farm, where it has been worked. Murchison remarks that organic remains are nowhere more abundant than in the Malvern district.

Lower Ludlow Shales.—These beds consist of grey shales with limestone-nodules, and at the top include somewhat flaggy beds as in the Woolhope and Ludlow districts. The beds mantle round the great quarry in the Wenlock Limestone above Ledbury, and have been worked in a brickyard at the foot of the western slope of Eastnor Hill. Phillips observed the beds well exposed in the hollow west of Gold Hill, but the best places are in the lane near Dog Hill. The section by the side of the lane south of Eastnor village, where the beds are very fossiliferous, is now quite overgrown. The middle portion of the series is visible between Brock Hill and Colwall Copse, but in the Cradley district the beds are rarely visible.

Aymestry Limestone.—Phillips, who took so much pains to show the distribution of this limestone in the Malvern district,[132] remarks that clear as are the physical indications of its presence, the

130 Q.J.G.S., lvi. (1900). pp 147-148.
131 "Silurian System" (1839), p. 413.
132 Mem. Geol. Surv., ii. pt. 1 (1848), pp. 91-94.

THE TEMESIDE AND BOTTOM-BEDS OF THE OLD RED SANDSTONE IN THE APPROACH-CUTTING TO THE LEDBURY TUNNEL. A. Watkins, Photo.

bed itself is by no means easy to map. The division consists of irregular concretions mixed with shale, and, as observed by Murchison, although nearly as thick as in Shropshire, is never so pure. Symonds found *Sieberella galeata* to take the place of *Conchidium Knighti* in this district, and Murchison did not notice the latter fossil. The beds have been quarried at Dog Hill, and alongside the road at Chance's Pitch. At the latter place and at Evendine, *Leptæna depressa* is a common shell. A boring at Schweppe's Water-Works, left off in the Aymestry Limestone, proved brine-water, but the presence of the salt has not been satisfactorily accounted for.[134] Phillips has recorded the section at Hales-End in the Cradley district, where the limestone—consisting of nodular rock in the lower portion, and shale and concretions in the upper—is seen with the Upper Ludlow Shales above and the Lower Ludlow Shales below. A layer made up of specimens of *Wilsonia Wilsoni* occurs in the upper beds—the "Passage-Beds" Phillips called them.

THE UPPER LUDLOW SHALES.—The beds cover a considerable area to the east of Ledbury. Phillips remarks that the basement-beds are difficult to separate from some of the shaly "Passage-Beds" of the Aymestry series. The middle portion contains many limestone-nodules and is replete with shells. The upper beds are equally fossiliferous, and become increasingly arenaceous and of a littoral facies as they are traced upwards. In the roads about Dog Hill there are fair sections of the beds.

G. H. Piper discovered the Ludlow Bone-Bed in the railway cutting at Ledbury, and again below the bridge between Reddings Hole and the Frith.[135] *Graptolithus ludensis* has been found in the Ledbury tunnel, but such remains appear to be rare in the Malvern district.[136] Above Frith Farm the beds are full of fossils. Northwards they may be traced along the steep hillside to Coomb Hill, thence round to Barton Court and Oldcastle to Evendine, at all of which places the transition into the Temeside Series may be observed. The best section, however, is that at Hale's-End, in the Cradley area, where the complete succession from the Lower Ludlow into the Old Red is to be seen.[137]

TEMESIDE STAGE.—In the Malvern district the Temeside Beds have been exposed at several places. The chief section is at the entrance to the Ledbury tunnel (plate II). At the time the line was constructed in 1860, the section was considered the finest of these particular deposits in England, and was described

133 "Old Stones" (1884), p. 75.
134 Trans. Woolhope Nat. F.C., 1896 (1897), p. 213
135 *Id.*, 1884, pp. 136-137.
136 "Old Stones," p. 69.
137 Mem. Geol. Surv., ii. pt. 1 (1848), pp. 98-99.

in detail by Symonds.[138] Above the Upper-Ludlow Shales, in ascending order, come (1) Downton Sandstone, with remains of *Pterygotus* and *Lingula*, 9 feet, (2) red and mottled marls and thin sandstones with *Lingula* and remains of *Pteraspis*, 210 feet, (3) grey shales with *Pterygoti* and *Cephalaspis Murchisoni*, 8 feet, (4) purple shales with thin sandy beds and fragments of *Lingulæ*, 34 feet, (5) grey marl passing into red and grey marl with bluish-grey rocks with *Auchenaspis Salteri*, *Auch. Egertoni*,[139] *Pterygotus*, *Cephalaspis*, and *Lingula* (*Auchenaspis*-Grits), 20 feet, and then strata which pass conformably into red marly beds with white and reddish sandstones that have yielded remains of *Pterygotus*, *Pteraspis*, and *Cephalaspis*. It was from the "Old Red Sandstone" immediately above the *Auchenaspis*-Grits that *Didymaspis Grindrodi*, Lankester, came.[140]

Piper examined the sections at the time the alterations were made at the tunnel-mouth in 1882-83, and has contributed remarks upon the subject. He found the Temeside Shales to be 400 feet thick. Remains of *Cephalaspis* were much more abundant here than even in the Ludlow railway-cutting, where *Auchenaspis* was discovered about the same time as Brooks procured the first specimen from Ledbury in 1858. Brooks, however, only obtained the heads of the fish; it was not until 1882 that Piper[141] found specimens with a few body-scales attached. Later he obtained three tolerably perfect fish, but they came from a stratum much lower down than that from which the first specimen was procured.

Along the borders of the Silurian tract exposures of the "Passage-Beds" may be seen at many places. Downton Sandstone, which varies in thickness in this district (according to Phillips, from 10 to 100 feet) has been worked on the west side of Raycombe and Raffnal Woods.[142]

At Brockhill the junction of the Silurian and Devonian Systems is exposed, and Phillips has recorded details of this well-known section,[143] but it was the Rev. F. Dyson[144] who was the first to find the Ludlow Bone-Bed here.[145] Salter also examined the section, and found at the base sandstone full of *Rhynchonella nucula*, *Chonetes lata*, *Leptæna lævigata*, etc. Above are hard thick-bedded cal-

138 Q.J.G.S., xvi (1860), p. 193; Edin. New Phil. Journ., 1859, p. 232; see also Q.J.G.S., xvii. (1861), p. 154; Symonds in Woodward's Monograph, pp. 99-100; "Records of the Rocks," p. 202.

139 R. Lankester, "Monogr. on the Fishes of the Old Red Sandstone," Pal. Soc., p. 57.

140 Geol. Mag., iv. (1867), p. 152.

141 Trans. Woolhope Nat. F.C., 1883 (1890), pp. 17-18, *id.*, 1884 (1890), pp. 136-138; *id.*, 1895-97 (1898), pp. 310-313.

142 Mem. Geol. Surv., ii. pt. 1 (1848), p. 100.

143 *Id.*, p. 97.

144 Edin. New Phil. Journ., 1856, p. 172.

145 See Symonds, Trans. Malvern Nat. F.C., pt. 2 (1853-70), p. 8.

careous sandstones and shales with *Chonetes lata* and *Rhynchonella nucula*; and then the Bone-Bed—"a series of calcareous nodules, filled with the before-named species and bearing on its surface coprolitic masses and nodules." To the Bone-Bed succeeds the Downton Sandstone, the lower part of which consists of soft and thin-bedded layers of rock, and the upper of more solid. *Platyschisma helicites* is common near the base and *Lingula cornea* is another not infrequent fossil. The overlying beds Salter thought might represent the Kington building-stones from which so many *Pterygoti* and *Pteraspides* have been obtained, but from his notes they would seem to belong rather to the Temeside Shales. Salter was the first to find the Ludlow Bone-Bed cropping out in the hillside immediately behind Hale's-End Farm, near Stifford's Bridge.[146]

(c) Woolhope District.—The Silurian rocks forming this inlier occupy a pear-shaped tract, the broad end of which is directed to the north-east. The major axis is at least 10½ miles in length, striking north-north-west and south-south-east, while the minor axis is at right angles to this and measures about 4½ miles.

The genesis of the "Woolhope Dome," as it is termed by geologists, probably dates from that period of flexuring and fracturing which intervened between the time of formation of the "older" and Upper Coal-Measures. There is no doubt that the strata now uplifted and dipping away in all directions from the central mass of May-Hill Sandstone were once horizontal. They have been thrown into their present position, Mr. T. Mellard Reade thinks,[147] by peripheral pressure, for when so affected they could only find relief in bulging upwards and forming a great pyriform dome. The top of this dome has long been removed, and the surface of very diverse stratal composition that was laid bare has been subjected to differential denudation during untold ages.[148] The results compel admiration. Standing on the vantage ground of Adam's Rocks and looking over this great "Valley of Elevation," as Murchison termed it, to the south-south-east is seen the rolling, wooded, May-Hill-Sandstone tract called the Haugh Wood, flanked by the Woolhope Limestone, and followed by the broad level expanse where the soft Wenlock Shales crop out. Then comes the notched ridge of Wenlock Limestone, which is separated from the Aymestry Limestone that forms the outer chain of high ground which borders and overlooks the whole of this singular district, by a valley excavated in the Lower Ludlow Shales.

Mr. Mellard Reade's explanation of the origin of the Woolhope Dome as being due to peripheral pressure may also be expressed in

146 *Id.*, p. 11.

147 Proc. Cotteswold Nat. F.C., xiv., pt. 3 (1903), pp. 258-259; Trans. Woolhope Nat. F.C., 1902-1904 (1905), pp. 32-33.

148 See C. Callaway, Proc. Cotteswold Nat. F.C., xiv., pp. 257-258.

terms of forces acting contemporaneously or thereabouts from southerly and easterly directions. In the present case it is obvious that the force acting from the east or north-east was the stronger, This fact is brought out very clearly in a diagram by the Rev. R. Dixon,[149] and still more so by Phillips in his lucid little outline-sections across the Malvern Hills and the Woolhope Valley.[150] Phillips also noticed that while the strata about the junction-line of the Silurian and Old-Red Systems on the north-east side of the inlier were comparatively free from dislocations and contortions, those on the south-west were much confused and the dips "irregularly twisted."

Few brooks drain the Woolhope Valley. There is the Pentalow Brook, which has excavated for itself a valley along the line of the fault at Mordiford, and there are the Fownhope and Sollar's-Hope Brooks, which also breach the hills on the south-west side of the valley, but as yet none of the streams working their way backwards from other quarters have obtained access to the central region.

Since the publication of Murchison's "Silurian System,' wherein the remarkable physical features of the district are so admirably outlined and the succession of the rocks so briefly, but so clearly sketched, many geologists have visited the tract, but few with any object other than to become acquainted with the general features of so classic a neighbourhood.

Phillips has described in considerable detail the geographical distribution of the various rock-divisions, noticing the dips of the beds at various places, and mentioning numerous faults, only one of which, however, is shown on the Geological Survey-Map.[151] The Rev. R. Dixon has contributed a paper on the geology of the district, giving a general account of the distribution of the strata, their method of upheaval, the means by which they have been denuded, their palæontology, and a list of the localities where they may be most advantageously studied and fossils collected.[152] Piper has also written on the same subject,[153] and the Rev. P. B. Brodie has contributed papers on the palæontology of the Silurian rocks[154] and on the "Passage-Beds" of the district; but as yet the illuminating rays of modern methods of research have not been brought to bear on the rocks first studied by the "Silurian Chief," nigh 70 years ago.

149 Trans. Woolhope Nat. F.C., 1867 (1868), p. 174 ; see also Symonds, "Record of the Rocks," pp. 152, 164-165 ; Dr. T. A. Chapman, Trans. Woolhope Nat. F.C., 1876, pp. 255-258.
150 Mem. Geol. Surv., ii. pt. 1 (1848), facing p. 6.
151 *Id.*, pp. 164-179.
152 Trans. Woolhope Nat. F.C., 1867 (1868, pp. 170-190) ; *id.*, pp. 135-142.
153 *Id.*, 1891, p. 164.
154 *Id.*, 1868 (1869), pp. 144-147.

SCUTTERDINE QUARRY, NEAR MORDIFORD, IN THE WOOLHOPE DISTRICT. THE ROCK QUARRIED IS WOOLHOPE LIMESTONE.

A. Watkins, Photo.

SCUTTERDINE QUARRY, NEAR MORDIFORD.

A. Watkins, Photo.

Several general accounts of the district have been published[155] and, needless to say, incidental references abound.

MAY-HILL SANDSTONE.—This rock forms the rising ground called the "Haugh Wood," but except for occasional exposures in lanes, when it is seen to occur as "thin brown sandy deposits,"[156] there are no sections of importance. At Foulmire's Farm a mass of this rock has been observed *in situ*,[157] and on the slope of the hill above Scutterdine Brodie found in detached blocks, "*Petraia bina*," *Pentamerus oblongus*, and *Stricklandinia lens*.[157] Phillips records an attempt to find coal on the south side of the Mordiford fault at Mangerdine.[158]

WOOLHOPE LIMESTONE.—The Woolhope Limestone was thus named by Murchison on account of its fine development near the village of Woolhope, from which the County Naturalists' Club also takes its name. The limestone wraps round, except for a short space on the north-west, the mass of May-Hill Sandstone, and has been largely worked at the well-known Scutterdine Quarries, near Mordiford (plate III.), and at the Scar Quarry, Woolhope. Other sections are at Rudge End, 1½ mile north-east of Fownhope, at Wessington, about a mile south-west of Woolhope, and at Stony Hill, Woolhope. The quarry at Scutterdine is as satisfactory as any for fossils, and *Homalonotus delphinocephalus*, *Illœnus barriensis*, have been found here,[159] while the *Actinoceras baccatum*, described and figured by Dr. H. Woodward, probably came from the same place.[160] Graptolites are said to have been obtained from the Woolhope Limestone of this neighbourhood.[161]

WENLOCK SHALE.—Between the Haugh Wood and the ridge of Wenlock Limestone is a broad flat-bottomed valley in the Wenlock Shales. As these shales are of no commercial value the sections are either natural ones or in lanes. There are fossiliferous exposures in some lanes and in the brook-sides on Checkley Common, in lanes south of Woolhope, and at Nupend on the road to Rudge End.

WENLOCK LIMESTONE.—This division comprises a massive bed some 30 feet thick, overlaid by shales with scattered limestone

155 Symonds in "The Flora of Herefordshire," *id.*, 1866 (1867), pp. 6-8; "Records of the Rocks" (1872), pp. 164-165; Proc. Geol. Assoc., iii. (1874), pp. 275-277; "Old Stones" (1884), pp. 62-66; "A Flora of Herefordshire," Hereford, 1889, pp. ix.-xiii.; Rev. Prebendary Elliot, "Geology," in Jakeman & Carver's "Directory and Gazetteer of Herefordshire," p. 12, Hereford, 1890; W. J. Harrison "Geol. Counties England and Wales" (1882), p. 116; H. C. Moore, Trans. Woolhope Nat. F.C., 1902, pp. 19-35.

156 "Records of the Rocks," p. 140.

157 Trans. Woolhope Nat. F.C., 1870 (1871), p. 175; see also "Records of the Rocks," p. 164.

158 Mem. Geol. Surv., ii. pt. 1 (1848), p. 168.

159 Trans. Woolhope Nat. F.C., 1891 (1894), p. 160.

160 Geol. Mag., 1868.

161 Trans. Woolhope Nat. F.C., 1852, p. 18.

nodules measuring between 30 and 40 feet. In some places, as at Donnington, the nodules at the top of the upper division are cemented together and form a second massive limestone deposit. The beds are crowded with fossils, particularly corals, such as *Halycites catenularia* and *Favosites gothlandicus*, and the now disused quarries at Dormington are well-known as a rich hunting ground for collectors. Similar beds can be studied on the ridge at Canwood, in the road at Winslow Mill, at Hyde, where the limestones are particularly fossiliferous, and at Lindels. The last-named is an interesting locality about a mile east of Sollar's Hope. It is situated at the place where the escarpments of Wenlock Limestone meet. As would be expected from the known structure of the district, a section of any extent along a line running north-east and south-west, that is at right angles to the major axis, would reveal the anticlinal disposition of the strata. Here the two ridges of Wenlock Limestone meet at an acute angle, showing dips in different directions, but matters are also complicated by faulting. The Wenlock Limestone is coarsely oolitic, as near Malvern, and has yielded numbers of trilobites, brachiopods, and corals. On Common Hill, above Fownhope is a long line of exposures in equally fossiliferous limestone.

Lower Ludlow.—There are not many recorded sections of these beds, but from what details have been obtained it would seem that they are of the same general facies as in the Ludlow district. The lower portions consist of shale, but in the upper parts Phillips observed "flat limestones," which correspond no doubt to the "Pendles" of the Ludlow district. The shales are occasionally seen in the lanes around Wootton, at Winslow Mill, and under Backbury Hill. At the last-named place, and from the outcrop of the beds between there and Dormington, graptolites have been obtained.[162]

Aymestry Limestone.—This rock forms an almost continuous ridge, and is the great natural boundary of the Woolhope "Valley of Elevation." It is well exposed at Adam's Rocks, where the straight-cut joints which traverse it, and to which Phillips drew attention, can be admirably studied, and many fossils collected. Brachiopods, including *Conchidum Knighti*, *Sieberella galeata*, *Wilsonia Wilsoni*, and corals, are not infrequent here or at the numerous other places where the limestone is exposed, for instance, at Marian's Hill, Perton, near Stoke Edith,[163] Putley Cockshoot, Sleeves Oak (2 miles south-east of Woolhope), Ridge Hill (3 miles south-south-east of Woolhope), Bodenham, near Much Marcle (where Captain James obtained from the bed which is exposed at

162 "Records of the Rocks," p. 204; Trans. Woolhope Nat. F.C., 1852, pp. 24, 36.
163 Trans. Woolhope Nat. F.C., 1886, p. 83; *id.*, 1876, p. 53; *id.*, 1900, p. 29.

the bottom of a large quarry, *C. Knighti*[164]) Nupend Mill, and Cherry Hill to the north of Fownhope. Near the Pound in Queen's Wood, Phillips records the occurrence of Wenlock Limestone, and Aymestry Limestone at the bottom of the quarry at Woodhouse, on the road from Ross to Newent.[164]

Upper Ludlow Shales.—These deposits are of the usual facies, and frequently exposed—especially in lanes. They have been observed at Old Sufton,[165] Prior's Court, Dormington, Perton Lane, Durlow Common, Bodenham, Gamage Ford, Yatton Farm, and elsewhere. The section in the lane between Gamage Ford and Bickerton shows the Aymestry Limestone, very fossiliferous, Upper Ludlow Shales (with the Bone-Bed), and the basal Downton-Sandstone beds. The Ludlow Bone-Bed is crowded with fish-remains, and it was here that the strange fossils, called *Pachytheca* by Sir J. Hooker,[166] were first discovered by the Rev. H. Stone. From the upper beds in the Yatton-Farm Quarry Phillips obtained graptolites, and from the lower, *Dayia navicula*. The Durlow Common section is up the hill by "Hazle" and Hill Barn, where the Aymestry Limestone is seen succeeded by shales with thin limestones full of *Lingula Lewissi*, and in the upper part *Chonetes lata* is common. At "Hazle" blue flaggy rock is worked, and still farther east laminated sandy beds and shales with "Walker's Soap" come on, succeeded by flaggy micaceous beds "on the confines of the true Old Red Series."[167] This "Walker's Soap" often occasions slips (see plate IV.), the most notable of which is that called "The Wonder." Many ancient authors have written about it, including Stowe, Camden, Fuller, Drayton, and Baker. Murchison notices it in some detail, and Phillips has referred to it.[167]

Temeside Stage.—Although the Temeside Beds of this district have not been methodically investigated as yet, thanks to the labours of Brodie[168] and Phillips, considerable information is available. The beds environ those represented as Silurian on the map, and are exposed at many localities—more particularly on the north-east side. The best section in Brodie's time was that at Perton, Stoke Edith. Here in a small quarry at the foot of the lane were seen, in descending order, (1) sandstones and shales, which are on the same stratigraphical horizon as the Fragment-Bed, 5 ft., (2) yellow sandstone, 1½ ft., (3) "Olive Shales," 5 ft., (4) Sandstone, 5 inches, (5) "Olive Shales," (5 ft., (6) Downton Sandstone. From the Olive Shales Brodie procured *Pterygotus Banksi*, three species

164 Mem. Geol. Surv., ii. pt. 1 (1848), p. 178.
165 *Id.*, p. 175.
166 Q.J.G.S., ix. (1853), p. 12.
167 Mem. Geol. Surv., ii. pt. 1 (1848), p. 176.
168 Trans. Woolhope Nat. F.C., 1870 (1871), pp. 273-279; Q.J.G.S., xxv. (1869), pp. 235-237.

of *Eurypterus* identified by Dr. H. Woodward, and a new *Eurypterus* called *E. Brodiei* by Dr. Woodward.[169] The Olive Shales, which Brodie paralleled with bed 12 of Symonds's Ledbury section, rest upon the Downton Sandstone, and it was from the latter that Symonds obtained the carapace of a *Pterygotus*.[170] All the sandstone beds are more or less fossiliferous and yield plant-remains—particularly seeds (*Pachytheca*) belonging to a plant of doubtful affinity.[171]

The "Passage-Beds" are exposed all along the lane from Old Sufton to Dormington. At Prior's Court are sandstones, which Brodie paralleled with the top sandstone-beds of the Perton section. Sandstones with *Pachytheca* and other plant-remains were formerly worked near Tarrington;[172] between this place and Lower Marcle; and at "Hillfoot," where they were clearly seen to occur above the "Olive Shales." The beds at the last place yielded *Pachytheca*, and a *Lingula* that Brodie thought was the small *Lingula cornea*, but which Symonds pronounced distinct. Farther to the south-east, on Putley Common, Brodie found beds with *Lingula cornea*, which he held corresponded to the grit-bed above the "Olive Shales" at the Tin Mills, Downton. A peculiar stratum, somewhat resembling a volcanic rock, was noticed by Brodie above the clay worked in a pit at Putley, and again two miles farther south at Chandler's Farm. The Passage-Beds are also very well exposed in the lane between Lynedown and Gamage Ford.[173] Near Welsh-Court Farm the junction of the Old-Red and Silurian Beds is admirably displayed, and the section has been described in detail by De la Beche.[174]

On the south-west side of the Woolhope inlier, between Welsh Court and Mordiford, the "Passage-Beds" are not often exposed, being hidden under Superficial Deposits, but they have been observed at Nash Tump, near Sollar's Hope, where crustacean and plant-remains have been found.[175]

On Gorstley Common the yellow Downton Sandstone has been largely worked, and the "Passage-Beds" have been noticed by Murchison in Linton Lane; but then, as far as is known at present, the Silurian rocks dip down and disappear under the Old Red. Only for a short distance, however, for they re-appear to form the conspicuous, picturesque, and equally classic tract of May Hill, which, with its diadem of firs, is so well-known a landmark in the Lower Severn Valley.

169 Rep. Brit. Assoc., Liverpool, 1870, p. 91; Q.J.G.S., xxvii. (1871), p. 261; Trans. Woolhope Nat. F.C., 1870 (1871), pp. 276-277.
170 Symonds in Woodward's Monograph, pp. 110-111.
171 Proc. Geol. Assoc., xviii. (1904), pp. 458-459; see also A. C. Seward, Fossil Plants, i. (1898), pp. 192-204; "Flora," pp. xi.-xiii.
172 Trans. Malvern Nat. F.C., pt. 2 (1853-70), p. 13.
173 Mem. Geol. Surv., ii. pt. 1 (1848), p. 178.
174 Mem. Geol. Surv., i. (1846), p. 37.
175 Trans. Woolhope Nat. F.C., 1868 (1869), p. ii.

(D) MAY-HILL DISTRICT.—It is unnecessary to describe in detail the rocks of this tract. They are of the same general facies as their equivalents in the Malvern and Woolhope districts. Only a small portion of the May-Hill area, that about Aston Ingham, is in Herefordshire, but rocks from the May-Hill Sandstone to the Temeside Series, inclusive, are present. Since the days of Murchison and Phillips they have received little or no attention, but recently Dr. C. G. Cullis and the writer made a preliminary survey with a view to undertaking a detailed examination of the district.

In the May-Hill district two great axes of elevation, the Malvernian and the Woolhopian, meet. No wonder then that the rocks of the neighbourhood of Aston Ingham are so peculiarly distributed. The resultant of the forces induced by the crust-pressures seems to have been directed to the south-east. Rocks which should have formed portions of continuous belts around the dome have been displaced and thrust in that direction in wedge-like masses—younger rocks in some cases parting older. For example, the Old Red in one place separates Ludlow rocks from Wenlock.

At Clifford's Mesne, on the borders of Herefordshire and Gloucestershire, in one section (southern one) the Old-Red Marls are seen overlying the Downton-Castle Sandstones; in another (northern one), the latter deposit upon the Ludlow rocks—here impure limestones. Along a certain horizon in the Downton-Castle Sandstones the spherical seeds, called *Pachytheca*, abound. Here, as at Ludlow, the massive sandstone-beds are parted from the Ludlow rocks by more shaly beds, three or four feet thick. The Downton-Castle Sandstones are exposed in a disused quarry by the road-side a third of a mile east of Aston-Ingham Church. The Wenlock Limestone, somewhat more nodular than usual, and stained red and purple, is exposed in a small quarry under half a mile east by north of the same church, and again at the back of Hay Farm, where it is in close proximity to the great fault that throws the Limestone into juxtaposition with the May-Hill Sandstone, that forms the heart of May Hill. Gorse and bracken grow well upon the gritty soil of May Hill, and remind one of the Cotteswold Hills, where gorse is an infallible index to an arenaceous deposit.

(E) HAGLEY INLIER.—To the north-west of the Woolhope inlier are the two inliers of Hagley and Shucknall Hill. The flexuring of their rocks probably took place at the same time as those of the Woolhope inlier.[176]

The Hagley inlier has been very minutely described by H. E. Strickland. J. Scobie, the first Honorary Secretary of the Woolhope

176 *Id.*, 1886, p. 53.

Club,[177] discovered this "upcast of uppermost Silurian deposits,"[178] when in company with Symonds and Strickland.[179] The quarry which they investigated[180] has long been abandoned, but in ascending order they observed (1) the top-beds of the Upper Ludlow from which Scobie obtained the remains of the *Pterygotus problematicus* dealt with by Salter,[181] (2) the Ludlow Bone-Bed, 1 inch thick, and rich in crustacean and ichthyic remains embedded in a calcareous cement, imperfectly crystalline,[182] (3) Downton-Castle Sandstones, with *Pachytheca* and other plant-remains, according to Symonds, 6 feet 6 inches thick, and (4) Ledbury Shales, 4 feet. Strickland concludes his paper by showing the relations of the beds in this inlier to those at Woolhope, and points out that the trap-rock of Bartestree occurs on the same axis as the protrusions of the Silurian rocks at Hagley and Woolhope.

(f) Shucknall Hill.—The rocks of this inlier have been described by Phillips[183] and Murchison.[184] There are quarries in the Aymestry Limestone, which is the lowest rock seen; and the Upper Ludlow Shales—in addition to being exposed in the large quarry—can be studied in the lane near Shucknall Farm. According to Murchison, "Walker's Soap" has been worked in this area.

VII.—DEVONIAN SYSTEM.

(i.) General Remarks.—In Herefordshire the Devonian rocks are known by the familiar name of Old Red Sandstone, and occupy by far the greater part of the county. Iron, of course, is the colouring substance, and the change in colour and the diminished richness of the soil when these Old-Red rocks are left and the Silurian deposits are entered upon is very noticeable. Water occurs at various levels. Where the deposits are clayey the water holds many red particles in suspension, but where they are chiefly of the nature of impure limestones, or "cornstones," as they are locally called, it is beautifully clear.

Murchison was the first to properly investigate the Old Red rocks of Herefordshire, and emphasized their distinction from the

177 Trans. Woolhope Nat. F.C., 1852, p. 5.
178 "Flora" (1889), p. xx.
179 See Symonds in Woodward's Monograph, p. 95.
180 Strickland, Q.J.G.S., viii. (1852), p. 381; see also *id.*, ix. (1853), p. 8; Trans. Woolhope Nat. F.C., 1870 (1871), pp. 167-172; Rev. R. Dixon, *id.*, 1867 (1868), pp. 180-181.
181 Q.J.G.S., viii. (1852), p. 386; Trans. Woolhope Nat. F.C., 1870 (1871), pp. 171-172.
182 Proc. Geol. Assoc., i., p. 260.
183 Mem. Geol. Surv., ii. pt. 1 (1848), pp. 179-180.
184 "Silurian System" (1839), p. 435; see also R. Dixon, Trans. Woolhope Nat. F.C., 1867 (1868), p. 181; Symonds, "Records of the Rocks," p. 205.

Carboniferous System with which previous writers, except Lyell, had been wont to class them. He commenced his researches in 1831, and pointed to the lofty Black Mountains and to the Fans of Brecknockshire and Carmarthenshire, as affording "the grandest exhibition of the Old Red Sandstone in England and Wales." In no other country that he had visited had he ever seen "such a mass of red rocks so clearly intercalcated between the Silurian and the Carboniferous."[185]

The term "Devonian" was first published by Murchison and Sedgwick in 1840 for the great series of slates and limestones of South-West England, that Lonsdale had three years previously shown to contain fossils of forms intermediate between those of the Silurian and those of the Carboniferous Systems, and they regarded the unlike rocks of Hereford and Devon as belonging to one and the same period. At first the dissimilarity between the observed organic remains in the two districts seemed to militate against this view, but later its probability was shown by Murchison and M. de Verneuil finding in association in the Devonian rocks of Russia fish similar to those that characterize the Old-Red rocks of Herefordshire, and mollusks and corals similar to those that occur in the marine or normal facies of the System in Devon.

The Old Red Sandstone is that system of deposits which intervenes between the Fragment-Bed or its equivalent and the phase of *Modiola lata* (see Table of Strata).

Murchison made two divisions of these intervening beds, (1) Quartzose Conglomerate and Sandstone, and (2) Cornstone and Marl.[186] Symonds made three, (1) an Upper, (2) Middle or Brownstone, and (3) a Lower or Cornstone.[187]

It has been doubted by some whether the Brownstones should rank as a distinct series, and be looked upon as the equivalent to the Middle Devonian, as Symonds thought. Prof. T. McKenny Hughes holds that they belong to the Upper Division.[188] Symonds was disposed to parallel them with the *Osteolepis*-Beds—the Middle Devonian of Murchison in the north of Scotland—holding that they occupied the same physical position; but he admitted that the Brownstones had "supplied no fossils of correlation value."

Of recent years little or no serious work has been done in connection with the Old Red of this county. Thanks, however, to

185 "Siluria" (ed. 5, 1872).
186 "Silurian System" (1839), p. 170.
187 "Records of the Rocks" (1872), p. 212; see also for a good general description, "Old Stones" (2 ed. 1884), pp. 91-115, and Edin. New Phil. Journ., 1859, p. 232.
188 See H. B. Woodward's "Geology of England and Wales" (2 ed., 1887), p. 119.

the pioneer work of Murchison, to the assiduous collecting on the part of Dr. Lloyd of Ludlow, who was apparently the first to find fish-remains in these strata,[189] Salwey, Lightbody, Dr. D. M. McCullough, the Revs. T. T. Lewis and W. S. Symonds, R. Banks, G. H. Piper, and Henry Brooks, of Ledbury, and to Dr. H. Woodward, Prof. Ray Lankester and James Powrie, J. W. Salter, and Dr. R. H. Traquair, who have identified and described many of the fish-and crustacean- remains, the fauna is fairly well known.

Fish predominate, and, as in other parts, admit of the Old Red of Herefordshire being divided into two series, an Upper and a Lower. Fish-remains, of course, are not often descried on a mere cursory inspection of a section, but as long ago as 1852, Scobie remarked that he had obtained vertebrate-remains in almost every quarry in the vicinity of Hereford, and that their rarity had been taken too much for granted. It is true that only fragments of *Pteraspis* and *Cephalaspis* have been found in the Brownstones, but they are quite sufficient to show that the strata belong to the Lower Division rather than to the Upper, and improbably to the horizon of the *Osteolepis*-Beds, which, as Dr. A. Smith Woodward has observed, possess a very distinctive fauna that "has not been found in the Welsh area."[190] *Holoptychius, Saurichthys, Bothriolepis,* and *Asterolepis,* characterize the Upper Division of the Devonian wherever it occurs, whether in Britain, Belgium, Germany, Russia, Greenland, or Canada; while *Pteraspis, Cephalaspis,* and *Phlyctænaspis,* the Lower, over an area no less extensive. While the ichthyic remains permit of a dual division of the system, colour and lithic structure allow of the separation of the Lower Division into two parts, namely, an Upper or Brownstone, and a Lower, or Cornstone.

The correct thickness of the Old Red Sandstone of Herefordshire is not known. Murchison estimated it at 9,000 or 10,000 feet.[191] That was when the Tilestone was included. Phillips placed its maximum thickness at 8,000 feet,[192] but admitted that it varied between 5,000 and 8,000 feet.[193] Mr. H. B. Woodward gives the thickness of the Cornstone division as varying from 1500 to 2,500 feet;[194] and that of the higher beds as 4,000 feet.[195] Mr. A. J. Jukes-Browne states the thickness of the Upper Series as from 200 to 500 feet, and the Middle or Brownstone from 500 to 1,500, and the Lower or Cornstone from 2,500 to 4,000.[196] Since in Shropshire on the

189 "Silurian System" (1839), p. 586.
190 Proc. Geol. Assoc., xviii. (1904), p. 434.
191 "Silurian System," p. 184.
192 Mem. Geol. Surv., ii. pt. 1 (1848), p. 102.
193 "Geology of Oxford and the Valley of the Thames" (1871), p. 78.
194 "Geology of England and Wales" (1887), p. 119.
195 *Id.*, p. 142.
196 "The Students' Handbook of Stratigraphical Geology" (1902), p. 188.

north, the Old Red is 3,700 feet thick, and at Abergavenny on the south, 4,200 feet, the mean of these two numbers might have been expected for its thickness in the intervening tract. Until more precise information is to hand its thickness may be supposed to be anything between 3,900 and 8,000 feet.

The Silurian Period was brought to a close by crust-pressures which increased the land-surface, ridging it with mountain-chains having a general west-south-west and east-north-east alignment. In Siluria the change was gradual, for the marine beds of the Silurian give place to the shallow-water sandstones and shales of the Temeside Series, and these to the Old Red Sandstone.

There has been much discussion as to the conditions under which the Old Red of Siluria was deposited, whether in an estuary, bay, or lake.

Dr. John Fleming was the first to suggest a lacustrine origin.[197] Godwin-Austen, basing his conclusions on the fact that the Old-Red fish resemble in many respects those of the American lakes of the present day, also advocated a lacustrine origin[198]—a view that was upheld by Sir A. Ramsay[199] and later by Sir Archibald Geikie.[200] The late R. Etheridge,[201] and La Touche,[202] also believed in the areas of accumulation of the marine Devonian and the Herefordshire Old Red having been quite separate, and in 1904 Dr. A. S. Woodward quoted Geikie's view of the origin of the latter in a "Welsh" lake.[203] Symonds was always opposed to the "lake theory,"[204] and so also was Prof. E. Hull,[205] who held that the Cornstones at any rate were most probably of estuarine origin, and laid down in an area connected with the open sea which spread over the Devonian region to the south. Neither does Mr. Jukes-Browne support the "lake theory." As he rightly points out, if there had been a lake separated from the sea by a barrier, there should be some evidence of this barrier. But there is not.[206] At present the view that the Herefordshire Old Red was found in a bay seems the most probable, and this was obviously G. H. Piper's opinion.

It may be suggested that in Lower-Old-Red times the effect of the crust-pressure was to produce in Siluria a tongue-shaped bay, which narrowed to the north, in which direction it may have passed into an estuary. In Scotland, however, between the subparallel

197 "Geol. Eng. and Wales," p. 118.
198 Q.J.G.S., xii. (1856), p. 51.
199 "Physical Geol. and Geogr. Gt. Brit.," ed. 5, p. 106.
200 Trans. Roy. Soc. Edin., xxviii., p. 246.
201 Q.J.G.S., xxiii. (1867), p. 697.
202 Trans. Woolhope Nat. F.C., 1893 (1896), p. 15.
203 Proc. Geol. Assoc., xviii. (1904), p. 434.
204 "Records of the Rocks," pp. 214-215.
205 Q.J.G.S., xxxvi. (1880), p. 270.
206 "The Building of the British Isles" (2 ed. 1892), p. 98.

mountain-chains lay lakes of various lengths in which was accumulated a thickness of Old Red far greater than that of Herefordshire.

The unconformity between the Lower and Upper Old Red in Scotland bespeaks an upward movement at the close of Lower-Old Red-times. This uplift either caused the rivers to cut down their channels anew or enabled the waters of the lakes to obtain egress by other courses, for the lakes were drained. What were the results of these movements in Herefordshire is not known, for no marked break in the succession has yet been observed either in this county or in the South Wales and Monmouthshire areas during the recent work of the Geological Survey. Here apparently, practically uninterrupted deposition continued throughout the Old-Red Period, throughout the Middle Devonian Epoch (when vulcanism was rife in the Scottish uplands), until a period of general subsidence admitted waters bringing with them a fauna which inaugurated another period—the Carboniferous.

(ii.) Lower Old Red Sandstone.—This series comprises the "Brownstone" and the "Cornstone Series." The lower, or Cornstone Stage, has been divided into (1) Rowlstone Beds, (2) Lower Cornstone, and (3) *Pteraspis*-Beds; the upper, or "Brownstones," into (1) Brownstones proper, and (2) Upper Cornstones.

The *Pteraspis*-Beds were once well displayed in a quarry near Pontrilas railway-station, and from similar beds in the tunnel Symonds procured the egg-packets of *Pterygotus* ("*Parka decipiens*") plant-remains, and portions of either *Scaphaspis* or *Pteraspis*[207]. The Lower Cornstones appear in the lower slopes of the Black Mountains and cap Ewyas-Harold Common.

The Cornstones, as originally described by Buckland,[208] consist of marl studded with concretions of limestone varying in size from that of a pea to blocks many tons in weight, and sometimes are present as thick beds. Dr. McCullough thought he could recognize two types—a concretionary and a conglomeratic.[209] In the case of the former, the Cornstones occur as disconnected bands of nodules, with less calcareous matter intervening between the masses, while in size they ranged from lines of nodules, like the smaller flints in the chalk, through beds measuring from 1 to 2 feet, to strata 9 to 10 feet thick. Later, however, he found that this series contained some very massive beds such as were seen in a quarry on Ewyas-Harold Common. In the conglomeratic type the cornstone-nodules are embedded in a matrix more calcareous than the nodules themselves, with the result that the deposit simulates a conglomerate. These beds vary in thickness from one inch up to 15 feet, and in

207 "Records of the Rocks," p. 229.
208 Trans. Geol. Soc., v. p. 512.
209 Trans. Woolhope Nat. F.C., 1869 (1870), p. 36.

SCENERY IN THE OLD RED SANDSTONE TRACT AROUND CRASSWALL PRIORY, NEAR HAY. A. Watkins, Photo

places furnish some useful building-stone and road-metal. In the southern tracts the cornstone-nodules are often so small as to be workable for gravel, and such Dr. McCullough thinks may have been formed by seggregation. Both De la Beche[210] and McCullough held that the cornstones were formed from lime deposited from a chemical solution. In samples of the rock collected from all parts of the county the percentage of carbonate of lime was found to vary from 38 to 88,[211] and in the days of Murchison these cornstones were widely burnt for lime—there was scarcely any part of the central districts of the county where lime-kilns were not numerous.[212]

The fish-remains in the Lower Cornstones of Ewyas-Harold Common are very fragmentary, but a fine specimen of *Eucephalaspis Agassizi*,[213] Lankester (= *C. Lyelli, Ag.*) has been obtained from a quarry here, and from that on the summit Dr. McCullough procured the *Pterygotus*,[214] called *P. taurinus* by Salter,[215] which must have measured 7 feet in length when complete. Symonds, however, thought that this specimen came from beds below the Lower Cornstones.[216] "*Parka decipiens*" is the common fosil here.

Above the Lower Cornstones are the Rowlstone Beds—greenish sandstones and marls. Such beds cap Rowlstone Hill, and were formerly worked for building-stone near the Church. They contain plant-remains, and yielded the *Eurypterus Symondsi*, Salter,[217] of "Siluria"[218] (later called *Stylonurus Symondsi*[219]); to the Rev. W. Wenman another *Eurypterus*;[220] and to McCullough the giant isopod, *Prœarcturus gigas*, described and figured by Dr. H. Woodward.[221]

Farther to the north-west, along the escarpment of the Black Mountains, between Cusop and Hay, Symonds procured from "some red flaggy beds" belonging to the Lower Cornstones the largest fish-spine known from the Old Red.[222] It was named *Onchus major* by Etheridge, and was presented by its discoverer to the Earl of Enniskillen. Up on the hill above Cusop, at a greater elevation than the place where the Lower Cornstones crop out, grey sandstones

210 Mem. Geol. Surv., i, (1846), p. 52.
211 Trans. Woolhope Nat. F.C., 1868 (1869), pp. 9-10.
212 "Silurian System," p. 177.
213 Lankester and Powrie, "Monogr. Fishes Old Red Sandstone of Britain," Pal. Soc., 1869 (1876).
214 Trans. Woolhope Nat. F.C., 1869 (1870), p. 38.
215 Rep. Brit. Assoc., 1868, Norwich, p. 78; Trans. Woolhope Nat. F.C., 1868 (1869), p. 178.
216 Symonds in H. Woodward's "Monograph Brit. Foss. Crustacea, etc.," Pal. Soc., p. 103.
217 Edin. New Phil. Journ., vi. (1857), p. 267; Q.J.G.S., xv. (1859), p. 230.
218 "Siluria" (3 ed., 1859), p. 230.
219 Q.J.G.S., xxi. (1865), p. 426; "Siluria" (4th ed., 1867), p. 246; Trans. Woolhope Nat. F.C., 1868 (1869), p. 239.
220 "Silurian System," pp. 246-247.
221 Q.J.G.S., xxi. (1865), p. 484; Trans. Woolhope Nat. F.C., 1870 (1871), pp. 266-270.
222 "Records of the Rocks," p. 239; "Flora of Herefordshire" (1889), p. xxxv.

are quarried for building purposes. These Symonds paralleled with the *Stylonurus*[222] or Rowlstone Beds and with the building-stone of Cradley; but Murchison included them in his Upper Division. They contain plant-remains so abundantly that they suggested a search for coal,[223] but vestiges of the old workings in the eastern side of the ravine above Cusop alone commemorate the fruitless attempt.

The Golden-Valley district, which lies at the foot of the Black Mountains, is a land of "cornstone, sandstone, and denuded valleys,"[224] in the rocks of which are embedded many fish-plates, called by the country-people "oysters."

In the neighbourhood of St. Weonards rocks belonging to the Cornstone Stage prevail. Cornstones are worked beyond Kilpeck; at Kentchurch, where, from a quarry in the top-beds near the Keeper's Lodge at the Park, Symonds once obtained many remains of *Pteraspis*, *Scaphaspis*, and *Zenaspis*; and on Orcop Hill, where the same geologist found plates of *Pteraspis* and *Cephalaspis*. These hills, together with Saddlebow, are capped with the Rowlstone Beds.

In the district of which Ross is the centre the Lower-Old-Red rocks occur in the lowlands, and the Upper Old Red in the hills that form the north-western fringe of the Forest of Dean. Instead, however, of the rocks of the Cornstone Stage occupying a great extent of country as they do in other parts of the county, they—together with the other Old-Red beds—crop out in the narrow tract, scarcely two miles wide, between the Carboniferous rocks of the Forest and the Silurian rocks of May Hill. This is owing to crust-pressures which have inclined the strata at a much higher angle than usual. From the summit of May Hill the ridges formed by the harder rock-subdivisions of the Old Red Sandstone may be admirably seen. Between the Hill and the Forest of Dean the two ridges are close together owing to the comparatively high inclination of the component beds; but westwards—as the dip lessens—they become parted by a wider expanse; the one ridge (formed by the lower strata) skirting the Silurian rocks of Fownhope before turning southwards; the other, keeping close to the Forest, and traceable in the far distance, forming a kind of outwork to the main mass of Upper Old-Red rocks that form the hills which stretch nearly across southern Herefordshire. The ridges, composed of hard strata, standing up amid lowlands carved out of softer material, afford an excellent illustration of the differential action of subaërial denudation.

222 "Records of the Rocks," p. 239; "Flora of Herefordshire" (1889), p. xxxv.
223 "Silurian System," p. 173.
224 "Flora" (1889), p. xxxi.

De la Beche has given a record of the succession of the beds between Howle Hill, near Hope Mansel, and Welsh Court, on the south-western slopes of the Woolhope inlier, near Yatton Chapel. The total thickness he puts at 5,620 feet.[225] He reproduces a sketch by Captain H. James of some false-bedded rocks displayed on the rise of the hill between Wilton and Ross.[226] Symonds searched all the quarries and railway-cuttings in this neighbourhood, but failed to find any trace of fossils.[227]

To the north-west of a line drawn north-east and south-west through Hereford, and lying between it and the main hill-mass composed of Silurian deposits, this part of the county (except in the Black Mountains) has for its rock-floor strata belonging to the Cornstone Stage. This is the case in the Golden Valley district, and beneath the Superficial Deposits, upon which Hereford is mostly built, are rocks low down even in the Cornstone Stage. Hills composed of Cornstones, however, rise upon all sides of the ancient city. Such are Dinmore,[228] The Pyons, Aconbury, Tybberton, Dinedor,[229] and Credenhill—the last a bold wooded eminence situated to the north of the Roman Magna Castra, the present Kenchester. Moccas Hill, near Bredwardine, is a mass of cornstones. Near Moccas is Brobury Scar on the Wye, where Lower-Old-Red beds, that have yielded fragments of *Zenaspis Salweyi* and *Scaphaspis*,[230] are exposed in a river-cliff.[231]

At Credenhill stone was once very actively worked, but only a few fragments of *Cephalaspis* and plant-remains were found. The hills bordering the road to Sutton are composed of cornstone rocks from which the Brownstones have only been, geologically speaking, recently removed;[232] while in the cuttings on the Hereford and Shrewsbury Railway, sandstones, interstratified with cornstones containing *Pteraspis*, and on about the same horizon as the beds worked in the well-known Lugwardine Quarries,[233] were exposed. From the strata exposed in the hills and railway-cuttings Symonds procured *Eucephalaspis Agassizi* (*C. Lyelli*), and in loose stones around Sutton Walls and Marden the plates of *Pteraspis* have been noticed.

In the hills near Weobley the succession of beds is (1) Cornstones with *Cephalaspis*, (2) thick sandstones, (3) cornstones, and (4) sandstones.[234] The differential action of denudation upon these

225 Mem. Geol. Surv., i. (1846), pp. 555.
226 *Id.*, pt. 3.
227 "Flora" (1889), p. vii.
228 "Records of the Rocks," p. 222.
229 *Id.*, p. 226.
230 "Flora" (1889), p. xxiv.
231 "Records of the Rocks," p. 241.
232 *Id.*, p. 226.
233 *Id.*, p. 228; and Edin. New Phil. Journal, 1859, p. 232.
234 "Records of the Rocks," p. 227.

rocks of various powers of resistance has given rise to some pleasing scenery. The hills to the south-east of the town, Lady-Lift, Wormsley, and Robin-Hood's Butts, are capped with strata that Symonds paralleled with the Rowlstone Beds. Building-stone is quarried at Penrhos, a little over a mile to the east of Kington,[235] and in the Ludlow district there are quarries in the Lower Old Red displaying layers of cornstone.[236]

The lowlands around Leominster have been excavated out of the lower beds of the Lower Cornstones, from which many specimens of *Eucephalaspis Agassizi*, and *Scaphaspis Lloydi* (Ag.) have been obtained. The hills that rise up from these lowlands are composed of the upper beds of the Lower Cornstones, which have likewise yielded many ichthyic remains—*Zenaspis Salweyi*, Egerton, *Z. Lloydi*, Eg., and *Pteraspis rostratus*, Ag. These forms are common in the *Pteraspis*-Beds of Leyster's Pole or "Sprowle," and in the equivalent beds around Puddlestone. Beds of later date cap Ivington Camp, and many of the other hills in the neighbourhood.

Around Bromyard, clays, marls, and cornstones, the last forming such hills as at Castle Frome and Bishop's Frome, prevail. The quarries between Acton Beauchamp and Castle Frome are now disused. Fish-remains were somewhat abundant, particularly at Ridgeway Cross, where Gill found the portions of the *Pteraspis* with the scales attached, which he gave to Prof. Ray Lankester, and the *Zenaspis* now in the University Museum, Oxford. The *Zenaspis* called *Z. Salweyi* was found by Mr. H. Salwey in this neighbourhood.[237]

South of the Bromyard district the rocks of the Cornstone Stage extend, wrapping around the Silurian inliers of Hagley, Shucknall Hill, and Woolhope, and occupying the synclinal area, which becomes narrower to the south, between the last-named inlier and the wooded Silurian hills above Ledbury.

Near Stifford's Bridge, north of Cradley, beds thought to be the equivalents of the Rowlstone Beds have been extensively quarried for building purposes in Malvern. They contained very few fossils, but some temporary openings about a mile to the north of the large quarry yielded to Mr. Gill many of the fish-remains now in the museums of Malvern and Worcester, while Prof. Ray Lankester obtained from the same place the tail of a *Pteraspis* with scales attached.[238] Cradley, Castle Frome, Canon Frome, Munsley, and Pixley, to mention but a few localities, are all situated on rocks of

235 "Flora," p. xxix.
236 Proc. Geol. Assoc., xviii., p. 488.
237 "Flora" (1889), p. xviii.; "Records of the Rocks," pp. 218-219; Q.J.G.S., xiii. (1857), p. 283; *id.*, xv. (1859), p. 503; Rep. Brit. Assoc., 1864.
238 "Records of the Rocks," pp. 228-229; see also Q.J.G.S., xx. (1864), p. 194; Rep. Brit. Assoc., 1864, p. 239

the Cornstone Stage, and near Hales-End Phillips noticed a good section of the beds under review.[239]

Pteraspis has been found at Bush Pitch, Ledbury, and *Zenaspis* (?) in the large quarry on the south side of the Wall Hills where cornstones capped by sandstones are exposed.[238]

The tract to the north-east of Hereford, that between the city and Stretton Grandison, is of interest because in it at Hagley and Shucknall Hill are inliers of Silurian rocks and an intrusive mass of doleritic rock at Bartestree.

The Brownstones.—This stage comprises (1) a monotonous series of red marls overlying chocolate-coloured sandstones, and (2) reddish and grey sandstones, marls and cornstones, altogether between 1,200 and 1,500 feet thick. They contain few fossils, except fragments of *Pteraspis* and *Cephalaspis*, and stretch from north-west to south-east, occupying the lower slopes of the Black Mountains. "The precise relations of these beds have yet to be determined."[240] Palæontologically they would seem to be connected with the Cornstone Stage, but Symonds believed there was a break at their base, for they "overlap the Rowlstone Beds both on the Scyrrid and the Sugar-Loaf,"[241] The basement-beds of the cornstones belonging to the Brownstone Stage are to be seen at Cusop and Rowlstone, where from in the hills below the former village, Symonds procured plates of a *Pteraspis* and an ichthyodorulite; but such finds are few and far between.[242] The percentage of lime in these "Upper Cornstones," as Symonds occasionally called them, is often considerable, and water that has percolated through them often forms deposits of Travertine such as that noticed by Symonds near the remote little Welsh chapel of Capel-y-affin.[243] In the Ross district little is known about the rocks of this stage, but on the borders of the Forest of Dean, according to Symonds, they have "very much thinned out."[244]

(iii.) Upper Old Red Sandstone.—This series consists of (1) yellow, grey, and red sandstones with occasional bands of red shale, and (2) red marly beds and quartz-grits and conglomerates.[245] The quartz-grits and conglomerates form the summit of the escarpment of the Black Mountains and give rise to a light and unproductive soil, which is, nevertheless well adapted for sheep-farming. The

238 "Records of the Rocks," pp. 228-229; see also Q.J.G.S., xx. (1864), p. 194; Rep. Brit. Assoc., 1864, p. 239.
239 Mem. Geol. Surv., ii. (1848), p. 102.
240 Geol. Eng. and Wales" (1887), p. 142.
241 "Records of the Rocks," p. 235.
242 *Id.*, p. 230.
243 *Id.*, p. 238.
244 *Id.*, p. 244.
245 See H. C. Moore, Trans. Woolhope Nat. F.C., 1900, to April 1902 (1903), pp. 227-226.

higher beds of this Upper Division have been removed from the edge of the escarpment, but occur farther back, where they can be seen dipping under the Carboniferous rocks of the great South Wales Coalfield.

Owing to the uplift of the strata along an anticlinal axis and removal by denudation of the cap, Upper-Old-Red rocks are absent from the Ganarew area. But farther to the east, where the syncline is entered, they come in again, and are seen in several places dipping beneath the Carboniferous rocks along the north-west fringe of the Forest of Dean coal-basin. The conglomerate-beds crop out in the deeply-cut lane which ascends the north-western slopes of the Great Doward, and higher up are seen indications of the topmost yellow beds. Owing to the dip these yellow-coloured strata are seen on the opposite side of the Wye below Symonds Yat.[246] A similar succession can be observed at Howle Hill, but by far the clearest and most important section of these upper beds is that in the "Deep Cutting," near the "Hawthorns," on the road from Ross to Drybrook. It has claimed the attention of De la Beche,[247] Symonds,[248] J. Jones and W. C. Lucy,[249] and Mr. E. B. Wethered.[250] Between the "Deep Cutting" and the bridge over the now abandoned railway at the foot of the hill the Quartzose Conglomerate is well exposed. It is first seen by the road-side, and can be traced thence through the wood. A short distance north of the railway-bridge is (May, 1907) the place where they are driving an adit into the hill-side in order to penetrate at a lower level the easterly-dipping Conglomerate, which is said to be auriferous. The Buck Stone, near Staunton, about two miles east of Monmouth, is composed of the same kind of conglomerate, which surrounds the Forest of Dean and dips under the Carboniferous rocks.

VIII.—BARTESTREE IGNEOUS ROCK.

This rock occurs along a line striking north-east and south-west. It has been largely quarried in the past, and the excavation takes the form of a long cutting, the sides of which are composed of Old Red Sandstone, while the trap-rock is exposed in a steep face at the end. As noticed by Murchison, who has given an excellent description of the igneous rock and the effect of its intrusion upon the surrounding beds, the Old Red nearest the mass is considerably altered,[251] being changed into a compact homogeneous grey rock

246 "Flora" (1889), p. vi.; "Records of the Rocks," p. 252.
247 Mem. Geol. Surv., i. (1846), pp. 58-59.
248 "Records of the Rocks," p. 252.
249 Proc. Cotteswold Nat. F.C., iv. (1866-68), pp.175-193.
250 Q.J.G.S., xxxix. (1883), pp. 211-216.
251 "Silurian System," pp. 185-186.

FIG. 1.—BARTESTREE QUARRY. VIEW OF THE IGNEOUS ROCK. MR. BANKS IS POINTING TO THE LINE OF JUNCTION OF THE IGNEOUS ROCK WITH THE OLD RED.

FIG 2.—VIEW OF ONE SIDE OF THE BARTESTREE QUARRY, SHOWING THE OLD-RED-SANDSTONE BEDS.

Photos by Prof. S. H. Reynolds.

enclosing peculiar patches of a yellow colour and not very definite mineralogical composition.

Many writers have referred to the igneous rock as a greenstone,[252] and La Touche describes it as a diorite,[253] but Prof. S. H. Reynolds tells me that a microscopic examination shows that it is a dolerite. The main part of the intrusion is a dark, compact, rather fine-grained rock, showing in a hand-specimen crystals of augite. In section it is seen to consist of a finer-grained groundmass through which are scattered phenocrysts of plagioclase, augite, and magnetite. No olivine occurred in the section examined. The marginal part of the intrusion is considerably coarser than the rest, and proved on sectionizing to be a typical olivine-dolerite similar to many others from the Midlands originally described by Allport.[254] The same minerals occur as in the central part of the mass, with the addition of olivine and apatite (Prof. S. H. Reynolds, *in litt.*, 1906). The intrusion is post Old Red. Its strong resemblance to many of the other Midland dolerites, some of which are intrusive in the Upper Coal-Measures, suggests that it belongs to the same series, in which case it would not be earlier than very late Carboniferous. Prof. Watts remarks on the very close resemblance between some of the Midland dolerites and those of Scotland and the North of England, and suggests that the former group like the latter may really be of Tertiary age.[255]

At Weston Beggard to the south of Shucknall Hill, the Old Red has been worked, and has yielded a few fish-plates; while at Lugwardine there are also quarries, but here the fish-remains are usually very fragmentary.[256]

IX.—CARBONIFEROUS SYSTEM.

In Herefordshire rocks belonging to this system are found only in the extreme south-eastern portion, where they form the north-western fringe of the Forest of Dean.

It has been customary in the Bristol district to divide the Lower Carboniferous into Lower Limestone Shales, Lower Limestone, Gully Oolite, Middle Shales, Upper Limestone, and Upper Limestone Shales.[257] Then come the Millstone-Grit and the Coal-Measures. In a general way, the same rock-subdivisions have been observed in the

252 Phillips, Mem. Geol. Surv., ii. pt. 1 (1848), p. 180; H. E. Strickland, Q.J.G.S., viii. (1852), p. 384; see also R. Dixon, Trans. Woolhope Nat. F.C., 1867 (1868), p. 180.

253 Quoted by G. H. Piper, Trans. Woolhope Nat. F.C., 1890-92, p. 166.

254 Q.J.G.S., xxx. (1874), p. 529.

255 Proc. Geol. Assoc., xv. (1897), pp. 397-400.

256 "Flora" (1889), p. xx.

257 Handbook Brit. Assoc., Bristol, 1898, pp. 14-19.

Forest of Dean. An attempt, however, to determine equivalent deposits mainly by means of their lithic structure is almost sure to meet with failure, especially if the rocks to be correlated occur in widely-separated areas. This is why comparatively little substantial progress was made in this work previous to the appearance of Dr. A. Vaughan's great paper on "The Palæontological Sequence in the Carboniferous Limestone of the Bristol District"[258] in 1905. Dr. Vaughan, from investigations extending over some years in the Bristol district, supplemented by work in other localities with a view to testing the value of his proposals, suggested that genera of brachiopods or corals should be used for zonal indices. He selected genera for these indices, in order that the proposed divisions might have more than a purely local value, and since his paper appeared his views have been entirely endorsed by a number of geologists being able to identify the equivalent zones by the means suggested in localities at considerable distances from the typical area.

Dr. Vaughan has made five zones in the Carboniferous rocks of the section in the gorge of the Avon at Bristol, in descending order, those characterized by (1) *Dibunophyllum*, (2) *Seminula*, (3) *Syringothyris*, (4) *Zaphrentis*, and (5) *Cleistopora*. Excepting that of *Syringothyris*, it has been found possible to divide each of these zones into two parts, the subzonal indices for this purpose being "gentes," or species-groups.[259] A "gens" Dr. Vaughan defines as "the aggregate of all the species which possess, in common, a large number of essential properties, and are continuously related either in space or time."[260] As might be expected, there is a certain amount of faunal overlap of the zones. Consequently, between the zones there are certain horizons at which the zonal indices occur in association. These horizons are important, and have been distinguished, in ascending order, as α, β, γ, δ, and ϵ. At the base of the system is a phase characterized by a pelecypod called *Modiola lata*.

Dr. Vaughan has called the Carboniferous-Limestone series of the South-West of England the Avonian, and has divided it into two parts—an upper or Kidwellian, embracing the zones of *Dibunophyllum* and *Seminula*, and a lower or Clevedonian, comprising the other three zones.

In the course of his investigations Dr. Vaughan visited some of the Herefordshire sections of the Carboniferous Limestone in the neighbourhood of Mitcheldean. He found that the faunal succession was the same as that of the Bristol district, but that the lithic structure of the deposits was somewhat different. The most notice-

258 Q.J.G.S., lxi. (1905), pp. 181-307, and pls. xxii.-xxix.
259 *Id.*, p. 186.
260 *Id.*, p. 183.

able dissimilarity was in the case of the age of the Millstone-Grit. In the Mitcheldean district the bottom-beds are of Upper *Seminula*-date; but in the Bristol district they belong to the horizon ϵ, which comes just above the *Dibunophyllum*-Zone. Below the Millstone-Grit of the Mitcheldean district, and also belonging to the Upper *Seminula*-Zone, are a few thick limestone-beds, interstratified in many places with crystalline dolomites, known as the "Whitehead Limestone." A series of interesting, but practically unfossiliferous, dolomites separates this limestone from another band bearing the local name of the "Crease Limestone," which is the chief repository of the iron-ores of the district. The Crease Limestone also belongs to the *Syringothyris*-Zone, and contains many fossils similar to those which characterize the equivalent deposit in the Bristol district. The upper part of the *Zaphrentis*-Zone, and the whole of the lower, are dolomitized, but there is a fossiliferous band containing a Lower *Zaphrentis*-Zone assemblage, corresponding to a similar band in the neighbourhood of Chepstow. The Upper *Cleistopora*-Zone is not very fossiliferous, but overlies a perfectly typical development of the Lower, in which a *Modiola*-ostracod phase is present, and beneath which are the transitional-beds between the Old-Red and Carboniferous Systems similar to those in the Avon section at Clifton.

Except for Dr. Vaughan's paper, from which the above details are taken,[261] little work of any importance has been done in connection with the Carboniferous beds of Herefordshire. Symonds noticed that the Great Doward is capped with Lower-Limestone Shales and Carboniferous Limestone, and records species of *Productus* and *Spirifer*, together with large tuberculated ganoid scales, portions of the spines of *Ctenacanthus*, and of the teeth of *Orodus* and a cestraciont fish.[262] From one of the several quarries in which the limestone is being actively worked, the writer obtained *Michelinia* cf. *favosa* (Goldfuss), which indicates the presence of a deposit on the same horizon as a particularly fossiliferous bed in the Chepstow district. Some greenish shales, weathering rather clayey, are associated with the limestones in one of the quarries, and contain seams of a very slightly calcareous, fine-grained, sandstone, locally called "Silver-Sand," that has been used in the neighbourhood for cleaning purposes. Symonds' record of fish-remains from the Great Doward is interesting in that it bears out the conclusion, which had been founded on a coral, that the beds belong to the *Zaphrentis*-Zone. In the *Zaphrentis*-Beds, both of the Black-Rock Quarry, Clifton, and of Oreton in the Clee-Hill area, fish-teeth and spines are common.

261 Q.J.G.S., lxi. (1905), pp. 251-252.
262 "Flora of Herefordshire" (1889), p. viii.; "Records of the Rocks," p. 353.

The Howle-Hill district between Hope Mansel and the Wye sadly requires re-mapping. Symonds noticed that at Howle Hill "a band of Lower Coal-Measures still remains," and that in ascending to Howle Green from Ross the upper beds of Old Red Sandstone, the Lower Limestone Shales, Carboniferous Limestone, Millstone-Grit, and Lower Coal-Measures are passed over.[263] Great Howle is situated on an outlying patch of rocks which contains some coal-seams that were formerly worked. The late H. D. Hoskold contributed the most detailed account of these Coal-Measures that has been published,[264] but apparently his remarks were based upon the Geological Survey-Map,[265] which, as already remarked, requires revision.

There are many quarries, both in use and abandoned, in the neighbourhood of Howle Hill, and also on the hill-top a little over a mile to the west of Mitcheldean, around Silverton Farm. Here Mr. E. B. Wethered obtained many fossils, principally from the *Cleistopora*-Zone,[266] and it was in this neighbourhood that Dr. Vaughan obtained most of the details already noticed (page 51). Just north of the disused Gas-Works is an old quarry in the basal beds of the *Syringothyris*-Zone, and near Silverton Farm the transition-beds are succeeded by deposits belonging to the Lower *Cleistopora*-Zone, in which *Productus bassus* is abundant.

With regard to the conditions under which the Carboniferous System was formed, it has been stated (page 42) that towards the close of the preceding period a general subsidence took place, and the incoming waters spread far and wide over what had previously been dry land.

Although the Carboniferous Limestone is essentially a marine deposit, it is not necessarily a deep-sea one. Mr. A. J. Jukes-Browne thinks that it was most probably accumulated in a sea analogous to the West Indian and Mexican of the present day, and in which there were one or more islands.[267] Thick deposits of calcareous material are being formed at the present day around many of the West Indian Islands, and at a depth of between 100 and 500 fathoms fields of crinoids flourish. In his restoration of the geography of early Carboniferous time, Mr. Jukes-Browne represents an irregular island occupying a considerable portion of the present Midland Counties, and extending westwards through the heart of Wales.[268] According to this, the northern portion of Herefordshire and the Clee-Hill area was dry land during the "early Carboniferous time,"

263 "Flora of Herefordshire" (1889), p. vii.
264 Proc. Cotteswold Nat. F.C., pt. 2 for 1890-91, pp. 142-144.
265 Sheet xliii. S.E.
266 Q.J.G.S., xxxix. (1883), pp. 211-216.
267 "The Students' Handbook of Stratigraphical Geology" (1902), p. 271.
268 "The Building of the British Isles," 2nd ed. (1892), pl. v.

but this is obviously incorrect as far as the Clee-Hill area is concerned, for the *Cleistopora*-and *Zaphrentis*-Zones have been identified there. Seeing that the "Clee-Hill area is essentially connected with the Mitcheldean and Bristol areas" (Dr. A. Vaughan, *in litt.*, Nov. 11th, 1906), the probability is that the Avonian sea spread over by far the greater part of Herefordshire.

Mr. Jukes-Browne thinks that there seems "good reason for supposing that the Millstone-Grit marks a general and rather rapid uplift of the whole British region."[269] The uplift would appear to have proceeded from north to south, for in the Clee-Hill area there are indications that the grit-facies sets in earlier than in the Mitcheldean district, and in the latter earlier than in the Bristol district. This shallowing of the sea, and its silting-up, rendered conditions suitable for that luxuriant growth which is now compressed and forms the seams of the Lower Coal-Measures.

After the formation of a considerable thickness of Coal-Measures, there occurred those great crumplings of the earth's crust to which reference has been made in the opening pages of this article. They originated as the expression of crust-pressure, and the stresses causing them may be described in terms of forces acting from southerly and easterly directions. That acting from the east produced flexures having axes running north and south or north-west and south-east; that from the south flexures with axes at right angles to the preceding. Where the anticlinal axes intersected, domes of various shapes were produced, and where the synclinal axes crossed, basins.

The Malvern Hills, those sentinels as it were of the Palæozoic land when approached from the east, were, Prof. Groom holds, uplifted in sections proceeding from north to south (with the greatest uplift in the south) at this time; but he also thinks that they did not obtain anything like their present definition until post-Liassic times, when the strata to the east of the great Malvern fault were lowered, while the Pre-Cambrian "massif" remained stationary on the west.

No Upper Coal-Measures are present in Herefordshire. Those of the Midland Counties were laid down in a lacustrine area, isolated from the sea probably by the earth-movements that had taken place. How far into Herefordshire this sheet of shallow water extended cannot now be ascertained, for apart from the fact that any beds would have been removed by later denudation, there was considerable pre-Permian denudation. From a study of the sections in the adjacent county of Worcester, which show the relations of the local representatives of the Permian to the subjacent rocks, it is known that this pre-Permian denudation removed the Upper Coal-Measures

269 *Id.*, p. 142.

nearly or quite down to the level of the old plain on which they were deposited, and in most cases denudation proceeded still further, so that the Haffield Breccia (thought to belong to the succeeding Permian System) rests directly upon the older rocks.[270] Prof. Groom says that at one time the Upper Coal-Measures clearly extended over some of the higher portions of the Malvern and Abberley Hills.

X.—PERMIAN SYSTEM.

At the close of Upper Coal-Measure times, as the above remarks have already shown, there were renewed earth-movements. They so affected the earth's crust in Herefordshire and the adjacent regions, that a somewhat tongue-shaped bay was formed, which was connected by way of the Cheshire plain with a stretch of water that spread over a somewhat greater area than that occupied by that part of the Irish Sea to the north-east of a line connecting Carnarvon and Newry, and with the main sea by means of a strait which was situated between the present southern termination of the Pennine Hills and a peninsula that ran northwards from the continental land which lay to the south. These remarks on the palæogeography are of course based upon the facts that have been observed; but later research, as in the case of the geography of the Avonian Epoch, may require considerable modifications to be made.

The only probable representatives in Herefordshire of the Permian rocks are certain conglomerates in the neighbourhood of Haffield, between Donnington and Bromesberrow, and immediately to the north of Whippets Farm, distant under a mile from the northern end of the Malvern Hills.

There has been some discussion as to the precise age of these accumulations, but Prof. Groom is probably correct in paralleling them with the well-known "Trappoid Conglomerate" of the Midlands.[271] Phillips, to whom the term "Haffield Conglomerate" is due, regarded them in 1848 as forming the base of the "New Red Series,"[272] although later he said that they were generally considered to belong to the Permian, and remarked that their included pebbles were such as might have been derived from "the adjacent stratified and igneous rocks of the Malvern Hills," and were cemented by "fine, red, sedimentary matter," sometimes into a "pretty firm"

270 Q.J.G.S., lvi. (1900), p. 185.
271 Q.J.G.S., lvi. (1900), p. 184.
272 Mem. Geol. Surv., ii., pt. 1 (1848), pp.111-112.

rock.[273] Symonds speaks of the "Permian" conglomerate or breccia as being well exposed below Haffield Camp. "A fine escarpment," he says, "faces the Hall door; and the stratified condition of the Conglomerate is well displayed dipping eastward under the Bunter Beds." He also comments upon the peculiar "glazed" condition of the included pebbles.[274] In the discussion which followed the reading of Prof. Groom's paper,[275] Mr. Wickham King advocated the use of the term "Haffield" breccia and the postponement of definitely asserting that it was of Permian age, until more ample data were to hand, for in its sandy nature it resembles certain Bunter and Keuper breccias. As Prof. Groom points out, however, the Bunter Beds overlie the Haffield Conglomerate unconformably—a fact also noticed by Symonds[276]—and therefore, if the latter were also of Bunter age it was older than any Triassic deposit hitherto discovered in this country.

As regards the other patch of conglomerate at Whippets, concerning the nature of which Phillips was in doubt,[277] it is clearly "Haffield Breccia," and appears to rest directly upon the May-Hill Beds.[278]

XI.—TRIASSIC SYSTEM.

The rocks hitherto discussed have all belonged to the Pre-Cambrian and Palæozoic Groups. The third and last of the primary groups into which the rocks of the earth's crust have been divided is the Neozoic. This group has been subdivided into systems, and these into series—the Bunter being the lowest series.

In Herefordshire the rocks of this series are soft, bright-red, sandstones, frequently called the Bromesberrow Beds, but the area which they occupy in this county, to the south of the tract composed of "Haffield Breccia" at Haffield, is barely half a square mile in extent. Once, however, Symonds thought they overlapped the breccia,[279] while Prof. Groom thinks that both these beds, and the "Haffield Breccia," "passed over much, if not the whole" of the Malvern and Abberley Ranges.[280]

273 "Geology of Oxford" (1871), p. 89; Trans. Malvern Nat. F.C., pt. 1 (1853-1870), p. 38.
274 "Records of the Rocks," pp. 417-418.
275 Q.J.G.S., lvi. (1900), p. 196.
276 "Records of the Rocks," p. 416.
277 Mem. Geol. Surv., ii., pt, 1 (1848), p. 112.
278 Q.J.G.S., lvi. (1900), p. 192.
279 "Records of the Rocks," p. 416.
280 Q.J.G.S., lvi. (1900), p. 192.

The Keuper Sandstones or Waterstones, which apparently succeed the Bunter Series non-sequentially in this country, are absent from Herefordshire; but there is a very narrow strip of red marls belonging to the succeeding stage or Upper Keuper, to the east of the fault, between Whippets and Coppice-End (about 2 miles north-east of Cradley).

Permian times were brought to a close by crust-pressures producing great physical changes. There was a considerable amount of elevation accompanied by north and south folding: one such fold separating apparently the areas of accumulation of the English and German Bunter deposits.

The exact conditions under which the Bunter beds of this country were formed have not yet been ascertained, but probably, as Mr. Jukes-Browne has remarked, "It is to the deserts of Central Asia and Arabia that we must look for deposits analogous to those of the Bunter." In other words, the conditions were probably desertic, and most of the component material of the sandstone may have been wind-blown and have derived from the Millstone-Grit, which at this time formed most of the surface of the then more lofty Pennine Range.

During Muschelkalk times, while continental conditions obtained in England, a sea lay over the German area. As the land subsided this sea extended, and its increasing nearness may have been the cause of the changed climatic conditions which are known to have led to the formation of the Keuper inland sea over the greater part of England. Later on, owing to the continuance of the movement of subsidence, the Keuper sea became connected with the wide-spreading Rhætic ocean, and marine conditions were established over the greater part of England and the border counties. It is well to bear in mind, however, that although no organic remains indicating a deposit of the same age as the Muschelkalk have been found in this country, there is the possibility that it may be represented by some unfossiliferous deposit.

Prof. Groom thinks that the Permian deposits extended over some of the higher portions of the Malvern and Abberley Hills. If that were so, it is probable that the Bunter and also the overlying Keuper deposits also extended westwards for some distance beyond their present limits.

XII.—ROCKS ABSENT FROM HEREFORDSHIRE.

With the Keuper beds the description of the "solid" rocks of Herefordshire finishes. In other parts of England above the

Keuper Series is found that great mass of clays, sands, and limestones, that make up the Jurassic system, and above again the deposits of the Cretæceous, Palæogene, and Neogene Systems. Looking eastwards from the Malvern Hills, there is seen stretching away from the foot of the hills to about the line of the Severn at Tewkesbury the red ground formed of the Keuper Marls. In the picturesque river-cliff of Wainlode, the Rhætic Series is seen capped by the Lias—the series which extends thence eastwards to the Cotteswold Hills, forming the "solid" rock of the Vale and the lower slopes of the hills that are capped with Inferior Oolite. In proceeding in a south-easterly direction, say from Birdlip, many other rock-series are passed over, until the sparsely grass-clothed white hill-slopes of another escarpment indicate the presence of the Chalk. It is impossible here to state the evidence for or against the former westerly extension of any one of these numerous rock-series. Suffice it to say that some probably passed westwards across the line of the Malvern Hills, but all traces of them have long ago been swept away by denudation. Seeing, however, that material similar to that which makes up the Chalk is not formed at the present day except in deep water, and that in the hills above Swindon it is of considerable thickness, it seems reasonable to suppose that Herefordshire, or the greater part of it, was beneath the sea during the greater portion of the time when the English Chalk was formed.

Towards the close of the Cretaceous Period there was an elevatory movement in the north-west, which originated a great plain composed of Chalk, and inclined towards the south-east. Throughout the Palæogene Period, the sea lay to the south-east, and did not, I think, at any time extend as far as Herefordshire, if as far as the borders of Gloucestershire. Through this long period, and the Miocene and Pliocene Epochs as well, denudation continued to sculpture the surface of the land, its differential action accounting for the diversified scenery of this border-county.

XIII.—RIVER-DEVELOPMENT.

The part played by the rivers in outlining the configuration of the county is of importance and much interest. It cannot be adequately treated of here, but in brief the suggested history of the "Development of Rivers," as far as Herefordshire is concerned is as follows (see figs. 1 and 2):

Fig. 1.—The supposed original Dip-Streams or Consequents, shown by dotted lines; the present rivers being marked in the ordinary way. (There are some misprints in this block: Martso should be Marlborough, and Welden should be Wealden). S. S. Buckman.

Fig. 2.—A supposed later stage of River-Development than that shown in Figure 1.—the Severn working its way up the Vale of Gloucester, but not yet having captured what may be termed the "Cheltenham River-Group"—the Coln system. Consequents . . . Subsequents - - - -Obsequents—-|—-|— S. S. Buckman.

(Figs. 1 and 2 are reproduced by permission of the Council of the Cotteswold Naturalists' Field Club.)

The south-easterly inclined plain of Chalk, formed towards the close of the Cretaceous Period, was bounded on the south by a chain of hills, the denuded remains of which are seen in the anticlines of the Mendips, of the Vales of Pewsey and Kingsclere, and of the Weald.[281] At the foot of the northern slope of this range ran the main river, into which there flowed from the south, short streams; but from the north-west, long rivers, rising far back in Wales, and flowing from north-west to south-east. Rivers having this direction are termed "consequents," and, since the dip of the surface over which they flowed was also to the south-east, these original consequents may also be known by the name of "dip-streams." As time progressed they developed lateral streams, or "subsequents,"

281 S. S. Buckman, "Natural Science," xiv. (1899), pp. 273-289.

which usually worked along the "strike" of the rocks—that is, at right angles to the dip. It will easily be understood that owing to a variety of causes certain of these lateral streams gradually gained a larger drainage area than others, and that frequently the subsequent of one river might capture the neighbouring consequent. In the river of Herefordshire, the Wye, and its tributary, the Lugg, it is thought there can be recognized portions of three original consequents. Mr. S. S. Buckman considers that the course of the first of these three consequents is approximately indicated by the Wye above Hay (the "Upper Wye,") the Monnow, the Gloucestershire Little Avon River, the upper reach of the Bristol Avon, and a line connecting this with the Kennet. The second is thought to be indicated by the "Middle Wye," the portion between Willersley and Holme Lacy, the Gloucestershire Frome, and a line thence to Marlborough; while the third is marked out by the portion of the Lugg to the north-west of Stoke Prior, near Leominster, the greater part of the Leadon, and the Churn, joining the preceding consequent somewhere near Swindon.

Mr. Buckman then suggests that the Severn, starting as a small river with a "strongly tidal estuary," commenced its headward growth, and after it had overcome the barrier in the form of a westerly extension of the Mendip Hills, composed of Jurassic rocks strengthened with Carboniferous, captured successively whichever consequents were flowing from north-west to south-east across its path.

The head-waters of the Monnow are thought to have been captured by a subsequent developed by the Middle Wye, before the Monnow was itself captured by a subsequent branch developed by the ever-growing Severn. This subsequent developed by the Severn continued its growth northwards, capturing first the Middle Wye and then the Lugg. The waters thus obtained were drained off southwards, and it is in a large measure due to this re-arrangement of the rivers that the central parts of Herefordshire became hollowed out.

Speculative as this theory of river-development may appear, there is much to be said in its favour; it has the advantage of explaining most of the phenomena noticeable in the central parts of England and Wales.

XIV.—NEOGENE SYSTEM.

(Superficial Deposits, etc.)

The conditions which obtained in Herefordshire during the Pleistocene Epoch, that is during the period which intervened between Pliocene times and the Roman occupation, are at present

ill-comprehended. In the northern part of England, where the evidence of ice-action in the form of striated rock-surfaces, boulders, and boulder-clays, is more perfect, a reconstruction of the conditions which obviously obtained during a considerable portion of the Glacial Period is easier than in these more southern parts where the evidence is either lacking or of dubious nature.

Unfortunately, as yet, in Herefordshire, the Superficial Deposits have not been much studied, and little is known concerning their composition, thickness, or distribution. Under these circumstances not much can be said concerning the conditions of Herefordshire during the Pleistocene Epoch. There is, however, not the least doubt that the climate became increasingly cold, snow fell and collected on the higher portions of the hills that form an imperfect circle around the county, and that as its mass increased and became compacted, glaciers began to be formed and to creep down the valleys (particularly those on the western borders),working up or scratching the rocks over which they passed, drawing along the detached blocks beneath them, and carrying on their surfaces fragments fallen from the valley-sides, to be deposited at the embouchure of the valley forming an accumulation of many kinds of rocks confusedly intermixed.

Symonds and most of his contemporaries believed that after the glaciation of vast tracts there was considerable submergence, and that it was at this time that the High Level Drifts and Gravels were formed, and that the large boulders, such as are stranded on many of the upland tracts, were left by floating ice. They also believed that after this first "Ice Period" there was re-elevation of the land, and that over the former sea-bed roamed the mammoth, the Siberian rhinoceros and hare, the musk-ox, and the reindeer, while man dwelt in the caverns in the hill-sides during this more congenial interval between a first and "second Ice Age."[282]

Murchison believed in the submergence of a considerable part of the county, and pointed out that the "Drifts" were all of local origin.[283] They had probably been derived for the most part from the rocks on and just beyond the north-west and western limits of the county. He noticed that, while the coarser material was strewn over the eastern slopes of the western hills (and that the farther eastwards the deposits were traced the finer they became), where there were breaches in the western hills the coarse débris was "usually propelled further to the south-east in the prolongation of these openings than elsewhere," and that in the Wye Valley about Hay it was confused and in irregular heaps, and was distributed over high ground and combe alike.

282 See "Old Stones" and "The Severn Straits."
283 "Silurian System," pp. 511-515.

Although the drifts are largely composed of pieces of Silurian rocks they contain also much material belonging to the formation on which they rest. At Luston, in the lowlands, near Leominster, Murchison observed a section in drifts, based upon Old Red, of alternations of red and white sand veined with coarse gravel.

Dr. Bull records that some field-drains on the high ground at Wicton, a hamlet some two miles south-east of Leominster, revealed masses of Silurian limestone. At first it was thought that an inlier of Silurian rocks had been discovered, but trial-holes (made with a view to settling the matter) proved the rock-fragments to belong to the drift.[284]

Between Kington and Hay the hill-sides are covered with débris, and as noticed by Murchison, it renders the ground difficult of cultivation.

Between Hay and the Wye at Kerne Bridge, in a direct line over twenty-five miles, the only record of gravels is near the latter place at Hill Court, where Symonds noticed low-level Wye drifts studded with large masses of rock.[285]

Gravels composed principally of local rocks and containing a large mass of Wenlock Limestone (said to have been striated), capped with "Northern Drift" pebbles, amongst which Symonds observed rolled specimens of Liassic *Gryphæa* and a few Chalk flints, were exposed in a temporary opening near Dick House, Haffield.[286]

Clincher's Mill is a well-known locality for "drift," which is of considerable thickness and extent, and partially obscures the outcrop of the Wenlock Beds. The material is heaped up chiefly against the hill-side called Clincher's Mill Wood, and has been worked from time to time. In the time of Symonds the principal section showed at the base an ill-stratified mass composed of fragments of "syenite," Llandovery, Wenlock, and Ludlow rocks, and here and there a piece of greenstone and Hollybush Sandstone. Above were beds whose constituents became more and more waterworn in appearance, while in the highest layer (but in this only) "Northern Drift" occurred.[287] Phillips also noticed that the deposit was rich in fragments derived from the neighbouring hills, but when he visited the locality, the section, of which he gives a sketch, displayed more sandy beds.[288] Henry Brooks found here a

284 Trans. Woolhope Nat. F.C., 1868 (1869), pp. 3-6.
285 "Records of the Rocks," p. 252.
286 *Id.*, p. 418; and "Old Stones," p. 77. In the Hasting's Museum at Worcester there is a rolled Liassic *Gryphæa* and a fragment of flint from "a gravel pit at the foot of Haffield Camp."
287 Proc. Cotteswold Nat. F.C., iii., p. 35; "Old Stones" (1884), p. 145.
288 Mem. Geol. Surv., ii. pt. 1 (1848), pp. 15 and 79; see also "Silurian System," p. 516.

very fine molar of *Elephas antiquus*. Ledbury is partly situated upon gravels of the Leadon, which have yielded bones and teeth of rhinoceros and mammoth.[289]

Murchison noticed accumulations of angular fragments of "syenite" near Colwall Green, and again near Eastnor Obelisk;[290] while Prof. Groom says that "some of the gentler elevations [in the tract immediately to the west of the South Malverns] are capped or flanked by a stratified Drift of local origin."[291]

Rolled fragments of the Liassic pelecypod *Gryphæa arcuata* occur in the gravels at Cradley, and at Mathon have been found associated with *Terebratulæ* and other waterworn Jurassic shells.[292] Bones of extinct species of elephant, elk, and deer, have been found at several places in the parish of Bosbury, a village about four miles north of Ledbury, particularly when the now disused canal from Gloucester to Hereford was constructed in 1843.[293] A few mammalian remains have been recorded from the neighbourhood of Tenbury,[294] and from Stockton, near Leominster.[295]

The alluvial tract in the Wigmore Valley no doubt marks the site of a lake which existed in no very remote geological times. Murchison observed the lacustrine silt at Elton and Leinthall Starkes, and remarked that "in Leintwardine Bottoms we find a top layer of good brown loam, covering sandy and argillaceous earth, and passing downwards into a stiff silt sometimes containing leaves and sticks, while beneath this and six feet below the surface is a fine gravel of a lacustrine character, and the lowest stratum is a running sand in which water rises."[296] From certain gravel-deposits in this valley the Rev. T. T. Lewis obtained several rolled specimens of Liassic *Gryphæa*. The occurrence of these rolled Liassic fossils, and particularly *Gryphæa arcuata*, is very interesting. At present collateral evidence suggests that they came from a northerly direction, and if so, they would appear to have come from the Whitchurch (or Prees) outlier of Lias.

Murchison described the accumulations of fragments of local rocks, such as are still exposed to view by the road-side east of the Moon Inn at Mordiford, in the Woolhope district, and observed that similar débris is lodged upon the *external* slope of the elevated tract, frequently obscuring the junction of the Upper

289 "Flora," p. xiii.; "Records of the Rocks," p. 201.
290 "Silurian System," p. 516.
291 Q.J.G.S., lv. (1899), p. 131.
292 "Flora" (1889), p. xvii.; Murchison and Symonds in Trans. Woolhope Nat. F.C., 1852, pp. 48-50; Trans. Malvern Nat. F.C., pt. 3 (1853-70), pp. 6 and 7.
293 Trans. Woolhope Nat. F.C., 1852, pp. 4, 8.
294 "Flora" (1889), p. xxii.
295 *Id.*, p. xix.
296 "Silurian System," pp. 549-550.

Ludlow rock with the Old Red Sandstone;[297] but he failed to find any trace of either local or foreign drift within the valley, which was one of "clean" denudation. The Rev. F. Merewether, however, found within the valley in the Haugh Wood quartz-pebbles, pronounced by Symonds to be foreign to the district,[298] and near Court Farm, Woolhope, he discovered a tract at least two or three acres in extent covered with local drift. He also investigated the deposits between Mordiford and Fownhope, and noticed sections in the purely local drift, by the roadside opposite the bridge leading to Holme Lacy, at the turn in the road some 300 yards farther to the south-east, and in the village of Fownhope.[299] It would be as well, however, for confirmatory evidence of the foreign nature of the quartz-pebbles procured from the Haugh Wood by Merewether to be obtained, because there is the possibility that they have been derived from the underlying May-Hill Sandstone beds.

On the hills near Kington there are many ice-transported blocks of Cambrian, Silurian, and igneous rocks;[300] and in the valley of the Hales Brook, near the town, and on the south side, there is a deposit apparently of glacial origin.[301]

The Superficial Deposits around Hereford and bordering the Wye as far west as Hay have received considerable attention at the hands of Symonds, T. Curley, Mr. T. S. Aldis, and the Rev. H. E. Grindley.

Mr. Aldis thinks that during the greater part of the Glacial Period "Herefordshire was probably occupied by a mass of comparatively stagnant ice of great depth," and that into this mass a glacier pushed its way from the direction of the hills west of Hay. The peculiar ridge running out from Merbach Hill he regards as a lateral moraine, and the bank that extends southwards through Norton Canon and Staunton-on-the-Wye, and south-westwards to Brobury, as formed of material that was pushed before the glacier when it again advanced after a temporary regression. The lateral moraine, Mr. Aldis thinks, long prevented the Wye from flowing down its old valley, and in the narrowness of the gorge at Bredwardine he sees evidence for concluding that it has not long re-excavated its former channel. Towards or at the close of the Glacial Period he pictures lakes at Letton and about Moccas, and holds that "probably the whole country was largely a lake irregularly broken by islands, some [of which were] ancient hills, others

297 *Id.*, pp. 436-437.
298 "Records of the Rocks," p. 177.
299 Trans. Woolhope Nat. F.C., 1877, pp. 20-21; see also *id.*, 1870 (1871). pp. 173-177.
300 "Silurian System," p. 512.
301 Proc. Geol. Assoc., xviii. (1904), p. 489.

moraine-heaps." Merewether also believed that in comparatively recent geological times the greater part of south Herefordshire was occupied by a lake.[302] As regards the gravels immediately around Hereford, Mr. Aldis is of opinion that they were mainly derived from the destruction of such hills as Lady-Lift, Credenhill, and Mansell Hill, at the time when their crests first appeared from beneath the slowly-melting and easterly moving ice-sheet in closing Glacial times.[303]

When the railway-cutting was made at the foot of the hill upon which Clifford's Castle, near Hay, is built, bones of ox, boar, and deer were found, rudely-stratified in a gravel-bed, which was overlaid by silt and gravel at least 100 feet thick. Symonds, who records these details, says that the sections on the hill-side here are much obscured by débris, which was distributed over the surface, he thinks, by land-ice.

Mr. Grindley informs me[304] that on Merbach Hill, at about 900 feet above ordnance-datum there is a section in the Woolla Quarry of massive Old Red Sandstone overlaid by a soil containing fragments of rock and capped with reddish drift, in which are embedded rounded and striated boulders of Silurian rock, about nine feet thick. At the foot of Merbach, about Bredwardine, the surface is composed of regular ground-moraine clay, which spreads out in a sheet at least as far down as Brobury Scar.

"Drifts and clays with Silurian erratics, apparently transported from Welsh sources, occur at many localities between Bredwardine and Hereford, notably on the right bank of the Wye between Bridge Sollars and Canon Bridge; near Brinsop Court; and in a terrace on the north side of the valley between Mansell Lacy and Brinsop. But the whole Wye Valley is more or less covered with morainic clays, which occur in patches, and are found up to 400 feet above ordnance-datum. The river in many places has excavated its bed through these clays down to the solid rock, as is well seen on the left bank below Breinton."[305]

As pointed out by Mr. Grindley, the gravel-pits which occur at intervals along a line stretching from near Kingstone Grange, 6 miles south-west of Hereford, to Wellington Bridge, some 5½ miles to the north of the city, seem to point to a terminal moraine with a breadth of between 2 and 3 miles.[306] At Kingstone Grange there is a gravel-pit in which striated boulders have been found, and at Old

302 Trans. Woolhope Nat. F.C., 1877, p. 22.
303 *Id.*, vol. for 1902-04 (1905), pp. 325-329.
304 *In litt.*, Nov. 23rd, 1906.
305 See also "Flora" (1889), p. xxiv.
306 Trans. Woolhope Nat. F.C., 1902-04 (1905), p. 336.

Weir[307] a section through the same moraine shows it to be there of a more clayey facies; but by far the best exposure is that near the Midland Railway at Stretton Sugwas,[308] where a transverse section shows the moraine to consist of a cone of red sandy clay (with boulders) 50 feet broad at the base, flanked on either side by coarse gravel. "Boulders of Old Red Sandstone up to 5 feet 6 inches by 2 feet by 1 foot 9 inches, are found embedded in the clay, some of them striated" (H. E. Grindley, *in litt.*), and among the smaller ones are specimens of coarse Welsh grits, Ludlow rocks, clay-slates, and fragments of igneous rocks, in a few cases striated."

The Glacial Drifts seem to merge into the river-gravels upon which Hereford stands, and which cover, according to Curley, an area 900 acres in extent.[309] Mr. Grindley interprets these gravels as the Low-Level Gravels of Symonds. They are frequently exposed in and near the city, and in some places are more sandy than in others. Some sections display broken lines of pebbles coated with carbonaceous matter. There are pits, in the yard of the Working Boy's Home, in the Workhouse grounds, and in the Cattle Market, the general level of the surface of these pits being between 25 and 30 feet above the river-level, or 180 feet above ordnance-datum. Mammalian remains are not common in the Low-Level Gravels, but molars of *Elephas antiquus* have been obtained from excavations at the Infirmary,[310] and along the line of the Lugg a worn molar of *Rhinoceros tichorhinus* has been recorded from between Bodenham and Dinmore Hill, while "fossils" have been procured from the gravel at Monklands on Stretford Brook.[311]

Symonds obtained teeth of *Equus fossilis* and a worn molar of *R. tichorhinus* from the gravels of the neighbourhood of Lugwardine, which were worked at Wilcroft and Hagley for ballast for the Hereford and Ledbury Railway, and records large angular pieces of Old Red Sandstone, blocks of Cardington grits from Church Stretton, fragments of Clee-Hill basalt, Hope-Bowdler trap, and quartz-pebbles,[312] while Curley obtained a pebble containing the cast of *Dactylioceras commune*[313]—a truly remarkable assortment.

That a lake once occupied much of the low-lying country around Hereford at a time subsequent to the formation of the river-gravels just discussed, is obvious from certain details which have been obtained when excavations have been made. Curley records that a deep trench in Stonebow Meadow, below Barr's Court Station,

307 See also T. S. Aldis, *id.*, p. 228; H. C. Moore, *id.*, p. 331; Symonds, Edin. New Phil. Journ., n.s., vol. xiv., p. 284.
308 Proc. Cotteswold Nat. F.C., xv. pt. 3 (1906), p. 196.
309 Q.J.G.S., xix. (1863), p. 179.
310 "Flora" p. xxii.
311 *Id.*, p. xxiv.
312 "Records of the Rocks," p. 166.; "Old Stones," p. 83; "Flora," p. xx.
313 Trans. Malvern Nat. F.C., pt. 3 (1853-70), p. 27.

proved in descending order (1) surface-soil, 1 ft., (2) brick-earth, 3 ft., (3) peat-bed, usually 3 ft., (4) marl with leaves in the upper portion, and shells (such as *Anodonta cynœa*, *Unio pictorum*, *Bithynia tentaculata*, *Viviparus viviparus*, *Valvata piscinalis*, *Neritina fluviatilis*, *Sphærium corneum*, and varieties of *Planorbis*, *Helix*, and *Limnæa*, in the lower, 2 ft.[314] In sewerage excavations lake-silt is said to have been proved at a depth of 40 or 50 feet below the surface in Hereford.[315]

The most interesting discovery in connection with Pleistocene geology was made quite recently by Mr. Grindley, who kindly sent me the following notes:—"Just above the usual summer level of the water in the Wye and under the usual deposits of Alluvium composing the banks, there is observable at Breinton and about Bredwardine a bed of stiff grey clay which descends abruptly to the river-bed. It is pierced throughout by root-like structures, rotten and stained yellow with iron-oxide. From the Bredwardine clay Mr. J. Wright of Belfast, to whom specimens were submitted, obtained numbers of Foraminifera. He reported that they were all common shallow-water forms and might be found almost everywhere in muddy places off our coasts. He should say that the clay was one of the latest of the Pleistocene deposits, as the foraminifera found in the Glacial drifts are very much smaller." Mr. Wright also obtained Foraminifera, but less plentifully, from the clay from Breinton, and they were associated with freshwater organisms—diatoms, etc. "The freshwater organisms undoubtedly existed contemporaneously with the Foraminifera, indicating a brackish-water deposit, but the vegetable matter in the deposit would lead to the inference that it was laid down in close proximity to land. The evidence goes to show a submergence of 200 feet or more." (J. Wright, *in litt.*) The height above sea-level of the bed from which the clay was taken at Bredwardine is about 200 feet, and that at Breinton about 170 feet. Unfortunately, it has not been possible as yet to ascertain the relations of this clay-bed to the Glacial Drifts of the neighbourhood, but Mr. Grindley says it seems to be inferior.

ALLUVIUM.—Alluvial deposits border in many places the Wye and its tributaries, and give rise to some of the richest land in the county. Symonds agreed with C. Richardson, who claimed a great antiquity for the river,[316] that the Wye had in many places more than once re-arranged its alluvia.[317] Horns of red deer, and of *Bos primigenius*, are occasionally found in these deposits.

314 Trans. Woolhope Nat. F.C., 1866 (1867), pp. 253-254.
315 "Flora," p. xxii.; see also H. C. Moore, Trans. Woolhope Nat. F.C., 1902-1904 (1905), pp. 330-335
316 Edin. New Phil. Journ., 1861.
317 "Flora," p. xxi.

PREHISTORIC MAN.—In the Carboniferous Limestone of the Great Doward are several caves, one of which, "King Arthur's Cave," is of much interest and importance. Symonds undertook its exploration in 1871.[318] The present floor he found to consist of fallen débris from the roof, fragments of pottery, human bones, bones of birds, badgers, and foxes, mixed with stalactitic and vegetable matter. Below this came a layer of cave-earth containing flint implements, worked pebbles, and teeth and jaws of a bear and horse. To this succeeded, in descending order, a thin layer of stalagmite; stratified red sand with rolled pebbles of greenstone and "Lower Silurian" rock (a deposit Symonds believed to be part of an old river-bed of the Wye); a bed of stalagmite 2 ft.; and lastly, another cave-earth, containing a great number of bones, teeth, and horns. Associated with these remains of rhinoceros, fossil horse, reindeer, Irish elk, and bison, cave-lion, hyæna, and mammoth, but more particularly in the upper layer, were flint-flakes. "The evidence which the deposits in this cave give as to the antiquity of man," writes Mr. W. J. Harrison, "is indeed remarkable and convincing."[319] In the neighbouring "Bannerman Cave," some 50 feet above King Arthur's Cave, amongst other remains a perfect lower jaw of a beaver has been found. Flint-flakes are recorded from the vicinity of Ledbury.[320]

Such, in brief, is what is known concerning the geology of Herefordshire. As mentioned in the opening pages of this essay, much remains to be found out. It is urged that whatever is the rock investigated, minute attention should be paid to the fossils, for palæontology is the ultimate basis of historical geology.

318 "Records of the Rocks," pp. 350-353; Geol. Mag., 1871; "Severn Straits," p. 36; "Old Stones," pp. 141-142; Trans. Woolhope Nat. F.C., 1871, p. 21; *id.*, 1874 (1880), pp. 17-24; *id.*, 1884 (1890), pp. 217-218; "Flora," p. vi.

319 "Geology of the Counties of England and Wales" (1882), p. 119.

320 H. C. Moore, Trans. Woolhope Nat. F.C., 1894, pp. 191-193.

TABLE OF STRATA

IN HEREFORDSHIRE.

Neozoic Group.				Approximate Thickness in Feet.
Neogene	Pleistocene Series.	Alluvial deposits, peat, river-gravels, cave-deposits, moraines, boulder-clays.	Recent shells, plant-remains, etc. Numerous mammalian remains have been obtained from the cave in the Great Doward, and a few from the gravels.	
*System.	Pliocene Series	Absent from Herefordshire.		
	Miocene			
	Palæogene*			
Cretaceous		Red and variegated marls. Absent from Herefordshire. Absent from England so far as fossiliferous equivalents are concerned.	No fossils recorded.	
Jurassic				
Triassic.	Keuper Systems	Bromesberrow Beds. Soft, bright-red sandstones.	"	Up to 200
	Upper Stage			
	Muschelkalk Lower.			
	Bunter	Conglomerates of a dark-red colour containing pebbles of Silurian and Uriconian rocks.	"	
Permian	Upper.	Absent from Herefordshire.		
	Haffield Conglomerate.			
Upper.	Lower.	Shales with bands of ironstone-nodules and coal-seams. Lowest beds only preserved in the Herefordshire portion of the Forest of Dean.	Plant-remains.	1900

TABLE OF STRATA

IN HEREFORDSHIRE.

					Approximate Thickness in Feet.
Neozoic Group.	Neogene *System.	Pleistocene Series.	Alluvial deposits, peat, river-gravels, cave-deposits, moraines, boulders, boulder-clays.	Recent shells, plant-remains, etc. Numerous mammalian remains have been obtained from the cave in the Great Doward, and a few from the gravels.	
		Pliocene Miocene Series	Absent from Herefordshire.		
	Palæogene* Cretaceous Jurassic Systems				
	Triassic.	Keuper Muschelkalk Bunter	Upper Stage Lower.	Red and variegated marls. Absent from Herefordshire. Absent from England so far as fossiliferous equivalents are concerned.	No fossils recorded.	
			Bromesberrow Beds. Soft, bright-red sandstones.		
	Permian		Haffield Conglomerate.	Conglomerates of a dark-red colour containing pebbles of Silurian and Uriconian rocks.		Up to 200
Palæozoic.	Carboniferous.	Upper.		Absent from Herefordshire.		
		Lower.		Shales with bands of ironstone-nodules and coal-seams. Lowest beds only preserved in the Herefordshire portion of the Forest of Dean.	Plant-remains.	1900
		Lower.	Avonian. Kidwellian.	Millstone-Grit. Quartzose sandstones. (a) Coarse-grained: 370 feet. (b) Fine-grained: 100 feet.	*Lonsdalia floriformis* (D_3) *Dibunophyllum* 6. (D_1).	470
				The lowest beds of Millstone-Grit in this area belong to the sub-zone of *P. Cora*, as do also the thick 'Whitehead Limestones' with which are associated crystalline dolomites.	*Productus Cora* (mut. S_2), (S_2). *P. semireticulatus* (mut.) (S_1).	(*Cornina*-Zone.
			Clevedonian.	Dolomites with the very fossiliferous 'Crease Limestone' at the base.	*Syringothyris* aff. *laminosa* (C).	
				Limestones; the upper part of Z_1 and the whole of Z_2 extensively dolomitized.	*Schizophoria resupinata* (Z_2). *Spirifer* aff. *clathratus* (Z_1).	645 (less in this county?)
				Limestones, not very fossiliferous Limestones and shales.	*Spiriferina octoplicata* (K_2). *Productus bassus* (K_1).	
				Shales, grits, and calcareous beds.	*Modiola lata* (M).	
	Devonian.	Upper		Yellow, grey, and red sandstones, with occasional bands of red shale, Quartz-grits, and conglomerates.	*Holoptychius, Sauripterus, Bothriolepis, etc.*	200 to 500
		Lower	Brownstones.	Brownstones. Red marls and chocolate-coloured sandstones, passing down into	No fossils, except fragments of *Pteraspis* and *Cephalaspis*, have been recorded from the Brownstones.	500 to 1500
			Cornstones.	Upper Cornstones. Red and grey sandstones, marls, and cornstones.		
				Rowlstone Beds. Marls and greenish sandstones. Lower Cornstones. *Pteraspis*-Beds.	*Stylonurus Symondsi, Præarcturus gigas, Zenaspis Salweyi, Scaphaspis rectus, S. Lloydi, Cyathaspis (?) Symondsi, Pteraspis rostratus, P. Crouchi, Eucephalaspis Agassizi*, etc.	2500 to 4000 or more
	Silurian.	Ludlow	Temeside (Ludlow District).	F.—Temeside Shales. (f) Fragment-Bed. (e) Olive Shales with Eurypteridæ. (d) Temeside Bone-Bed. (c) Olive Shales with Eurypteridæ. (b) Micaceous grit. (a) Variegated rubbly shales and marls	*Lingula cornea* and *Eurypterus*.	110 to 120
				E.—Downton-Castle Sandstone. (e) Thinly-bedded micaceous sandstones with a Fish-Bed and a few *Lingulæ*. (d) Sandstones, carbonaceous. (c) Massive yellow sandstones with *Lingula minima*. (b) *Platyschisma-helicites*-Bed or the Downton Bone-Bed. (a) Shales, sandy.	*Lingula minima*. From the Downton Sandstone have been recorded *Cyathaspis Banksi, Auchenaspis Egertoni, Cephalaspis Murchisoni, Pterygotus Banksi, Pt. gigas, Pt. problematicus, Pt.* (?) *stylops, Eurypterus pygmæus, E. abbreviatus, E. linearis, Beyrichia*, etc.	30 to 50
			Upper Ludlow	D.—Upper Whitecliffe or *Chonetes*-Flags (c) Ludlow Bone-Bed. (b) Calcareous shales and flags with *Spirifer elevata*, mut. (a) Calcareous, olive-green flags, with *Chonetes striatella*.	(Zones). *Chonetes striatella*. *Scaphaspis ludensis, Eurypterus linearis, E. punctatus.*	150 to 160
				C.—Lower Whitecliffe or *Rhynchonella*-Flags. (a) Concretion-Band. (b) Calcareous, blue flags.	*Rhynchonella nucula.*	110 to 120
			Aymestry "Stage."	B.—Mocktree or *Dayia*-Shales.	*D. navicula.*	40 to 150
				A.—Aymestry or *Conchidium*-Limestones.	*C. Knighti.*	75 to 250
			Lower Ludlow.	Dark-grey argillaceous shale with calcareous concretions in places.	*Monograptus tumescens, M. scanicus, M. Nilssoni, M. vulgaris* — *S. ludensis, E. linearis, E. punctatus, Hemiaspis limuloides, H. Salweyi*, etc.	440 to 700
		Wenlock	Wenlock Limestone.	Grey, subcrystalline, usually concretionary limestone.	*Cyrtograptus Lundgreni* — *Calymene Blumenbachi*,	150 to 280
			Wenlock Shales	Fine-grained, grey, and dark-coloured clayey shales with lines of nodules in places.	*C. rigidus, C. Linnarssoni, C. symmetricus, Monograptus riccartonensis* — *Phacops candatus, Atrypa reticularis, Omphyma turbinatum*	640 to 900
			Woolhope Limestone	Bluish-grey limestone, very massive in the Woolhope district, but often more shaly in the Malvern and Ludlow districts.	*C. Murchisoni* — *Favosites gothlandica.*	30 to 50
		Llandovery	Upper Llandovery	Tarannon Shales. Shales and grey laminated sandstones passing down into, May-Hill Sandstone. Sandstones and conglomerates of grey, yellow, and purple colours.	"*Petraia*" *bina, Stricklandinia lens, Pentamerus oblongus, Clenodonta Eastnori*, etc.	1000
			Lower Llandovery	Absent from Herefordshire.		
	Ordovician.	Bala Llandeilo Arenig				
	Cambrian.	Upper or Olenian	Tremadoc	Upper Tremadoc. Absent from Herefordshire.		
				Lower Tremadoc. (a) Upper Grey Shales. (b) Coal-Hill Igneous Band. (c) Lower Grey Shales. (d) "Middle Igneous Band" — Bronsil Shales (Coral) Grey Shales (Holl)	*Dictyonema sociale.*	1000
			Lingula-Flags	Upper *Lingula*-Flags. (a) Upper Black Shales. (b) Upper White-leaved Oak Igneous Band. (c) Lower Black Shales — White-leaved Oak Shales (Coral). Black Shales (Holl) — Malvern Shales (Phillips).	*Peltura scarabæoides, Agnostus trisectus, Clenopyge pecten, Sphærophthalmus alatus.*	500
				(Certain zones come here which have not been detected in the Malvern district).		
		Middle or Paradoxidian	Menevian	Zone of *Polymorphina Lapworthi*. Shales, black, with gritty seams. Hollybush Sandstone. (a) Sandstones, massive. (b) Sandstones, flaggy and shaly.	*Protospongia, Kutorgina cingulata, var. pulsilla, Polymorphina Lapworthi.* *Hyolithus fistula, H. malvernensis, H. primævus, Scolecoderma antiquissima Kutorgina Phillipsi.*	Not less than 30 900 to 1000
		Lower or Olenellian	Harlech	Malvern Quartzite. Grey quartzites and conglomerates.	*K. Phillipsi, H. primævus*, and *Obolella? Groomi.*	Several hundreds of feet.
	Pre-Cambrian.	Longmyndian		Not exposed at the surface in Herefordshire.		
		Uriconian		Rhyolites, andesites, basalts, and felspathic tuffs.		
		Malvernian		Highly crystalline gneissic rocks.		

* These terms are not in general use at the present time, but they are very convenient, and for more than one reason their employment seems desirable. They are, however, used in Mr. A. J. Jukes-Browne's work, "The Students' Handbook of Stratigraphical Geology" (1902), pp. 22-23.

LANDSLIP NEAR PUTLEY COCKSHOOT, WOOLHOPE DISTRICT, ON FEBRUARY 17TH, 1904.
A. Watkins, Photo.

Woolhope Naturalists' Field Club.

NOTES ADDITIONAL TO THE FLORA OF HEREFORDSHIRE.

The order and nomenclature of the London Catalogue, Ed. IX., is observed in these Notes.

Thalictrum flavum, L.

New District: 14. River side near the Hay; *Ley.*

Ranunculus trichophyllus, Chaix.

New District: 9. Ditch by the railway, north of Leominster; *Rev. W. E. Thompson.*

Ranunculus Lenormandi, F. Schultz

New District: 3. Bog in Queen's Wood, Gorstley, 1898; *Ley.* The only record for this moorland species in the county, with the exception of the elevated ridges of the Black Mountain.

Ranunculus sceleratus, L.

New District: 3. Devereux pools, Woolhope; *Ley.*

Ranunculus Lingua, L.

Districts: 11. Vallets Wood Titley, 1893; *Ley.* 13. Blakemere, 1885; *E. Lees, in lit.*

Ranunculus sardous, Crantz

New District: 4. Arable field, Crump End Hill, a single plant; *R. F. Towndrow!* District 14. Cusop, plentifully; *Rev. W. M. Rogers!*

Var. *parvulus L.

District 14. At Rowlstone Church, 1906; *Bickham!!!*

Ranunculus parviflorus, L.

New District: 6. Shucknell Hill; *Ley.* District 10. Roadside banks, Richard's Castle; *Winterbourne.*

Ranunculus arvensis, L.

District 4. Ledbury; *Bickham.*

Caltha palustris, L. Var. b. Guerangerii (Boreau)

District 6. Near Pencombe; *Ley.*

Var. latifolia (Schott).

Observed at Sellack and King's Capel (D. 2), and near Lyonshall (D. 12); *Ley.*

Helleborus viridis, L.

District 8. Stream bank at Humber Church: *Winterbourne.*

Helleborus fœtidus, L.

New District: 8. Hell-hole near Hampton Court; *Winterbourne.* Shrubbery at Eyton hall (D. 9), introduced; *Winterbourne.*

Aquilegia vulgaris, L.

New District: 12. Roadside at Mortimer's Cross; *Winterbourne.*

Aconitum Napellus, L.

New District: 10. Pools in Sunny Gutter, Ludlow; *Winterbourne.* Ashford, "on the Herefordshire side of the brook" (D. 9); *id.*

Nymphæa lutea, L.

In the lower parts of the Frome brook, and in the Lugg, Mordiford and Longworth (D. 7); *Ley.*

Meconopsis cambrica, Vig.

District 13. Hedge bank near Turnaston, introduced; *Mrs. Green.*

***†Rœmeria hybrida, DC.**

District 4. On the railway, Ledbury; *Bickham!*

Chelidonium majus, L. var. *laciniatum, Stokes.

District 4. Hedge bank, Ledbury, 1906; *Bickham.*

Neckeria lutea, Scop.

New District: 4. Old gardens, Ledbury; *Bickham!*

Fumaria, L.

The following notes are due to the publication of Mr. H. W. Pugsley's paper on this genus in the *Journal of Botany*, 1902 (p. 129).

Fumaria *purpurea, Pugsley.

Fownhope (D. 3), 1871; *Herb. Purchas!* Bank at Lyonshall Railway Station (District 11), in abundance, June, 1902; *Ley.*

Fumaria muralis, Sonder.

Garden weed at Sellack (D. 2), 1875; *Ley.* This is the plant referred to in the *Flora of Herefordshire*, p. 17, as probably F. muralis, Sonder.

Fumaria Boræi, Jord.

It seems probable that far the larger proportion of the Capreolate Fumitories of Herefordshire fall under this aggregate.

The writer has plants which he assigns to the type from Lugford Park (D. 10); the var. ambigua, Pugsley, from King's Capel (D. 2); var. muraliformis, CL., from St. Weonards (D. 1) and Huntsham (D. 2).

Fumaria pallidiflora, Jord.

District 2. Hedge bank at Weston-under Penyard, June 1898. Confirmation of the old record for the same station in 1849. Alton Street, Ross, September 1871; *Herb. Purchas.*

Fumaria densiflora, DC.

District 2. Ross, July 1897; *H. Southall!* 4. Garden weed at Underdown, Ledbury; *Bickham.*

Barbarea stricta, Andrz.

District 2. Ditch in the river meadows near Sellack Church, 1905; *Ley.*

Cardamine pratensis L. Var. *dentata, Hayne and Welw.

District 2. Weed in garden soil, Sellack: river bank and hedge bank, Great Doward, 1906; *Ley.* Probably common.

Var. *paludosa, Petermann.

Districts: 2. Sellack, in wet and dry situations; *Ley.* 14. Wet osiery at Pontrilas, 1906; *Ley.* Certainly common.

Diplotaxis muralis, DC.

District 4. Round Colwall, "increasing"; *Bickham.*

Lepidium *ruderale, L.

District 4. By the new hotel, Colwall, 1906; *Bickham!*

Lepidium *†Draba, L.

Districts: 2. Waste ground at Ross, 1906; *Ley.* 4. Several times found at Ledbury; *Bickham.*

†Alyssum incanum, L.

District 4. Colwall. *Towndrow!*

†Hesperis matronalis, L.

Districts: 2. River side, Great Doward, 1901; *Ley.* 4 Colwall; *Towndrow!*

Sisymbrium Sophia, L.

District 4. On the Dymock road, near Ledbury, about a dozen plants, 1903; *Bickham!*

***†Sisymbrium pannonicum, Jacq.**

Railway ballast at Welsh Bicknor. D. 2, 1906; *Ley.*

Erysimum cheiranthoides, L.

District 2. Weed in Sellack garden, 1904, 1905; *Ley.*

Coronopus didymus, Sm.

New Districts: 7. Railway bank near Hereford; *Bickham!* 12. River bank at Monnington; *Sir G. Cornewall!* Districts: 2. Weed in Perrystone gardens; *Miss E. Armitage!* 14. Cusop, near Hay; *Rev. W. M. Rogers!*

†*Bunias orientalis, L.

District 2. Roadside near Peterstow; first noticed about the year 1900, and persisting for several years; *Ley.*

Reseda *lutea, L.

Very rare. District 4. Colwall, 1896; *Miss Raper!* Again at the same station, 1899; *Towndrow.* Reported also, with some expression of doubt, from Stoke Prior (D. 8), by *Mr. Winterbourne.* Probably a Native in Herefordshire.

Helianthemum Chamæcistus, Mill.

District 8. Marlbook farm, Fordbridge; *Winterbourne.* Stoke Prior, *Rev. W. E. Thompson.*

Viola *sepincola (Jord). Rare. (V. odorata × hirta, sub-odorata).

District 3. Cherry Wood, Fownhope, February, 1877; *Ley.*

Viola permixta (Jord). (V. odorata × hirta, sub-hirta).

District 4. Conèygree Wood, Ledbury; *Bickham.*

Viola silvestris, Reich.

The statement in the *Flora of Herefordshire*, p. 35, that this violet (=V. Reichenbachiana, Bor.) is less common than V. Riviniana, Reich. near Ross, and in other parts of the county, is shewn by longer experience to be unfounded.

Viola ericetorum, Schrader.

District 4. Near a footpath from Colwall to West Malvern, May, 1899; *Towndrow.*

Viola *tricolor, L.

Rare in Herefordshire, and confined, at least as a native plant, to the north-west districts of the county? D. 10. Deerfold Forest, 1871; also (near Cowley Pool, Deerfold), 1882; *Ley.* Wood path, Shobdon, 1886; hill pasture near Byton, 1902; *Ley.* Tillage at Bushy Farm, Brilley, 1905; *Ley.* The Deerfold and Byton localities were in old heathland pastures, shewing that the plant was in all probability a Native. In the south of the county V. tricolor is occasionally found in tillage, where its claims to be native are very doubtful.

The following forms of V. tricolor, L. and V. arvensis, Murr., have been identified with more or less certainty, by comparison with specimens in the British Museum:—

V. TRICOLOR, L.

V. Provostii (Boreau).

In tillage. Districts: 1. Priorswood, St. Weonards, 1880; *Ley.* 2. Great Doward, 1906; *Ley.*

V. Deseglesii (Jord.).

In tillage. District 2. Hope Mansel, 1880; Sellack, 1905; *Ley.*

V. carpatica (Borb.).

District 10. Wood path on Shobdon Hill, 1886; *Ley.*

V. hispida (Lam.).

District 10. Deerfold Forest, 1870; *Ley.*

V. contempta (Jord.).

Districts: 10. Hill pastures, Cowley Pool Deerfold, 1882; *Ley.* 11. Byton, 1902; *Ley.*

V. Sagoti (Jord.).

In tillage. Districts: 2. Fawley Cross, 1902; *Ley.* 10. At Bushy Farm, Brilley, 1905; *Ley.*

V. ARVENSIS, MURR.

V. segetalis (Jord.).

Tillage. District 2. On Caradoc Farm, Sellack, 1906; *Ley.*

V. Paillouxii (Jord.).

Tillage. District 10. Bushy Farm, Brilley, with V. Sagoti (Jord.), 1905; *Ley.*

V. pallescens (Jord.).

Tillage. District 2. Sellack, 1865; *Ley.*

Polygala *oxyptera, Reichb.

Dry hills. Rare?

South. 2. Dry open hill side on the Great Doward, 1890, 1894; *Ley.*

West. 14. Hill side, Cusop Dingle, 1898; *Rev. W. M. Rogers.*

Silene *nutans, L.

Native? Very rare. District 4. "In the grounds at the Wych Point near Malvern, five or six roots growing together and apparently wild"; *Mr. A. J. Crossfield.*

Silene †*dichotoma, Ehrh.

District 4. Waste ground at Ledbury, 1903; *Bickham.*

Cerastium quaternellum, Fenzl.

New District: 10. Bank at Stapleton, Presteign, 1898; *Ley.* District 3. Backbury Hill; *Ley.*

Stellaria nemorum, L.

District 2. In abundance in a damp thicket at the Weir, Great Doward, 1899 and subsequent years; *Ley.*

Stellaria media, Cyr. *Var. major, Koch.

Districts: 2. Abundant in the river meadows, Sellack, Great Doward, &c. 4. Colwall; *Towndrow*; recorded in 1895 as S. unbrosa, Opiz. This Stitchwort, though unrecorded previously in the county, is probably abundant throughout Herefordshire in suitable situations.

Stellaria umbrosa, Opitz.

New District: 12. Damp hedge near Westonbury; *Ley.*

Arenaria serpyllifolia, L., Var. leptoclados (Guss.)

Districts: 3. Stoke Edith; *Ley.* 4. The Wych, Malvern; *Towndrow!*

Sagina ciliata, Fr.

New District: 3. Dry ground, Backbury Hill, 1900; *Ley.* District 4. Road side on the Ridgeway, Eastnor; *Bickham.*

Buda rubra, Dum.

New Districts: 11. Weed in a yard at Eywood, 1902; *E. H. Greenly.* 13. Among gravel on a drive at Moccas, 1901, apparently introduced with salt; *Sir G. Cornewall!!!* District 4. Weed at Underdown, Ledbury; *Bickham.*

Claytonia†*sibirica, L., and †*perfoliata, Donn.

"These two are establishing themselves as weeds at Ledbury" (D. 4); *Bickham.*

Hypericum Androsæmum, L.

New District: 12. Whitney; *Rev. W. M. Rogers.*

Hypericum pulchrum, L.

Confirmation of District 4. Wynds Point, Malvern; *A. J. Crossfield.*

Hypericum montanum, L.

New District: 11. Near Nash Scaur, 1897; *Ley.* District 2. In Rigg's Wood, Sellack, 1892; and on a hedge bank at Little Birch, 1894, both stations on sandstone; *Ley.*

Malva rotundifolia, L.

District 4. Not uncommon near Ledbury; *Bickham.*

Geranium sylvaticum, L.

District 12. "On the road side between Titley and Lyonshall, several plants, about the year 1893, but subsequently disappearing"; *Winterbourne.* Doubtless an introduction at this station.

Geranium pratense, L.

New District: 8. Ford and Hampton Court; *Winterbourne.*

Geranium pyrenaicum, Burm., fil.

New Districts: 5. Abundantly in the Churchyard at Whitbourne, 1905; *Sir G. Cornewall.* 8. Norton Canon, 1905; *Sir G. Cornewall.* District 2. Meadow near Ross, on the Weston road; *Miss E. Armitage.*

Geranium columbinum, L.

Districts: 2. Hedge near Winter's Cross, Peterstow; *Ley.* 3. Littlehope, near Mordiford; *Dr. Wood!!!* 4. Frith Wood, Ledbury; *Rogers* and *Ley.*

Geranium lucidum, L.

Districts: 4. Near Colwall; *A. J. Crossfield.* 10. Rocks at Ludford; *Winterbourne.*

Rhamnus catharticus, L.

New District: 8. Broadwood near Leominster; *Winterbourne.* Districts 3. Littlehope near Mordiford; hill above Grendon Court; *Ley.* 9. Poplands near Leominster; *Winterbourne.*

Rhamnus Frangula, L.

Districts: 2. Marshy wood, Howle Green; *Ley.* 3. Queen's Wood, Upton Bishop; *Ley.* 8. Canon Vallets Wood, Westhope Hill; *Ley.*

Genista anglica, L.

District 3. In some quantity in a rough pasture between Aston Ingham Church and Gorstley, 1903; *Ley.*

Genista tinctoria, L.

District 9. Cursneh Hill, Leominster; *Winterbourne.*

***†Spartium junceum, L.**

District 4. In abundance in a railway cutting close to Ledbury Station; *Bickham!!!* This beautiful plant appeared first on the railway at Dymock, West Gloucestershire, about the year 1895, and has since spread to Ledbury.

Ononis spinosa, L.

New District: 4. Coddrington; *Towndrow*

Medicago †sativa, L.

"This plant has maintained itself for some years on the railway embankment at Steen's Bridge (D. 4)"; *Winterbourne.*

Melilotus officinalis, Lam.

Districts: 3. Wood path between Broadmoor Common and Sharpnage Well; *Ley.* 4. Railway bank in Colwall parish; *A. J. Crossfield.* 8. Dinmore, near the railway station; *Winterbourne.*

Trifolium medium, L.

District 4. Bullen Bank, Ledbury; *Bickham.*

Trifolium arvense, L.

New District: 8. Stoke Lane, Leominster, on a wall top; but destroyed afterwards through the repair of the wall; *Winterbourne.* Districts 2. Field at Dadnor, near Ross; *Miss E. Armitage.* 4. Near Rowick, Eastnor; *Bickham.*

Trifolium striatum, L.

New District: 6. Shucknall Hill; *Dr. Wood.*

Trifolium repens, L., Var. *Towsendi, Bab.

District 13. Moccas Park, in turf, 1904; *Bickham!* Authenticated by Mr. Townsend.

Trifolium filiforme, L.

Districts: 1. Pasture near Garway Mill; *Ley.* 4. Lawns, Underdown, Ledbury; *Bickham.*

Anthyllis Vulneraria, L.

New District: 6. Between Stoke Lacy and Ullingswick, "very large and fine"; *Rev. T. S. Lea.*

Lotus tenuis, Waldst. & Kit.

District 4. Colwall; *Towndrow.*

Astragalus glycyphyllos, L.

Districts: 3. Backbury Hill; *Ley.* 4. On the Ridgeway, Eastnor Park; *A. J. Crossfield.* Road side between Eastnor and Ledbury; *Bickham.*

Vicia gemella, Crantz.

Districts: 3. Oldbury Hill, Stoke Edith; *Ley.* 14. Dulas; *Mr. C. Butler.*

Vicia Orobus, DC.

District 14. At the head of Cusop Dingle, both in Hereford and Brecon, abundantly, 1897; *Ley.*

Vicia sylvatica, L.

Districts: 4. Abundant at Bradlow and Dog Hill, Ledbury; *Bickham.* 5. Tedstone Delamere; *Rev. T. S. Lea.* 8. Dinmore Hill; *Ley.* Ivington Camp; *Rev. W. E. Thompson; Winterbourne.*

Vicia angustifolia, L., Var. Bobartii, Koch.

District 2. In more than one spot on Great Doward Hill, 1905; *Ley.*

Lathyrus montanus, Bernh.

Correction of statement in *Herefordshire Flora*, p. 76, "Plentiful at Kimbolton" (D. 9); *Hutchinson.*

Prunus insititia, Huds.

New District: 4. Colwall; *Towndrow.*

Prunus Avium, L.

New District: 14. Wood near Pont Esgob; *Ley.*

Prunus Cerasus, L.

District 2. Chase Wood, Ross; *Miss E. Armitage.* Conglomerate rocks on Great Doward; *Ley.*

Spiræa Ulmaria, L. Var. *denudata, Bœnn.

District 2. Ditch at King's Capel, with the type, 1905; *Ley.* Probably common.

Rubus idæus, L. Var. obtusifolius, Willd.

District 2. In the garden of Walford Vicarage, 1896; *Ley.* Apparently the f. rotundifolius, Bab.

Rubus plicatus. Wh. & N.

New District: 3. Queen's Wood, Upton Bishop; *Ley.*

Var. *hemistemon (P. J. Muell).

District 11. Bog in Lyonshall Park Wood, 1900; *Ley.*

Rubus *nitidus, Wh. & N.

District 12. Shirl Wood, Eardisland, 1898; *Ley.*

Rubus affinis, Wh. & N.

New District: 12. Hackley Common, Sarnesfield, abundantly, 1903; *Ley.*

Rubus imbricatus, Hort.

Districts: 1. Rough bank near Callow, Welsh Newton; and on Lawson farm, Ganarew; *Ley.* 2. Edge of Suff wood, Howle Hill; Howley Grove, Mitcheldean; *Ley.* 3. Road hedge in Linton parish, near Gorstley; *Ley.*

Rubus carpinifolius, Wh. & N.

New District: 2. Bank at Suff wood, Howle Hill, 1906; *Ley*. District 11. On a rough bank between Nextend farm and Lyonshall Park Wood, abundantly, 1905; *Ley*.

Rubus Lindleianus, Lees.

New Districts: 3. Mains Wood, Putley; Coldborough Park Wood; *Ley*. 4. Hansett Wood, Canon Frome; Eastnor and neighbourhood; *Ley*. 6. Ashperton Park Wood; Ullingswick; *Ley*.

Rubus argenteus, Wh. & N.

New Districts: 8. Hedge, Yazor, *f*., 1891; *Ley*. 12. Winforton Wood, *f*. 1898; *Ley*. Both forms very far from the type, but referred to this species by *Rev. W. M. Rogers*.

Rubus rhamnifolius, Wh. & N.

Districts: 1. Stream side, Kilpeck; *Ley*. 3. Main's Wood; Putley; Queen's Wood, Gorstley; Linton; *Ley*. 4. Hansett Wood, &c., Canon Frome; Eastnor; *Ley*. 6. Ashperton Park Wood, Ullingswick and neighbourhood, abundantly; *Ley*. 9. Hill side above the Goggins, Richard's Castle; *Ley*.

Rubus nemoralis, P. J. Muell. Var. glabratus, Bab.

New District: 7. Rough pasture under Belmont; and under Rotherwas Park wood; *Ley*. Districts 2. Puttridge Quarry, Ross, 1871; *Purchas!* 3. Main's Wood, Putley; Yatton Wood; *Ley*. 6. Ashperton Park Wood; Morton Wood, Ullingswick; *Ley*.

Rubus pulcherrimus, Neum.

Districts: 1. Stream side, Kilpeck; *Ley*. 3. Queen's Wood, Gorstley; *Ley*. 9. Hill side above the Goggins, Richard's Castle; *Ley*. 10. Stapleton, Presteign; *Ley*. 11. Many spots near Kington; *Ley*. 13. Big wood, Whitfield; *Ley*.

Rubus dumnoniensis, Bab.

New District: 11. In plenty in a rough pasture near Rodd Hurst, 1897; *Ley*. Still one of our rarest brambles.

Rubus Lindebergii, P. J. Muell.

New Districts: 1. Welsh Newton Common, 1902; *Ley*. 10. Willey; Corton near Presteign, 1896; *Ley*. 14. Swampy ground near Pont Esgob, 1889, *Ley*. Districts 11. Hergest Ridge, Kington; *Ley*. 12. Near the Apostles' Farm, Eardisley, 1895; *Ley*.

Rubus *mercicus, Bag.

District 2. Edge of a plantation near Hole-in-the-Wall, Foy, 1903, teste Rogers; *Ley*.

Var. bracteatus, Bag.

New District: 12. Thicket near Newport House, Almeley, 1901; *Ley*. District 11. Abundant in hedges at Kingswood, Kington; *Ley*.

Var. *chrysoxylon, Rogers.

Districts: 10. Hedge at Bushy Farm, Brilley, 1905; *Ley*. 11. With the last at Moseley Mere and Kingswood, Kington; *Ley*. 12. With the last at Newport House, Almeley; *Ley*.

Rubus Selmeri, Lindeb.

New Districts: 7. A single bush by the river at Lower Bullingham, 1904; no doubt from seed brought down in a flood; *Ley*. 11. Hedges at Moseley Mere and Kingswood, Kington, 1901; *Ley*. 12. Rough ground above Whitney Wood, 1900; *Ley*. District 10. Near Willey, 1896; *Ley*.

Rubus villicaulis, Koehl. Subspecies rhombifolius, Weihe.

New locality. District 2. Sellack, at the edge of the railway cutting, 1904; *Ley*. Still one of our rarest brambles.

Rubus *sciaphilus, Lange.

Districts: 1. Roadside at Llantywain, Llangarren, 1886; hedge at St. Weonards, 1899; *Ley*. 14. Wood border in the lower part of the Honddu valley near Cwm-y-oy; *Ley*.

Rubus *leucandrus, Focke.

See 'Herefordshire Rubi' in the Transactions of the Woolhope Club, 1896, under R. carpinifolius. The stations mentioned for this species in Districts 1, 2 and 3, must be transferred to the present species.

Marshy thickets, locally abundant.

South—1. Several spots in St. Weonards parish; Trolloway Brook; Trellesdee; *Ley*. 2. Wet thickets at Coughton Marsh, Howle Hill, and Lodge Grove, Bishopswood; Cockshot Wood, Hope Mansel. Wet thicket at the Lea; *Ley*.

North—11. Vallets Wood and Lyonshall Park Wood, in old pool beds. Wet Thicket near the Rodd Barn; *Ley*. 12. The Quebb, Eardisley; *Ley*.

Rubus thyrsoideus, Wimm.

New Districts: 2. In some abundance in Lodge Grove, Bishopswood, 1896; wood border near Holme Lacy, 1896; hedge at Aconbury Common, 1904; *Ley*. 12. Field hedge near Broxwood, 1902; *Ley*.

Rubus Godroni, Lec. & Lam.

New Districts: 6. Ashperton Park Wood; *Ley.* 10. Willey, Lingen, Stapleton near Presteign, abundantly; *Ley.* 12. Near Eardisley; *Ley.* Districts: 3. Mainswood and Putley Common, Yatton and Coldborough Park Woods, abundantly; *Ley.* 4. Maphill Copse, Canon Frome; Eastnor, abundantly; *Ley.*

Var. robustus (P. J. Muell).

New Districts: 3. Littlehope near Mordiford, 1902; *Ley.* 8. Westhope Hill, 1900; *Ley.* District 2. Hillside between Mitcheldean Road station and Bailey Point; *Ley.*

Var. clivicola, A. Ley.

New Districts: 6. Lowdy Hall, Ullingswicke; *Ley.* 8. Westhope Hill, Dinmore preceptory, Ivington; *Ley.* Districts 1. Streamside at Kilpeck; *Ley.* 3. Linton Ridge; *Ley.* 7. Hillside north of Rotherwas Park Wood; *Ley.* 10. Wood border near Aymestry; wood under Ashley Vallets; *Ley.* 13. Timberline Wood, Criseley Vallets, Big Wood, and Nell's Wood; *Ley.*

Rubus pubescens, Weihe.

*Type. District 2. Howle Hill, near the Church, 1906; *Ley.* The typical plant is rare in Britain, and had not previously been detected in Herefordshire.

Var. subinermis, Rogers.

New District: 3. In the Haugh Wood, at one spot, 1902; *Ley.* District 2. Hedge at Aconbury Common, *f*, 1904; *Ley.*

Rubus silvaticus, Wh. & N.

New Districts: 11. Riverside between Kington and Peas Grove, 1901; *Ley.* 12. Winforton Wood, 1895, and subsequent years; "a form of Rubus silvaticus," Rev. W. M. Rogers; *Ley.* District 14. A remarkable form appears in wet thickets near Pont Esgob, both in Herefordshire and Monmouthshire, with very small leaves.

Rubus macrophyllus, Wh. & N.

New District: 13. Big Wood, Whitfield, 1898; *Ley.* District 3. Queen's Wood, Gorstley, "typical," Rev. W. M. Rogers; *Ley.*

Subsp. Schlechtendalii (Weihe).

New District: 6. Rough pasture at Lowdy Hall, Ullingswick; *Ley.*

Var. *macrophylloides (Genev.)

The plant growing at Shobdon, and noticed as a distinct form in "Herefordshire Rubi," Transactions, 1894, p. 67, has now been determined to be R. macrophylloides of Genevier. Its distribution as known in the county is here given.

South—3. Gorstley quarries, 1887; *Ley.*

North—10. Abundant near the large pools in Shobdon Park, in this District and 11. Wood bordering the Lugg at Aymestry. Woods near Presteign and Lingen; *Ley.* 11. Near Titley in more than one spot; *Ley.*

West—13. Timberline Wood and Big Wood, Whitfield, 1898; *Ley.*

Rubus amplificatus, Lees, must be withdrawn from our lists; the plant growing at Treago ('Herefordshire Rubi', p. 68), being certainly Rubus Schlechtendalii, *Weihe.*

Rubus *amphichloros, P. J. Muell.

District 7. Rough pasture under Rotherwas Park Wood; also in a similar situation under Belmont Wood, 1905; *Ley.*

Rubus *Questierii, Lefv. & Muell.

Rare. Districts 2. Rigg's Wood, Sellack, a single bush, 1899; *Ley.* 11. Old pool beds in Lyonshall Park Wood, not typical, but placed under this species by Rev. W. M. Rogers; *Ley.* The Rigg's Wood plant was typical R. Questierii. It is feared that this rare bramble has now been destroyed at both these stations.

Rubus Salteri, Bab.

New District: 6. Pasture at Little Cowarne, 1900; *Ley.* District 2. Fox Wood, Little Dewchurch, 1896; *Ley.*

Rubus *Colemanni, Blox.

Rare. District 2. Rough pasture near Lodge Grove, Bishopswood, 1891.

This is an interesting addition to the Flora of Herefordshire. It occurs also at more than one station in the Forest of Dean, West Gloucester.

Rubus Sprengelii, Weihe.

New District: 10. Wood at the northern base of Shobdon Hill, 1903; *Ley.* A doubtful plant growing in Criseley Vallets Wood, D. 13, has been placed under R. Sprengelii by Rev. W. M. Rogers.

Rubus hypoleucus, Lefv. & Muell.

Districts: 10. Under Berkly Knoll, near Willey; *Ley.* 13. Park Farm, St. Devereux; Poston Lodge, Peterchurch; Ley.

Rubus hirtifolius, Muell. & Wirtg.

New District: 6. Plentiful on wooded banks, Upper Hope, Ullingswick; *Ley*. District 10. Stapleton Wood near Presteign; Barnes' and Lingen Vallets; *Ley*.

Var. *danicus, Focke.

Districts: 2. Hedge at Holme Lacy, 1896; *Ley*. 6. Near Ullingswick, *f.*; *Ley*. 10. Stapleton, near Presteign; *Ley*. 11. Hill side near the Rodd House, Presteign; *Ley*.

Var. *mollissimus, Rogers.

Districts: 1. In the Buckholt, and at other stations near Welsh Newton. 2. Longclose Wood, Little Doward; Trilloes Court Wood, Bolston; *Ley*. 3. Border of the Haugh Wood, near Mordiford, 1900; *Ley*.

Rubus pyramidalis, Kalt.

New District: 6. Ashperton Park Wood, Morton Wood, &c., Ullingswick; *Ley*. Districts: 3. Mains Wood, Putley; Coldborough Park Wood; *Ley*. 4. Hansett Wood, Canon Frome; *Ley*. 13. Timberline, Nell's Wood, and Big Wood, Whitfield; *Ley*.

Form eglandulosa.

New Districts: 5. Woods and hedges at Sapey Common and Hanley Dingle, both in Hereford and Worcester; *Ley*. 9. Hedge at Orleton Common Hill; *Ley*.

Rubus lasioclados, Focke.

*Type. District 2. On Howle Hill, near the Church, 1906; *Ley*.

Var. angustifolius, Rogers.

New Districts: 3. Rough pastures under Coldborough Park Wood; *Ley*. 10. Lingen Vallets, Presteign; *Ley*. 11. Brake between Nextend Farm and Lyonshall Park Wood; *Ley*. District 8. Ivington Camp and Westhope Hill; *Ley*.

Rubus criniger, Linton.

New Districts: 2. Wallbrook Wood, Aconbury; *Ley*. 7. Belmont Wood; *Ley*. 10. Hillside above the Rodd; *Ley*. 13. Wood above Dulas mill; Birches copse, Wormbridge; *Ley*. District 10. Abundant in Stapleton glen, Lingen and Barnes' Vallets, and other woods near Presteign; *Ley*.

Rubus ? *Lettii, Rogers.

A bramble closely allied to this Irish form is abundant in Bolston Wood (D. 2.); *Ley*. The following careful note on this Bolston plant was prepared by Rev. W. M. Rogers:—"The Bolston Wood plant seems nearer to R. Lettii than to R. criniger or R. Gelertii. From the very constant plant of County Down and Armagh [R. Lettii], it differs by closer pubescence on the stem, being in that one character most like R. criniger; by the leaf, more open and widespread, with whitish instead of greenish grey felt on the under serface, and with the terminal leaflet with longer, more gradually acuminate point and narrower base, the toothing also being deeper and more finely pointed; and by the much longer ultra-axillary panicle top. These characters, though not very distinctive when taken singly, give in combination a considerably different look to the two plants; and each form seems constant to a remarkable degree." First found in 1900.

Rubus *adenanthus, Boul. & Gill.

Rare. District 2. Carey Wood; *Ley*. Found in 1894, but only named with certainty by Rev. W. M. Rogers in 1905.

Rubus *Boræanus, Genev.

Rare. Districts: 2. Longclose Wood, Little Doward, 1904; *Ley*. 5. Stanford Park; both in Hereford and Worcester, 1902; *Ley*.

Rubus cinerosus, Rogers

Transactions, 1896, p. 62. (as R. pulcherrimus, Neum. forma setosa). New Districts: 2. Netherwood Aconbury, and Athelstane's Wood, *f*, 1896; *Ley*. 12. Wood bank Monnington, 1901; *Ley*. 13. Big Wood and Criseley Vallets, Whitfield; *Ley*.

Rubus mucronatus, Blox.

Districts: 2. Chase Wood, Ross; *Ley*. 12. Monnington; Ley.

Var. *mucronatoides, A. Ley.

See Handbook of British Rubi, p. 55. Scattered through the north-west and west of the county; not common.

North—10. Corton Wood, Presteign, both in Hereford and Radnor; *Ley*. 11. Peas Grove, Kington, first in 1884; *Ley*. 12. Highmoor Wood, Almeley, 1899; Shirl Wood, Eardisland, 1900; Bushy Farm, Brilley, 1905; *Ley*.

West—14. Swampy ground near Pont Esgob, 1901, *f.*; *Ley*.

Rubus *Gelertii, Frider.

Equally common in Herefordshire with R. criniger, Linton, which was combined with it at the time of the publication of 'Herefordshire Rubi' in 1896.

South—2. Longclose Wood, Little Doward, 1894, and in several subsequent years; *Ley*. Recorded in 'Herefordshire Rubi' as R. criniger.

Central—7. Wood border at Ruckhall mill, Eaton Bishop, 1905; *Ley*.

North—10. Wood on the Lugg above Amestry, 1905; *Ley*.

Rubus anglosaxonicus, Gelert.

Type far more rare in Herefordshire than the sub-species.

New Districts: 10. Stapleton Wood, Presteign, in many spots, 1896: *Ley*. 13. Big Wood, Whitfield, *f*, nearest to the type; *Ley*. District 2. Bogmarsh Wood, Holme Lacy; *Ley*. In many spots in the Chase Wood, Ross; *Ley*.

Sub-species curvidens, A. Ley.

Districts: 2. Penyard Park Wood, Ross, 1884; *Herb. W. H. Purchas!* Ramsden Coppice Holme Lacy; *Ley*. 13. Timberline and other woods near Whitfield; *Ley*.

Sub-species *vestitiformis, Rogers

Locally abundant in the south and east of the county, and in neighbouring districts of Monmouth and West Gloucestershire.

South—1. Welsh Newton; *Ley*. 2. Abundant on the borders of Chase and Penyard Park Woods, Ross; abundant in Hope Mansel parish and on the County border at Mitcheldean Road Station; Lodge Grove; Great Doward; *Ley*. 3. Yatton Wood; Cherry Wood, Fownhope; *Ley*.

East—4. Abundant on hills above Ledbury; abundant near Eastnor, a *f.*; abundant in Cowleigh Park, Malvern; *Ley*.

North—9. The Goggins, Richard's Castle; *Ley*.

Sub-species raduloides, Rogers

New Districts: 7. Belmont Woods, Hereford; *Ley*. 8. Westhope Hill, Dinmore, 1903; *Ley*. 10. In the Lugg Valley above Amestry, *f.*; Pedwardine Wood, Brampton Bryan; *Ley*. 11. Whitney-on-Wye, *f.*; *Ley*. Districts: 2. Harechurch Wood, Hope Mansel, recorded as R. præruptorum, Boulay in "Herefordshire Rubi." Tar's Wood, Little Dewchurch; *Ley*. 6. Ashperton Park Wood, 1896; *Ley*.

Sub-species setulosus, Rogers

New District: 3. Yatton and Coldborough Park Wood, in several spots; *Ley*. Districts: 1. Stream side, Kilpeck; *Ley*. 13. Thruxton Vallets; Treherbert, St. Margarets, near the schools *Ley*.

Rubus *melanoxylon, Muell. & Wirtg.

Very rare in Herefordshire. Open Common at Moseley Mere, Kington, (D. 11); only one or two bushes, 1896; *Ley*.

Scattered in small quantities in the neighbouring Welsh Counties of Brecon, Glamorgan, and Carmarthen; but far more abundant in Scotland.

Rubus infestus, Weihe.

Still one of our rarest brambles. New District; 10. Wood border by the Lugg above Aymestry, *f.*, 1905; *Ley*.

Var. virgultorum, A. Ley.

New District: 8. Westhope Hill, Dinmore, abundantly; *Ley*. Districts: 5. Stanford Park, 1898; *Ley*. 10. Streamside under Berkly Knoll, Willey; *Ley*. Still unknown in the South of the County.

Rubus Borreri, Bell Salt.

New Districts: 3. Border of Newent Wood, May Hill, in Herefordshire and Gloucestershire; *Ley*. 10. Willey Lodge; Stapleton; Pedwardine Wood and Berkly Knoll; Lingen Vallets; recorded in "Herefordshire Rubi," p. 78, as R. mutabilis, *Genev*.

Rubus *Drejeri, G. Jensen.

Rather rare in Herefordshire, and known only in uncharacteristic forms.

South—1. Wood at St. Woolstan's Farm, Welsh Newton; *Ley*. Caisty Wood, St. Weonards, 1883; *Ley*. 2. Caplar Wood; Wood at Aconbury; *Ley*.

Central—7. Wareham Wood, Breinton; Belmont Wood; *Ley*.

North—9. Berrington Woods; *Ley*. 12. Winforton Wood; *Ley*.

Sub-species Leyanus, Rogers

Districts: 2. Foxholes Wood, Little Dewchurch; Ramsden Coppice, Holme Lacy; *Ley*. 6. Broxash and Shortwood, Ullingswick, plentifully; *Ley*.

Rubus Radula, Weihe.

New District: 4. Hedge near Ashperton Station; *Ley*. Districts: 1. Wood border, Welsh Newton Common, 1901; *Ley*. 2. Bank, Welsh Bicknor; bank, Huntsham Hill; Tar's Wood, Fox Wood, and Netherwood, Aconbury; *Ley*. 3. Queen's Wood, Gorstley, near the county boundary, 1898; *Ley*.

Sub-species anglicanus, Rogers

Rare in Herefordshire. D. 2. Puttridge Lane, Ross, 1887; *Herb. W. H. Purchas!*

The stations given for this form in Herefordshire Rubi, p. 75, are now assigned to other species; those at Ganarew and St.

Weonards to R. podophyllus, *P. J. Muell*; those at Carey and Brockhampton to R. Griffithianus, *Rogers*.

Sub-species echinatoides, Rogers

New District: 13. Stream side thicket and wood near Dulas mill; wood border, Whitfield; *Ley*. District 2. Lady Coppice, Little Dewchurch; *Ley*. Plants near this sub-species have been gathered at Belmont (D. 7) and near Aymestry (D. 10), but are left for the present under R. Radula, sp. coll.

Rubus echinatus, Lindl.

New District: 4. Hansett Wood, Canon Frome; *Ley*. Districts: 3. Mains Wood, Putley; Yatton Wood; *Ley*. 6. Ashperton Park Wood; Woods at Ullingswick; *Ley*. 9. Richard's Castle; *Ley*. 13. Timberline and Whitfield Woods; *Ley*.

Rubus oigocladus, Muell. & Lefv.

New Districts: 7. Belmont Wood, Hereford, *f.*; *Ley*. 10. Wood near Lyepool Bridge, Deerfold; *Ley*. Districts 2. Lord's Wood, Great Doward; Chase Wood, Ross; *Ley*. 3. Frequent in Yatton and Coldborough Park Woods; *Ley*. 11. Kennel and Stocking Woods, near Kington; *Ley*. 12. Sarnesfield Coppice; Pentrecoed; Eardisley; *Ley*. 13. Timberline and Big Wood, Whitfield; *Ley*.

Var. Newbouldii, Rogers

New District: 3. Coldborough Park Wood; Queen's Wood; *Ley*. Districts: 7. Sugwas Park, in two spots, 1905; *Ley*. 8. Foxley, 1891; *Ley*.

Rubus podophyllus, P. J. Muell.

This bramble seems to be still ill understood, and the name has to be accepted in an aggregate sense. The large plant which is abundant at Trolloway, St. Weonards, is now placed under R. podophyllus by Rev. W. M. Rogers. Similar plants occur on Welsh Newton Common, at Tregates Bridge Llanrothal, and near Ganarew, all in District 1; *Ley*.

Rubus *Griffithianus, Rogers

Rare, and only known in an untypical form. District 2. Carey Wood, at several places; copse, Brockhampton; Ley. See above, under R. anglecanus, Rogers.

This plant is a very distinct one. It is certainly not typical R. Griffithianus, but was assigned to this species as a *f.* by Rev. W. M. Rogers in 1901.

Rubus *præruptorum, Boulay ?

Rare. District 5. Wood borders Upper Sapey, near the county boundary, and I believe in Worcester as well as Herefordshire; *Ley*.

R. præruptorum is not admitted as British by Rev. W. M. Rogers (see "Handbook," p. 69), on account of the uncertainty of the identification of the Dorset plant with M. Boulay's. The Upper Sapey bramble is identical with the Dorset bramble mentioned above.

Rubus Babingtonii Bell Salt.

New Districts: 3. Clifford's Mesne; *Ley*. 13. Big Wood, Whitfield, abundantly; *Ley*.

Var. *phyllothyrsus, Frider.

More common than the type in Herefordshire.

South—2. Great Doward; Bull's Hill, Walford; Wallbrook Wood, Aconbury; *Ley*. 3. Yatton Wood; *Ley*.

West—13. Middle Cefn, St. Margarets; *Ley*. The plant from Walford and Yatton was recorded in 'Herefordshire Rubi,' p. 77, under R. Babingtonii.

Rubus ericetorum, Lefv.

New Districts: 2. Longclose Wood, Little Doward, *f*; *Ley*. 11. Hedges at Kingswood, near Kington; Lyonshall Park Wood; Whitney; *Ley*. Districts: 12. Monnington, 1901; Broxwood, 1902; Summer Pole, Brilley, 1905; *Ley*. 13. Moccas, 1901; *Ley*.

Sub-species sertiflorus, (P. J. Muell ?).

District 2. Drybrook, near Kerne Bridge; *Ley*.

Rubus mutabilis, Genev. must be cancelled from our list; the plants ascribed to it at various times being now assigned to other species.

Rubus *Bloxamii, Lees.

Very rare. District 6. Abundant on rough banks above Lowdy Hall, Ullingswick, 1898, 1903; *Ley*.

Rubus fuscus, Wh. & N.

New Districts: 9. Abundant on the hills near Richard's Castle; *Ley*. 12. Roadside at Whitney Station; the Welsh Newton variety with a nearly eglandular stem; *Ley*.

Var. *nutans, Rogers

Rare and local.

Central—8. Abundant in woods at Ivington Camp and its neighbourhood, 1901; *Ley*.

North—10. Barnes' Vallets, Lingen, 1891; *Ley*. 11. Hillside above Byton, 1902; *Ley*.

Var. macrostachys, P. J. Muell.

New Districts: 4. Cowleigh Park Malvern, 1905; *Ley.* 9. Wood under Orleton Common, 1905; *Ley.* Districts: 2. Little Doward, 1897; *Ley.* 3. Hill above Grendon Court; *Ley.*

Sub-species obscurus, Kalt.

The typical plant is still known only in the Belmont Woods, Hereford; but a plant plentiful in Cowleigh Park, Malvern (D. 4), is placed under this sub-species by Rev. W. M. Rogers, as a form, differing from the type chiefly in having white flowers.

Rubus pallidus, Wh. & N.

New Districts: 1. Llancrwm Wood, Welsh Newton, 1902; *Ley.* 2. Lord's Wood, Great Doward, scarce; *Ley.*

Var. leptopetalus, Rogers

Still only known upon our south and south-east border. D. 2. In the Chase Wood, Ross; *Ley.*

Rubus scaber, Wh. & N.

New Districts: 2. In the Lord's Wood, Great Doward, on sandstone conglomerate, 1884, 1890; *Ley.* 3. West border of Queen's Wood; *Ley.* 11. Lyonshall Park Wood; Kingswood Common, Kington; wood near Rodd Barn, Lyonshall; *Ley.* 12. Winforton Wood; *Ley.* The plant found in Lord's Wood, Great Doward, was recorded in the 'Herefordshire Flora,' p. 105, under the name of R. glandulosus, Bell., Var. Bellardi. See also 'Herefordshire Rubi,' p. 78.

Rubus longithyrsiger, Lees.

Districts: 3. Mains' Wood, Putley; Yatton Wood; *Ley.* 6. Ashperton Park Wood; *Ley.* 7. Stretton Sugwas Park; *Ley.*

Var. *botryeros, Rogers.

Rare. South. 2. In the Lord's Wood, Great Doward; abundant in several spots; first observed in 1888; *Ley.* 3. Main's Wood, Putley, 1898; *Ley.*

North. 11. Thicket at Shobdon Pools, 1898; *Ley.*

West. 13. Timberline and Big Woods, Whitfield; *Ley.*

Rubus rosaceus, Wh. & N.

New Districts: 1. Llancrwm Wood Welsh Newton, 1902; *Ley.* 13. Timberline Wood, 1896; *Ley.* District 2. Border of the Lord's Wood, Great Doward; *Ley.*

Var. hystrix, (Wh. & N.)

New Districts: 3. Main's Wood Putley, 1898; *Ley.* 12. Winforton Woods; Whitney Wood, 1905; *Ley.* District 11. Brampton Wood Knill, 1895; *Ley.*

Form *sylvestris, Murray.

12. Hedge near Brilley village, 1896; *Ley.* The plant recorded as var. hystrix in the *Flora*, p. 97, and 'Herefordshire Rubi,' p. 81, from Titley, appears to be *f* sylvestris.

Sub-species Purchasianus, Rogers.

Very rare except in the South of the country; but recorded from the following stations.

Central—7. Thick wood at Broomy Rise, Clehonger, 1886; Belmont Wood, 1906; *Ley.*

North—11. Wood border at Titley railway cutting, 1905; *Ley.*

Form pseudo-hirta, A. Ley.

New District: 3. Lower hedge of Yatton Wood; *Ley.*

Sub-species adornatus, P. J. Muell.

District 3. Wood on Linton Ridge; Cherry Wood, Mordiford; *Ley.*

Rubus fusco-ater, Weihe.

New Districts: 8. Bishopston Hill, 1888; *Ley.* 9. Hill side above the Goggins, Richard's Castle, 1905; *Ley.* 10. Heathy Park and Coxwall Knoll, Brampton Bryan, 1888; *Ley.* District 1. White Rocks, Garway Hill; *Ley.* The Coxwall Knoll plant was recorded in 'Herefordshire Rubi,' p. 84, as R. Marshalli, Focke and Rogers.

Rubus Kœhleri, Wh. & N. Var. cognatus (N. E. Br.)

New District: 13. Big Wood, Whitfield; *Ley.*

Rubus *distractus, Muell. & Wirtg.

A plant answering with much exactness to Rev. W. H. Painter's Staffordshire plant thus named (see 'Handbook of British Rubi,' p. 84,), occurs in Westhide Wood, D. 6.

Rubus Marshalli, Focke & Rogers. Var. *semi-glaber, Rogers.

South—2. Lodge Grove, Bishopswood, 1885; *Ley.*

North—12. High Grove, near Summer Pole, Brilley, 1905; *Ley.* 11. Lane near the Workhouse, Kington, 1895; *Ley.* Of the above, the plants in Districts 2 and 11 have been previously recorded as R. Marshalli. See 'Herefordshire Rubi,' p. 84.

Rubus viridis, Kalt.

Still among our rarest brambles. New District: 13. Big Wood, Whitfield, 1897; *Ley.*

Rubus Bellardii, Wh. & N.

District 4. Wood at Cowleigh Park, Malvern, abundantly, 1905; *Ley*. A hybrid, fuscus × Bellardii, was abundant in parts of the same wood.

Rubus serpens, Weihe.

New District: 12. Winforton Wood; Highmoor Wood. Almeley; *Ley*

Rubus hirtus, W. & K. (sp. coll.)

Accidentally omitted from 'Herefordshire Rubi,' p. 85. Woods, rare. *South*: 2. Lord's Wood, Great Doward, 1901; *Ley*. 3, Main's Wood, Putley, abundantly in the lower part of the wood; *Ley*. *East*: 4. Cowleigh Park, Malvern, *f.*, 1894; *Rev. W. M. Rogers!!! West*: 13. Big Wood, Whitfield, 1906; *Ley*.

Sub-species *flaccidifolius (P. J. Muell).

Rare and very local. *South*: 2. Suff Wood abundantly and Cockshot Wood, Howle Hill; 1885 to 1905; *Ley*. These plants were recorded in 'Herefordshire Rubi,' p. 86, under *R. velatus, Lefv.*

Rubus *minutiflorus, P. J. Muell.

Woods. Rare. *South*: 3. Coldborough Park Wood, 1888; *Ley*. *West*: 13. Big Wood, Whitfield; Timberline Wood; and wood at Poston Lodge, Peterchurch; *Ley*. This plant occurs also at Southstones Rock, near Stanford Bridge, in Worcestershire, but on the borders of Herefordshire, D. 5. A hybrid, foliosus + minutiflorus was found with it.

Rubus acutifrons, A. Ley.

Districts: 2. Ramsden Coppice, Holme Lacy; Lady Coppice, Little Dewchurch; Bolston Wood; *Ley*. 3. Yatton Wood; Gorstley; *Ley*. 7. Cagebrook, Clehonger; *Ley*. 13. Big Wood, Nell's Wood, and Criseley Vallets, Whitfield; *Ley*. Bacho farm, Dorstone; *Ley*.

Var. *amplifrons, A. Ley.

D. 13. In large quantities in the Big Wood, Whitfield; first in 1897. Not discovered at any other station, up to the present.

Rubus *tereticaulis, P. J. Muell.

Rare. D. 13. Big Wood, Whitfield, 1905; *Ley*. Elsewhere recorded for Britain only from Sprowston, Norfolk.

Rubus ochrodermis, A. Ley.

Districts: 7. Wood at Tar's Mill, Aconbury; *Ley*. 8. Wood above Ford Bridge Station, abundantly; *Ley*. 11. Kingswood, Kington; *Ley*.

Rubus velatus, Lefv.

New District 10. Wood on the Lugg above Aymestry, 1905; *Ley*.

Rubus dumetorum, Wh. & N.

Var. *raduliformis, A. Ley.

South—1. Hedge at Tregates House, Llanrothal, 1904; *Ley*. 3. Hedge, Gorstley, 1906; *Ley*.

North—12. Lane side near Whitney Station, 1905; *S. H. Bickham*. Upper part of Brilley parish, near High Grove and at Bushy Farm, 1905; *Ley*.

West—13. Hedge near Trelough, Wormbridge, 1905; *Ley*. This well-marked variety is turning out to be widely distributed. It was found in 1905 abundantly near Caerphilly in Glamorgan; also in Radnor and Somersetshire.

Var. *triangularis, A. Ley.

Rare. *East* 5. Hedges and wood borders at Upper Sapey Common, also in Worcestershire, in the Valley of Teme, both above and below Stanford Bridge. Whitbourne and Tedstone Delamere abundantly, 1907; *Ley*. First discovered in 1901. This plant occurs also in Wyre Forest, in Worcestershire, near Cleobury Mortimer Station.

Var. *britannicus, Rogers.

Abundant in the hilly western parts, rarer in the rest of the county.

South: 1. Glass house Farm, St. Weonards; *Ley*. Whiterocks, Garway Hill; Mynde Wood, near Bettws Court; *Ley*. 2. Great Doward; hedge between Holme Lacy bridge and Station; *Ley*.

Central: 8. Dinmore, near the Church; *Ley*.

West. 13. Woodbury Hill, Moccas: Snodhill Park Wood, Dorstone; Bigwood, Whitfield; *Ley*. 14. Abundant in the upper parts of the Crasswall, Monnow, and Michaelchurch brooks; Grwyne valley; *Ley*.

Var. diversifolius (Lindl.)

New Districts: 1. Orcop, 1886; *Ley*. 2. Great Doward, 1906; *Ley*. 4. Hedge of Mill Copse, Cowleigh Park; *Towndrow!!!* 5. Stanford Park; *Ley*. 9. Richard's Castle, wood border at the Boney Well, 1904; *Ley*. 10. Stapleton glen, Presteign; *Ley*. 11. Nash; *Ley*. 12. Railway bank, Pembridge; hedge, Whitney; *Ley*. 14. Cusop; *Rev. W. M. Rogers!*

Rubus corylifolius, Sm. Var. sublustris (Lees).

New District: 12. Hedge, Kingsland village, 1905; *Ley*. One of our rarest Herefordshire brambles.

Rubus *Bucknalli. White.

Rare. District 3. Wood border at Yatton old Church; quarry at Littlehope, and borders of the Haugh Wood in the vicinity; first in 1895.

On these plants Rev. W. M. Rogers writes: "Indistinguishable of R. Bucknalli so far as panicle is concerned, but much less densely hairy in the stem, which also lacks the resinous or glandular exudation characteristic of White's plant." Mr. White himself recognised the Herefordshire plants as his species.

Geum rivale, L.

New District: 12. Moseley Common; hedge near Westonbury, 1901; *Winterbourne*.

Fragaria elatior, Ehrh.

New District: 6. Shucknall Hill; *Ley*. D. 2. Lord's Wood, Great Doward; *Ley*. In both the above localities this plant would easily pass as a Native. It occurs at other spots on the Great Doward, where it is clearly introduced.

Potentilla verna, L.

District 3. Bank above Fownhope village, under the Cherry Wood; *Ley*.

Potentilla procumbens, Sibth.

New Districts: 2. Road bank near Much Birch; *Ley*. 3. Bromsash; *Ley*. 4. Colwall; *Towndrow!* 11 and 12. Near the Apostles' Farm, Eardisley, in both Districts; Shirl Wood, Eardisland; Lyonshall; *Ley*. 13. Dulas; *Ley*. 14. Hondd;s valley, above Llanthony, but in Monmouthshire; *Ley*. It iu clear from the above list that this Cinquefoil is a far more generas plant in Herefordshire than had been thought.

Potentilla procumbers × reptans.

New Districts: 4. Birchwood, Cradley; *Towndrow!* Colwall; *Towndrow!* 6. Ashperton Park Wood, and on railway sides, Ashperton; Broxash Wood; Docklow; Ullingswick; *Ley*. 12, Wood Eaves, near Eardisley; *Ley*. The following localities are new. District 3. Brainge Farm, Putley; *Ley*. 9. Uphampton; *Ley*. 14. Old Castle; *Ley*. This hybrid is, in hilly districts of the County, more plentiful than either of its parents, and often covers the banks with a blaze of golden blossoms in July.

Potentilla reptans × sylvestris.

New Districts: 12. Monnington; *Ley*. 13. Woodbury Hill, in wood-walks; *Ley*. 14. Honddu Valley above Llanthony, but in Monmouthshire; *Ley*. This still remains one of the rarest of the segregates.

Agrimonla Eupatoria, L.

New District: 11. Kington; *Winterbourne*. This completes the District records for this plant in Herefordshire.

Agrimonia odorata, Mill.

Districts: 5. Small coppice wood by the Teme at Whitbourne; *Ley*. 14. Thicket at Michaelchurch Court, *Ley*.

Poterium Sanguisorba, L.

Districts: 5. Roadside at Stoke Lacey; *Ley*. 8. Fordbridge; *Winterbourne*.

Poterium †polygamum, Waldst. & Kit.

District 4. Wynds Point, Malvern; *A. J. Crossfield*.

Rosa pimpinellifolia, L.

New District: 8. Dinmore Hill, near Bodenham, "a single bush"; *Winterbourne*.

In dealing with *Rosa mollis* and *tomentosa*, it is desirable, in view of the paper recently published by the writer on this group in the *Journal of Botany*, to restate the distribution of the forms occurring in Herefordshire, *de novo*.

Rosa pomifera, Herrm.

Mountain rocks, rare.

West—14. On the Red Daren, Hatterels, 1907; *Ley*. Known since 1876 on Taren-'r-Esgob (in Breconshire), but only recently recognised as undoubtedly this species.

Rosa mollis, Sm.

Rare in Herefordshire, and not known in its eastern or southern districts.

Central—8. Wormesley Grange, 1891; *Ley*.

North—9. Richard's Castle, 1904; *Ley*. 10. Mary Knowl, Ludlow, 1880; *Ley*.

Var. cœrulea, Woods.

Rare: only known in one district.

West 14. Thicket on Cefn Hill ridge: Red Daren, Hatterels, 1907; *Ley*.

Rosa submollis, Ley.

Scattered throughout the county, but not common except in the hilly parts.

South—1. Garway Hill, 1850; *Herb. Purchas!* 2. Harewood, 1886; *Ley.* 3. Littlehope, near Mordiford, 1899; Coldborough Park Wood, 1903; *Ley.*

East—5. Hanley Heath, and Edwin Wood, 1886; *Ley.*

Central—7. Ridge Hill, Hereford, 1884; *Ley.* 8. Wormesley, 1886; Bishopston, 1888; Dinmore, 1903; *Ley.*

North—10. Mary Knowl, near Ludlow, 1876; *Ley.* 12. Kingsland, 1905; Summerpole, Brilley, 1900; *Ley.*

West—14. Michaelchurch Escley, 1893; Llanthony Valley, 1874; *Ley.*

Rosa omissa, Deseg. Var. resinosoides, Crepin.

Not common.

East—4. Cowleigh Park; *Towndrow.*

West—14. Plentiful on Cefn hill: lane hedges at the top of the Escley valley, 1907; *Ley.*

Rosa pseudomollis, Ley.

Throughout the county, but not very common.

South—1. In the Buckholt, Welsh Newton, 1885; *Ley.* 2. Bolston, 1901; *Ley.* 3. Dormington, 1883; *Ley.*

East—4. Cowleigh Park, Malvern; the classical station from which this rose was described; *E. G. Baker!!!* Colwall, 1843; *E. Lees*, in *Herb. Bailey!*

Central—7. Belmont near Hereford, 1890; *Ley.*

North—10. Coxwall Knoll; *Ley.* 11. Staunton-on-Arrow, and Peas Grove, Kington, 1884; *Ley.* 12. Shobdon Marsh, 1884; Red Lane, Brilley, 1905; *Ley.*

West—13. Vagar Hill (also in D. 14), 1889; *Ley.* 14. Michaelchurch Escley, 1893; in the Honddu Valley, 1891; *Ley.*

Rosa Andrzeiovii, Steven.

Very rare?

Central—7. The Red Hill, Hereford, 1849; *Herb Purchas!*

Rosa Sherardi, Davies.

Not common.

South—1. Orcop, 1886; *Ley.* 3. Gorsley, on the borders of Queen's Wood, 1906; *Ley.*

Central—7. Burghill, 1882; *Ley.*

North—10. Aymestry, 1886; *Ley.* 11. Rough bank near Nextend Farm, Lyonshall, characteristic and typical, 1905; *Ley.*

Rosa uncinata, Ley.

As the last, but less common.

South—3. Coldborough Park Wood, 1903; *Ley.*

East—4. Colwall; *E. Lees*, 1843; *Herb. Bailey!* Cowleigh Park, 1893 and 1904; *Ley.* 5. Upper Sapey, 1886; *Ley.* 6. Burleigh Gate and Little Cowarne, 1900; *Ley.*

Central—7. Breinton, near Hereford, 1882; *Ley.*

North—9. Kimbolton, 1882; Ley. 10. Lingen, 1891; *Ley.* 12. Shirl Wood, Eardisley, 1891; Brilley, 1900; *Ley.*

Rosa scabriuscula, Sm.

Widely scattered, and rather common.

South—1. Dewsall, 1883; *Ley.*

East—4. Mill Copse, Cowleigh Park, 1887; *Ley.* 5. Brockhampton; *Ley.* 6. Shucknall Hill; 1881; *Ley.*

Central—7. Callow and the Ridge Hill, 1883 and 1884; Wareham, 1889; *Ley.* 8. Dinmore and Westhope Hills, 1882, 1888; Bishopstone Hill, 1888; *Ley.*

North—10. Mary Knowl, Ludlow, 1883: Aymestry and Deerfold Forest, abundantly, 1881; *Ley.* 11. Lyonshall, 1889; *Ley.*

West—13. Big Wood, Whitfield, 1877: Moccas and Bredwardine, 1887; *Ley.*

Rosa sylvestris, Lindley.

Not so common as the last.

South—3. Littlehope and Serpent's Lane near Mordiford, 1873; *Ley.*

East—5. Thornbury, 1901; *Ley.*

Central—7. Ridge Hill, 1907; *Ley.*

North—10. Shobdon, 1882; *Ley.* 12. Whitney-on-Wye, 1884; Winforton; Kingsland, 1882; *Ley.*

Rosa tomentosa, Sm. ex parte.

Generally distributed, and probably the most common form of this group in Herefordshire.

Rosa farinosa, Rau.

Rare.

South—3. Littlehope, near Mordiford, 1888; *Ley.*

Central—8. Dinmore Hill, 1891, Westhope Hill, 1888; *Ley.*

North—9. Kimbolton, 1881; *Ley.* 10. Aymestry, 1881; Coxwall Knowl, 1886; *Ley.*

The Herefordshire roses placed under this name are none of them *typical* R. farinosa of Rau, differing from it in possessing a few acicles on the peduncle: in other respects agreeing (especially as regards the Aymestry plant) with Rau's rose.

Rosa cuspidatoides, Crepin.

Widely spread in the county.

South—2. Rigg's Wood, Sellack, 1885; Bishopswood, 1887; *Ley.* 3. Mordiford, 1878; *Ley.*

East—5. Edwin Wood, 1886; *Ley.*

Central—8. Bishopstone Hill, 1888; Dinmore, 1903; *Ley.*

North—9. Hedge at Orleton Common, 1903; *Ley.* Bringwood Chase, Ludlow, 1878: Aymestry, 1886; *Ley.* 12. Whitney-on-Wye, 1884; *Ley.*

Var. britannica (Deseg.)

Central—7. Callow, near Hereford, 1851; *Herb. Purchas!*

Var. fœtida (Bast.)

East—5. Upper Sapey, 1886; *Ley.*

West—13. Dulas, 1892; *Ley.*

Rosa rubiginosa, L. Var. *echinocarpa (Rip).

West—13. Big Wood Whitfield, 1906; *Ley.*

Rosa obtusifolia, Desv.

New Districts: 11. Kingswood near Kington, 1901; *Ley.* 12. Hedges near Newport House, Almeley, 1901; *Ley.*

Var. frondosa, Baker.

New Districts: 11 and 12. With the type in each District, 1901; *Ley.*

Rosa canina L. Var dumalis (Bechst), f. *rubescens, Rip.

South—2. Hedge at Sellack, 1906; *Ley.*

Var. vinacea, Baker.

Rare.

South—1. Wood border near Callow, 1901; *Ley.*

West—14. In the Grwyne Valley, 1874; *Ley.*

Var. arvatica, Baker.

District 4. Bullen Bank, Ledbury; *Bickham.*

Rosa glauca, Vill. *Var. Watsoni, Baker.

Very rare.

North—11. Hedge near the Rodd Barn, Lyonshall, September, 1900; *Ley.*

Pyrus Aria, Ehrh.

District 2. A single tree on the rocks on the north-east face of Penyard Park Wood, Ross, clearly native, 1902; *Ley.*

Pyrus communis, L. Var. *Pyraster, L.

Recorded in 1895 as "probably bird sown" in the Lord's Wood, Great Doward. Further investigation renders it probable that this tree is a Native on the Great Doward, where it occurs at more than one station; *Ley.*

Pyrus *cordata, Desv.

Native: at several stations in the south of the county. District 2. Near the great quarry, Great Doward, at several spots: one small bush in Penyard Wood, Ross; *Ley.* 3. In the Haugh Wood at several places; *Dr. Wood!!!* Recorded in 1895 as P. communis, L.

This interesting plant cannot be supposed to be anything but a native plant in the county. The writer has watched it for four or five seasons at the Great Doward, but has never detected fructification. Yet seedlings occur in the vicinity of the older bushes.

Pyrus Malus, L. Var, acerba, D.C.

This form of Wild Apple is found to be far more widely spread in the county than was supposed when the *Flora of Herefordshire* was published. A great part of the apple of the hedgerows, as well as in hilly woods, consists of this, the truly native form.

Cratægus Oxyacantha, L. Var. oxyacanthoides, Thuill.

District 4. Conygree Wood, Ledbury, *Bickham.*

Saxifraga tridactylites, L.

District 8. Stoke Prior, abundant; *Winterbourne.*

Saxifraga granulata, L.

New District: 8. Field adjoining Stoke Lane, Leominster; *Winterbourne.* Abundant for a quarter of a mile between Risbury camp and Stoke Prior; *Rev. W. E. Thompson.* Districts 2. Meadows at Carey, on the left bank of the river, abundantly; *Ley.* 9. Brockmanton and Puddlestone; *Winterbourne.*

Cotyledon Umbellicus, L.

District 3. Adam's Rocks, Backbury; *Ley.*

Sedum †reflexum, L. Var. b. *albescens (Haw.).

A great part of the S. reflexum growing on old walls, in stone quarries, &c., in Herefordshire appears to be the var. albescens (*Haw.*), There is, however, no indication that this Stone-crop has any claim to be accounted native in the county.

Callitriche stagnalis, Scop.

New District : 4. Pool, Colwall Green ; *Towndrow.*

Peplis Portula, L.

New District : 5. Badley Wood Common, Whitbourne, 1907 ; *Ley.*

Epilobium angustifolium, L.

New Districts : 4. Eastnor ; *Mr. A. Bennett.* 10. Sunny Gutter, near Ludlow ; *Winterbourne.* District 8. Dinmore Hill, in profusion ; *Winterbourne.*

Epilobium parviflorum, Schreb.

New District : 4. Colwall ; *Towndrow.*

Epilobium roseum, Schreb.

District 11. Ditches at Lyonshall village ; *Ley.*

Epilobium adnatum, Griesebach.

New District : 4. Railway slopes at Ledbury ; *Bickham.*

Epilobium Lamyi, F. Schultz.

New Districts : 5. Stoke Bliss, 1901 ; *Ley.* 11. Wall base at Lyonshall village ; *Ley.* NOTE : This Willow herb has become a garden weed at Sellack (D. 2) after having been introduced by the writer when first discovered in Herefordshire.

Circæa alpina, L.

District 2. River side at Carey Islands (left bank) ; *Ley.* The plant recorded at Caplar in 1895 is C. alpina, not C. lutetiana, *f.*

Anthriscus †Cerefolium, Hoffm.

District 4. Wall top, Ledbury, 1903 ; *Bickham !*

Heracleum Sphondylium, L. Var. *angustifolium, Huds.

Generally distributed. Districts : 4. Near Bosbury ; *Bickham.* 8. Moorhampton, near Foxley ; *Bickham.* 13. Wood, Moccas Park ; *Bickham.*

†*Caucalis latifolia, L.

Roadside near Leominster, August, 1902 ; *Bickham.*

Œnanthe crocata, L.

New District : 4. Common on low ground at Ledbury ; *Bickham.*

Sambucus Ebulus, L.

Districts : 11. Staunton-on-Arrow ; *Rev. W. E. Thompson.* 13. Roadside between Dorstone and Peterchurch ; *Mrs. Robinson !*

Viburnum Lantana, L.

District 4. Near Ledbury ; *A. J. Crossfield ; Towndrow.*

Galium verum, L.

New District : 11. Titley ; *Winterbourne.*

Galium *erectum, Huds.

Rare. East—5. Pasture between Cradley and Leigh Sinton, just within the Herefordshire boundary, 1898 ; *Towndrow !!*

Galium Mollugo, L. Var. *Bakeri, Syme.

Rare. South : District 2. In quantity in a grass field at Tretire, about 1890 ; *B. M. Watkins.* Rough field border near Sellack, 1905 ; *Ley.*

Asperula odorata, L.

Districts : 9. Eaton Wood near Leominster ; *Winterbourne.* 12. Coppice near Shobdon ; *Winterbourne.*

Valeriana Mikanii, Syme.

New Districts : 11. Lyonshall Park Wood, 1898 ; *Rogers ; Ley.* 12. Shirl Wood, Eardisland ; *Ley.*

Valerianella olitoria, Poll.

New District 8. Near Leominster : Hampton Court ; *Winterbourne.*

Dipsacus pilosus, L.

District 3. Much Marcle, 1901 ; *Bickham !*

Scabiosa Columbaria, L.

District 4. The Ridgeway, Eastnor ; *Towndrow !*

Solidago Virgaurea, L. Var. *cambrica (Huds).

District 14. On the Red Daren, Hatterel Hills, August, 1888 ; *Ley :* Olchon Daren, 1886 ; *Ley.*

Var. angustifolia, Koch.

Districts 13. Wood near Whitfield, 1906 ; *Ley.* 2. Great Doward, 1904 ; *Ley.*

Erigeron acre, L.

District 4. Winds Point, Chance's Pitch, Malvern ; *Towndrow.*

Petasites †fragrans, Presl.

District 12. Roadside near Whitney Station, 1905 ; *Ley.*

Doronicum †Pardalianches, L.

District 9. Shrubbery at Eye Vicarage; *Winterbourne.*

Senecio erucifolius, L.

District 6. Morton Wood, Ullingswick; *Ley.*

Cnicus acaulis, Willd.

New District 4. Eastnor; *Crossfield*: Colwall; *Bennett*: Ledbury; *Bickham.*

†Onopordon Acanthium, L.

District 4. Purlieu Lane, Colwall; *Bennett.*

†Mariana lactea, Hill.

District 4. Colwall; *Foster, Towndrow.* 9 or 12. Garden weed, Leominster; *Winterbourne.*

Centaurea †solstitialis, L.

District 2. On the Minnit Farm, Peterstow; *Mr. F. Woodall!!*

Crepis †nicæensis, Balb.

District 4. Pasture at Crump End Hill, Cradley; *Towndrow!*

Hieracium.

The nomenclature and sequence of species and varieties, in this genus, is taken from the late Rev. W. R. Linton's *British Hieracia*, 1905.

Hieracium Pilosella, L.

Var. *concinnatum, F. J. H.

Growing with the type, but less common.

South—2. Silverstone Farm, Hope Mansel, 1904: Great Doward Hill, 1905; *Ley.*

Central—7. Breinton Common, 1905; *Ley.*

North—12. Wall top, Eardisley, 1904; *Ley.*

West—14. In the Honddu Valley, under Taren-r'-Esgob: in the Grwyne Valley, 1904; *Ley.*

Var. *nigrescens, Fr.

Wall tops; rarer than type, or var. concinnatum.

South—2. In the quarry, Great Doward, 1894; Silverstone Farm, Hope Mansel, 1904; *Ley.*

North—10. On a wall at Brampton Bryan, 1902; *Ley.*

NOTE: The Brampton Bryan plant is the true var. nigrescens, *Fr.*: the plants at Hope Mansel and Great Doward have very dark and shaggy heads; but the hair is less black than in

Fries' plant. That from the Great Doward is recorded by Rev. W. R. Linton (*British Hieracia*, p. 9) as H. peleterianum, in error.

Hieracium †aurantiacum, L.

Districts: 9. Puddlestone Rectory, Leominster, at several spots; *Winterbourne.* 11. Kington; *Winterbourne.* 13. On the disused railway line at Vowchurch, abundantly; *Ley.*

Hieracium *lasiophyllum, Koch. H. cinerascens, Jord: *Flora* p. 193.

Still fairly abundant at the Great Doward, at the stations for which it was recorded in the *Flora*, but unknown elsewhere.

Var. planifolium, F. J. H. H. pallidum, Fr. *Flora*, p. 193.

Great Doward, at several stations. Unknown elsewhere.

Var. *euryodon, F. J. H.

With the type at the Great Doward, occasional; *Ley.*

Hieracium *rubicundum, F. J. H.

Confined to mountain rocks in the Black Mountain district.

West—14. On the Red Daren, Hatterell Hills; first in 1886. See "Additions," 1894, p. 4.

Hieracium *stenolepis, Lindeb.

Native on limestone rocks, very rare.

District 2. Great Doward Hill, at one or two stations, along with the two preceding species, but less abundant; *Ley.* First gathered in 1882, but not recognised as H. stenolepis until 1897.

Hieracium *pachyphyllum, Purchas. H. cæsium, Fr. *Flora*, p. 194.

Still confined to the Great Doward Hill, but locally abundant there. The plant gathered by Rev. W. R. Purchas at Coldwell, West Gloucester, in 1847, is certainly this species; *Herb. Purchas!*

Hieracium *pellucidum, Læst.

Native in woods, on railway banks, rocks; more common in the West than in the Eastern parts of the county. Early in June.

South—2. Great Doward Hill, abundantly; *Ley.* Road bank at Riggs' Wood, Sellack; *Ley.*

North—11. Wood above the railway, Lyonshall Park, 1905; *Ley.*

West—14. Abundant on the Tarens, both of the Hatterel and Ffwddog ranges; on the walls of Llanthony Abbey; *Ley.*

This plant is much more generally distributed than the above meagre list of localities would indicate; but great confusion has occurred between it and the closely allied species, H. serratifrons, vars. lepistoides, and cinderella.

Var. *lucidulum, A. Ley.

Native on mountain rocks ; seldom met with in the lower country. June and July.

North—10. Gorge of the Teme at Downton, 1907 ; *Ley.*

West—14. Taren-'r-Esgob, Honddu Valley, 1898 ; *Ley.* This beautiful and well marked species is much more abundant in Breconshire than with us.

Hieracium serratifrons, Almq. Var. lepistoides, Johanss.

Native, in woods, on railway banks and rocks ; not rare.

South—2. Great Doward Hill, abundantly ; *Ley.* 3. Walls at Woolhope, 1886 ; wood, Backbury Hill, 1900 ; *Ley.*

East—5. Upper Sapey Common, 1886 ; *Ley.*

North—11. Lyonshall Park Wood, with H. pellucidum, 1900, 1905 ; *Ley.*

Var. cinderella, var. nov.

Aspect and height of var. lepistoides, Johanss, which it closely resembles in the root-leaves. The following characters differentiate it from that plant :—

Stem leaf well developed, ovate-lanceolate, often deeply toothed at the truncate base.

Peduncles long ; phyllaries long, narrowly subulate, senescent ; very glandular, floccose on surface, and very floccose-edged.

Heads narrow, light grey to brown, never black : small, normally cuneate-based. Ligule rather densely ciliate-tipped. Style livescent.

Native, in woods and on banks : not rare. June. Distribution in Herefordshire :—

South—2. Penyard Hill, 1849 ; *Herb. Forster,* in the British Museum ! 3. Backbury Hill, with var. lepistoides, 1900 ; *Ley.*

East—4. Wood in Cowleigh Park, Malvern, 1905 ; *Ley.*

North—10. Shobdon Hill Wood, 1902 ; Downton Gorge, 1907 ; *Ley.*

West—13. Big Wood and Criseley Vallets, Whitfield, 1905 ; *Ley.*

Other Counties :—

West Gloucester. Symonds Yat ; *Ley.* Nailsworth ; *Mrs. Foord Kelcey !*

Worcester. Wyre Forest, 1903 ; *Ley.*

Brecon. Head of Glyn Collwng ; near Builth, 1900 ; *Ley.*

Glamorgan. Ysgwd gwladys, 1904 ; *Riddelsdell !* Lisvane, Rudry, and other places near Caerphilly, abundantly ; *Riddelsdell* and *Ley.*

Montgomery. Craig Breidden, 1901 ; *Ley.*

Hieracium *subulatidens, Dahl.

Native, on mountain rocks : very rare in our area ; July.

District 14. Taren-'r-Esgob, in the Monmouthshire portion, 1898 ; *Ley.*

This plant, and its variety cuneifrons, *Ley,* are much more abundant in the Breconshire portion of the Black Mountain than in the part falling within the Herefordshire Flora. It has not been found on the Hatterel Hills, in Herefordshire proper.

Hieracium *platyphyllum, Ley.

Native, on mountain rocks ; July.

District 14. Red Daren, Hatterels, about 1897 ; Taren-'r-Esgob, in the Monmouthshire portion, 1897 and subsequent years ; *Ley.*

This remarkable Hawkweed is abundant throughout the Breconshire hills.

Hieracium *euprepes, F. J. H.

Native, on mountain rocks ; July.

District 14. On the Hatterel range, near the northernmost point in the county of Hereford, 1896 ; *Ley.* Taren-'r-Esgob, Honddu valley, within Monmouthshire, plentifully, 1898 ; *Ley.*

Abundant in the Breconshire portion of the Black Mountain.

In the Eu-vulgata section of Hawkweeds, several of the forms described by Scandinavian botanists have quite recently been recognised as British. Some of these occur in Herefordshire : it is therefore thought desirable to insert here a short description of these forms, together with the scheme of arrangement in which they are placed by Dahlstedt, Bidrag till Syd. Sver. Hier.

SECTION VULGATA.

A. Hairs more numerous than or equalling glands : Phyllaries ± floccose, especially on their margins.

I. Glands ± dense.

(*a*) Hairs fairly dense, phyllaries fairly floccose.

1. *acroleucum,* Stenst.
2. *vulgatum,* Fr.

(*b*) Phyllaries ± densely glandular, efloccose, with hairs scattered to dense.

3. *pinnatifidum*, Lonnr.
var. *vivarium*, Lonnr.
[*conspersum*, Norrl.]

II. Glands scattered or few.

4. *subramosum*, Lonnr.

B. Hairs fewer than glands, or in some cases o : phyllaries floccose-margined.

5. Sub-species, *scanicum*, Dahl.
6. *irriguum*, Fr.
[*sciaphilum*, Uechtr.]

C. Glandular : hairs o, or very few : phyllaries efloccose.

I. Styles dull.

(*a*) Leaves glabrous.

7. *anfractum*,

(*b*) Leaves ± pilose.

8. *cacuminatum*, Dahl.
var. *barbareæfolium*, Lonnr.
9. *diaphanoides*, Lindeb.
10. *ornatum*, Dahl.

II. Styles yellow.

11. *diaphanum*, Fr.
var. *glaucovirens*, Dahl.

Hieracium *vulgatum, Fr.

Very rare : unkown in any of the South-Welsh counties.

North—10. Wall top at the Forge, Downton, 1907 ; *Ley*.

H. pinnatifidum, Lonnr.

Stem tall, flexuose, violascent below and pilose, slightly pilose and with stellate pubescence above. Leaves 3–4, the outer withering early, not in a rosette ; outer oval, with broad short teeth or sub-entire ; inner oval-oblong to oval-lanceolate ; innermost lanceolate-oblong to lanceolate, acute, with many short teeth, or pinnate-dentate.

Stem leaves distant, the lower often large, ov.-lanceolate to lanceolate, long pointed, pinnatifid-dentate, especially at base, often laciniate, or many of the leaves slightly dentate ; all violascent beneath, pilose, with stellate pubescence on mid-rib.

Panicle ample, lax, lower branches remote, upper approximate, long, exceeding acladium. Peduncles white-floccose, with many rather strong dusky hairs and few scattered glands.

Involucre medium, somewhat slender, rounded at base. Phyllaries linear-lanceolate, inner green margined, with long naked points, slightly floccose at base, with fairly numerous black glands and somewhat fewer hairs. Styles yellowish or dingy.

Var. vivarium, Lonnr.

Heads with glands only.

Sub-species scanicum, Dahl.

Characterised by stem and petioles with long fine hair below ; leaves fewer, broader, ovate to ovate-lanceolate, quickly decreasing in size, bright green ; teeth of root leaves often broad triangular ; by the peduncles densely glandular, and with long soft hair ; heads dark, glandular, usually epilose.

H. cacuminatum, Dahl.

Stem tall, robust, softly pilose below, sparingly flocculose.

Leaves dull green ; basal oval to ov.-elliptic with broad sharp teeth, inner ovate elliptic to ov.-lanceolate, subulate-dentate or serrate, rapidly or gradually narrowing to long petioles.

Stem leaves 4–6, decreasing, lower petioled, ovate, ov.-lanceolate to lanceolate, with subulate teeth or serrate dentate, pilose beneath, margin ciliate.

Panicle contracted, with distant lower and approximate upper branches, all erect-patent.

Peduncles short floccose, with slender scattered stalked glands under head. Heads rather broad, darkish green, truncate below. Phyllaries rather narrow, linear-lanceolate, subacute, sparingly flocculose, especially on margins, with rather numerous blackish slender glands. Ligules glabrous ; style dull.

Var. barbareæfolium (Lonnr.)

Differs from the type by its stem leaves narrower, lanceolate, ± sharply longly and unequally pinnati-dentate at base ; by its broadish phyllaries, efloccose, with shorter stouter glands.

H. cacuminatum, Dahl. differs from *H. sciaphilum*, Uechtr. in its less numerous stem leaves, contracted panicle, and glabrous ligules : the heads also are more truncate at base, and the peduncles bear fewer bracteoles.

The following distribution in Herefordshire is at present known.

Hieracium pinnatifidum Lonnr. Var. *vivarium (Lonnr.)

Rare ; June and July.

South—2. Wall side at Kerne Bridge, 1899 ; *Ley*.

North—11. Lyonshall Park Wood, in the railway cutting, 1898, 1900, *f*; *Ley*.

A frequent form in South Wales.

Subspecies *scanicum, Dahl.

Rare. June and July.

South—2. Great Doward, 1898; *Ley*.

Central—8. Wood bank at Bredwardine Bridge, 1898; *Ley*.

North—10. Rocks at the Hay mill, Downton, 1907; *Ley*.

West—14. Taren-'r-Esgob, on the Monmouthshire portion, not abundant, 1898; *Ley*.

Hieracium *sciaphilum, Uechtr.

Common ?; July.

South—1. Goldsmith's Wood, Ganarew; *Ley*, 2. Sellack and King's Capel, in the railway cuttings; *Ley*. Great Doward, common; *Ley*.

West—14. On the Darens both of the Hatterel and Ffwddog ranges, plentifully; *Ley*. Much more generally distributed in the county than the above notes would appear to indicate; but confused until quite recently with H. cacuminatum, Dahl., and its variety barbareæfolium (Lonnr.)

Var. *amplifolium, Ley.

In woods, rather common; June and July.

South—2. Great Doward, abundantly; *Ley*. Penyard Park Wood, Ross: Caplar Wood, at the Slip: road bank, Kerne Bridge; *Ley*. 3. Haugh Wood; *Ley*.

East—6. Westhide Wood; *Ley*.

West—14. On the Red Daren, Hatterel Hills; *Ley*.

Var. *strumosum, Ley.

Woods, rare ? July.

West—14. In woods at the bottom of the Gwryne valley, in the three counties of Hereford, Monmouth, and Brecon, 1903; *Ley*.

Hieracium *septentrionale, Arv. Touv.

Banks and field borders, rare. July.

South—1. Road bank at Panbrook, Llangarren, 1888, 1902; *Ley*.

West—13 or 14. Field border near Hardwicke, 1886; *Ley*

Hieracium *cacuminatum, Dahl.

Common ? July.

South—2. Hedge Bank at Dadnor, Bridstow, 1896; *Ley*.

East—4. Wood in Cowleigh Park, 1905; *Ley*. 5. Edwin Wood, 1901; *Ley*.

North—9. Walls, Richard's Castle, 1904; *Ley*. 12. Hedge bank near Brilley, 1900; *Ley*.

Var. barbareæfolium, Lonnr.

Common ? July.

South—2. Wall top at Walford, 1895, good and characteristic: bank near Kerne Bridge, 1897; road bank, Harewood Park, 1902: road bank, Much Fawley, 1902; *Ley*.

East—4. Cowleigh Park, Malvern, 1892; *Towndrow !*

Both H. cacuminatum and its variety grow at and near Malvern Link, in Worcestershire; *Towndrow !*

Hieracium stictophyllum, Dahl. Var. *serpentinum, F. J. H.

H. sparsifolium, Lindeb.; "Additions to the Herefordshire Flora," 1894, p. 4. Not found in any further station in our area; but occurring at Taren-'r-Esgob just beyond the Monmouthshire boundary.

Hieracium tridentatum, Fr.

Rare in Herefordshire and only known at a single station. District 3. Gorsley Quarries, 1893, fine and typical; *Ley*.

The records for H. tridentatum in the Flora, p. 195, must all of them be placed under H. Friesii, Dahl.

It must be mentioned that Prof. Elfstrand placed the Gorsley plant here attributed to H. tridentatum to H. rigidum, Hartm., var. scabrescens, Dahlst.

Hieracium rigidum, Hartm. Var. *Friesii, Dahl.

Road banks, wood borders, &c.; widely distributed, especially in the West of the county. July, August.

The stations given in the Flora for H. tridentatum should be transferred to this plant. Add the following stations:—New District 13. Big wood, Whitfield, 1897; *Ley*. Districts 1. Road bank Llancloudy, and Panbrook, Llangarren; *Ley*. 2. Harewood End pitch, 1894; 3. Gorsley, 1878, 1888; *Ley*. 12. Bredwardine Bridge and Brobury, 1880: Badpatch wood, Kinnersley, 1902; *Ley*.

This Herefordshire plant differs from type H. Friesii in having the leaves efloccose, and heads with numerous glands and hair-

From H. tridentatum they differ in the nearly entirely aphyllopodous habit, in the larger and darker heads, and in the entire or nearly entire upper leaves. The Rev. W. R. Linton places them under H. Friesii as a *f.*

Var. *scabrescens, Dahl.

Very rare. July.

District 12. Road bank between Brilley and Summer Pole, 1900 : cultivated since that date ; *Ley.*

Hieracium boreale, Fr.

The most common Herefordshire form seems to fall under that called eu-sabaudum of Zahn, characterised by having its stem very hairy from the base to the heads, including the phyllaries themselves.

A plant answering to H. obliquum of Jordan in being less hairy in all its parts, and having smaller lanceolate leaves, occurs on the Red Daren, Hatterel Hills (D. 14).

Another form which appears to be the var. eminens of Jordan, with glabrescent stems and heads, the leaves ovate, broader, and coarsely toothed, occurs in several places in woods : Bolston wood, 1888, 1891 (D. 2) : Haugh Wood, 1891 (D. 3) ; *Ley.* This form is not rare in Wales.

Hypochœris *glabra, L.

Native ? Very rare.

East—4. Chances Pitch, Colwall, 1902 ; *Towndrow !*

Campanula latifolia, L.

New District : 4. Ash Coppice, near Cowleigh Park, 1900 ; *Towndrow.* Compare E. Lees, " Malvern Botany," Ed. III., where the record is given " Wood near Cowleigh Park."

Campanula rapunculoides, L.

District 4. Persistent as a garden weed at Underdown, Ledbury ; *Bickham.*

Pyrola rotundifolia, L., recorded for Herefordshire by Mr. Ridley, is probably a clerical error for P. minor, L. ; *Mr. A. Bennett in lit.* Nov., 1902.

Lysimachia nemorum, L.

District 10. Whitecliffe Woods near Ludlow ; *Winterbourne.*

Anagallis cœrulea, Schreb.

New District : 4. " Colwall, in abundance, Mr. Mackie " ; *Towndrow.*

Vinca minor, L.

New Districts : 6. Humber, but introduced ; Winterbourne. 9. Near Ashley Moor, Orleton ; *Winterbourne.*

Blackstonia perfoliata, Huds.

New District : 12. Cursneh Hill, Leominster ; *Winterbourne.* District 4. Bullen Bank : edge of Conigree Wood ; *Bickham.*

Erythræa pulchella, L.

New District : 2. Welsh Newton ; *Bickham !* District 4. Conygree Wood, Ledbury ; *Bickham.* 8. Pasture near Dinmore Church : Wood walk under Burghope Wood, 1903 ; *Ley.* 13. Wood walk, Big Wood, Whitfield, 1902 ; *Ley.*

Gentiana Amarella, L.

New Districts : 6. Morton Wood, Ullingswick : old lime kiln in Broxash Wood, Ullingswick ; *Ley.* 8. Bishopstone ; *Rev. W. E. Thompson.*

Gentiana campestris, L.

New District : 13. Turnastone, 1903 ; *Mrs. Green ! !*

Cynoglossum officinale, L.

New District : 10. Sunny Gutter, near Ludlow ; *Winterbourne.* Districts 4. Sandy bank, Eastnor, *Bickham.* 9. Eaton Hill near Leominster ; *Rev. W. E. Thompson.*

†* Asperugo procumbens, L.

District 4. Ledbury, in considerable quantity, 1903 ; *Bickham !*

†Anchusa sempervirens, L.

Districts 2. In several spots on the Great Doward : Sellack ; *Ley.* 9. Eyton ; *Winterbourne.*

Myosotis collina, Hoffm.

District 3. Lane side near Backbury Hill ; *Ley.*

Lithospermum officinale, L.

District 4. Bullen Bank, Ledbury ; *Bickham.*

Datura Stramonium, L.

Appears yearly in garden crops at Underdown, Ledbury (D. 4) ; *Bickham.*

Hyoscyamus niger, L.

New District : 9. Potato field near Steen's Bridge, noticed for two years ; *Winterbourne.* Districts 8. Sand pit at Hampton Court in great plenty, " noticed during at least twenty-five years " ; *Winterbourne.* 10. Ruins of Stapleton Castle, Presteign ; Woolhope Club Excursion, 1898 ! !

†Mimulus luteus, L.

District 12. Shobdon Marsh, Pembridge ; *Winterbourne.*

Limouella aquatica, L.

New District: 2. Margin of Lough Pool, Sellack, 1904, 1905; *W. R. Linton, A. Ley.*

Veronica scutellata, L.

District 9. Frequent in ditches near Leominster; *Rev. W. E. Thompson.*

Pedicularis palustris, L.

New District: 11. Moseley Mere near Kington; *Ley.*

Orobanche major, L.

District 4. Wind's Point, Colwall; *Towndrow.*

Lathræa Squamaria, L.

New District: 8. Dinmore wood, near the railway; *Winterbourne.*

Verbena officinalis, L.

New Districts: 3. Quarry near Stoke Edith; *Ley.* 4. Upper Mitchell, near Ledbury; *Bickham.*

Mentha longifolia, Huds. Var. Nicholsoniana, Strail.

A Mint sent by the writer to Abbé le Strail in 1887, through the London Botanical Exchange Club, was thought by him worthy of receiving a varietal name, and was named by him as above after Mr. George Nicholson, of Kew, through whom he received it. It is however, the usual form of M. longifolia, Huds., growing in Herefordshire, and the one which he has been accustomed to think the type of the species. The specimens sent to the Abbé le Strail were gathered on the river side, Whitney, D. 12.

Mentha †viridis, L.

District 9. Eyton Common; *Winterbourne.*

Mentha piperita, L.

New District: 9. Eyton Common; *Winterbourne.* District 4. Colwall; *Towndrow!*

Mentha hirsuta, Huds. Var. *sub-glabra (Baker).

South—2. At the New Weir, Great Doward; *Ley.*

Central—7. On the Lugg at several spots near Mordiford; *Ley.*

Mentha sativa, L. Var. paludosa (Sole).

New District: 3. Ditch-side at Ford End Farm near Linton; *Ley.*

Mentha *gracilis, Sm.

River side thicket at the Great Doward, apparently native, 1906; *Ley.*

Origanum vulgare, L.

New Districts: 9. Brockmanton; *Winterbourne.* 12. Near Baron's Cross, Leominster; *Winterbourne.*

Var. megastachyum (Link).

New District: 2. Great Doward Hill, in many spots; *Ley.* District 10. Dry bank, along with the type, near Aymestry, 1905; *Ley.*

Thymus Chamædrys, Fr.

New District: 4. Colwall; *Towndrow!*

Calamintha Clinopodium, Spenn.

New District: 4. Chance's Pitch, &c.; *Crossfield.* Ledbury, abundantly; *Bickham.*

Calamintha *arvensis, Lam.

Very rare in the county. District 4. In the grounds at Wind's Point, near Malvern; *Crossfield.*

Salvia *†verticillata, L.

Near the railway station, Colwall (D. 4), 1906; *Bickham.*

Salvia *pratensis, L.

Very rare; native?

District 3. Bank on Backbury Hill, 1902; *Bickham.*

Nepeta Cataria, L.

New District: 4. Between Ledbury and Eastnor, also between Ledbury and Colwall; *Bickham.*

Scutellaria galericulata, L.

Districts 8. Wig Wood; and on the Lugg at Hampton Court; *Winterbourne.* 12. Shirl Wood, Eardisland; also a white form; *Ley.*

Marrubium vulgare, L.

New District: 4. Waste ground, on the Jubilee road, Malvern; *Crossfield.* Colwall Hill; *Towndrow.* Mitchell, near Ledbury; *Bickham.*

Stachys palustris, L.

New District: 4. Evendine, Colwall; *Ben*

Lamium purpureum, L.

New District: 4. *Towndrow.*

Teucrium Scorodonia, L.

New District: 9. Kimbolton; *Winterbourne.*

Plantago Coronopus, L.

District 4. On road sides and garden walks, Ledbury, 1902; *Bickham.*

Chenopodium polyspermum, L.

New District: 8. Ivington, near the Camp; Woolhope Club Expedition, 1900 ! ! !

Chenopodium urbicum, L. Var. intermedium, Moq.

District 4. On rubbish at Ledbury Park; *Bickham.*

†Fagopyrum esculentum.

District 4. Colwall; *Towndrow.*

Rumex crispus × obtusifolius: Rumex pratensis, M. & K.

New District: 4. Colwall; *Towndrow.*

Rumex Hydrolapathum, Huds.

New District: 4. In the old Canal, Upleadon; *Bickham.*

Asarum europæum, L.

"Recently planted in Eaton wood, Leominster"; *Winterbourne.*

Aristolochia Clematitis, L. is still in existence in the locality where it was first noticed, at Ross; *Ley.*

Daphne Mezereum, L.

District 2. In the Lord's Wood, Great Doward, March, 1907, "apparently native"; *Miss Matthews*, Clifton, *in lit.*

Daphne Laureola, L.

District 4. Coneygree Wood, Ledbury; *Bickham.*

Mercurialis annua, L.

Very rare in Herefordshire.

District 12. Leominster, on recently moved soil, 1906; *Winterbourne.*

Ulmus surculosa, Stokes. Var. glabra, Mill.

New District: 12. Hedge near Pembridge; *Ley.*

Ulmus montana, Stokes. Var. nitida, Syme.

New District: 12. Hedge at Weston: the great Wych tree at Moorcourt is this variety; *Ley.*

Parietaria officinalis, L.

New District: 4. Colwall; *Bennett.*

Urtica dioica, L. Var. *microphylla, Hausmann.

See Notes in *Bot. Exchange Club Rep.*, 1905, p. 184. Not uncommon in the county. District 2. River side at Carey: Sellack: Weston-under-Penyard, 1902, 1906; *Ley.* 7. Breinton, 1905; *Ley.*

†Carpinus Betulus, L.

District 4. Hedge near Hatfield; *Bickham.*

Salix triandra, L. Var. Hoffmanniana, Sm.

New District: 3. On the Sandford brook at Ford End Farm; *Ley.* District 7. On the Lugg and lower Frome, near Mordiford and Longworth; *Ley.*

Salix fragilis, L.

Districts 9. Wet hedge near Woofferton Junction; *Ley.* 12. Hedge at Weston; *Ley.*

Juniperus communis, L.

District 10. Deerford Forest; "a small hill covered with Juniper"; *Winterbourne.*

Spiranthes autumnalis, Rich.

New District: 4. Crump End Hill, Cradley; *Towndrow.* District 13. Dorstone; *Mrs. Powell.* 14. Llywn-celyn, Honddu Valley; *Ley.*

Cephalanthera ensifolia, Rich.

District 2. Copse on the Great Doward; *H. Southall.*

Orchis pyramidalis, L.

District 4. Bullen bank, Ledbury, in fair quantity, 1903; *Bickham.*

Ophrys apifera, Huds.

District 8. Near Ford Bridge Station, 1905; *Winterbourne.*

Habenaria albida, R. Br.

District 14. Grwyne valley; seen again in 1904; *Ley.* Head of Cusop dingle, 1899; also a single specimen of the hybrid, H. albida × conopsea; *Dr. Wood ! !*

Iris fœtidissima, L.

District 4. Coneygree Wood, Ledbury; *Bickham.*

Iris Pseudacorus, L.

District 4. Common between Ledbury and Colwall; *Bickham.*

Narcissus Pseudo-narcissus, L.

District 12. Meadows at Eardisley in large quantity; also a robust variety bearing a crown with recurved lobes, and perianth nearly or quite concolorous with the crown; *Binstead ! ! !* This variety appears *not* to be the var. b. lobularis, Haw., the "Tenby Daffodil."

Convallaria majalis, L.

New Districts: 10. Wood at Wigmore; *Mr. C. B. Hurst.* 12. Shirl Wood, Eardisland, 1900; *Ley.* District 3. Very fine and plentiful in the north part of the Queen's Wood; *Ley.*

Allium vineale, L. Var. Bulbiferum, Syme.

Rare. New District: 4. Bullen Bank, Ledbury, "only a few plants," 1902; *Bickham.*

Gagea fascicularis, Salisb.

New District: 4. Purlieu Lane, Colwall, 1899; *Mr. W. H. Jones, fide Towndrow.*

Narthecium Ossifragum. Huds.

District 14. Upper edge of the Park Wood, Craswall, "plentifully"; *Dr. Wood.*

Juncus obtusifolius, Ehrh.

New District: 13. Bog near Wormbridge; *Bickham.*

Typha angustifolia, L.

District 3. Planted in a small pool near the railway, Stoke Edith; *Ley.*

Sagittaria sagittifolia, L.

District 2. Quite established in the Wye at Strangford, 1905; *Ley.*

Butomus umbellatus, L.

District 2. Established and increasing in the Wye at and near Sellack. With the Sagittaria at Strangford, 1905; *Ley.*

Potamogeton decipiens, Nolte. Var. salicifolius, Ar. Bennett.

This Pondweed will now have to be named P. salignus, Fryer. Still to be found near Carey, but not known at present in any fresh stations; *Ley.*

Scirpus setaceus, L.

New District: 4. Brand Lodge; *Crossfield*: Colwall; *Towndrow !*

Scirpus lacustris, L.

New District: 7. On the Lugg and lower Frome, near Mordiford and Longworth; *Ley.*

Eriophorum latifolium, Hoppe.

District 3. Bog in Queen's Wood; *Ley.*

Carex ovalis, Good.

New District: 4. Meadows adjoining Cowleigh Park; *Bickham !*

Carex acuta, L.

District 7. On the lower Frome at Longworth; *Ley.*

Carex strigosa, Huds.

District 3. Mains Wood, Putley; *Ley.*

***†Panicum Crus-galli, L.**

District 4. Weed in garden ground at Ledbury, 1903; *Bickham.*

Alopecurus fulvus, Sm.

New District: 4. Crump End Hill, Cradley; *Towndrow.*

Phleum pratense, L. Var. *nodosum (L.).

District 4. Ledbury, 1902; *Bickham.*

Agrostis canina, L.

New District: 3. Bog in the Queen's Wood; *Ley.*

Calamagrotis epigejos, Roth.

New District: 13. Wet hedge near Wormbridge; *Ley.* District 3. Bog in the Queen's Wood, with the last; *Ley.*

Kœhleria cristata, Pers.

New District: 3. Marcle Ridge in two spots and in fair abundance 1899; *Ley.*

Molinia varia, Schrank.

District 12. Rough ground near Bushy Farm, Brilley, 1905; *Ley.*

Catabrosa aquatica, Beauv.

District 12. Ditch at Pembridge Station, abundantly, 1901; *Ley.*

Poa compressa, L.

District 4. Ledbury; *Bickham.*

Glyceria aquatica, Sm.

New District: 4. In the old canal, and in a pool adjoining it, near Ledbury; *Bickham.*

Festuca rigida, Kunth.

District 4. Ledbury; *Bickham*

Festuca sciuroides, Roth.
District 4. Malvern Hills, in Upper Colwall ; *Bickham.*

Bromus ramosus, Huds. Var. Benekenii (Syme).
New District : 4. Wood at Ledbury, 1904 ; *Bickham ! !*

Bromus erectus, Huds. var. *villosus, Bab.
District 4. Bullen bank, Ledbury ; *Bickham.*

Bromus racemosus, L.
District 4. Meadow at Underdown, Ledbury ; *Bickham.*

Brachypodium pinnatum, Beauv.
District 4. Bullen bank, Ledbury, 1902 ; *Bickham !*

Hordeum secalinum, Schreb.
District 4. Bullen bank, Ledbury, 1902 ; *Bickham !*

Hordeum murinum, L.
District 4. Ledbury, 1902 ; *Bickham.*

Athyrium Filix-fœmina, Roth. Var. *Watsoni, Syme.
District 14. In the Grwyne valley ; a plant answering well to Watson's type specimens ; gathered about the year 1875 ; *Ley.*

Lastræa Oreopteris, Presl.
District 3. Main's Wood, Putley : Queen's Wood, Gorsley ; *Ley.*

Equisetum sylvaticum, L.
New Districts : 4 and 5. Cradley ; *Crossfield* ; *Towndrow.*

Lycopodium clavatum, L.
District 10. On Cole's Hill, near Presteign, abundantly: Woolhope Club expedition, 1898 ; *Ley.*

Woolhope Naturalists' Field Club.

MOSSES.

Note.—The nomenclature and order adopted in the following notes is taken from Dixon's Handbook of British Mosses, Ed. ii.

Catharinea undulata, W. & M. Var. minor, W. & M.
New District : 11. Corton Wood, Presteign, 1905 ; *Binstead ! ! !*

Polytrichum nanum, Neck.
New District : 12. Open hilly ground at and near Pentwyn Camp, Brilley, 1905 ; *Binstead ; Ley.*

Polytrichum aloides, Hedw.
New District : 5. Bringstye Common ; *Binstead.*

Polytrichum urnigerum, L.
District 11. Corton Wood, Presteign, 1905 ; *Binstead ! ! !*

Polytrichum commune, L.
New District : 5. Rare, Bringstye Common ; *Binstead.*

Diphyscium foliosum, Mohr.
District 11. Corton Wood, Presteign, 1905 ; *Ley.* 14. Grwyne Valley ; *Binstead.*

Archidium alternifolium, Schp.
New District : 2. Barren pasture at Little Dewchurch, 1898 ; *Ley.* District 12. Open hilly ground near Bushy Farm, Brilley, 1905 ; *Binstead ; Ley.*

Pleuridium axillare, Ldb.
New District : 12. Questmoor, Eardisley ; *Binstead.* District 8. River bank, Letton ; *Binstead.*

***Ditrichum tenuifolium, Ldb.**
Very rare. District 13. On the dried mud of a pool in Moccas Park ; *Ley.*

Ditrichum flexicaule, Hpe.
District 3. Exposed limestone on the summit of Cherry Hill, Fownhope ; *Ley.*

Var. densum, Braithw.

New District: 5. Whitbourne; Tedstone Delamere; *Binstead.*

Seligeria Doniana, C.M.

District 2. Shady rock in Castle Meadow Wood, Caradoc; 1906; *Ley.*

Seligeria *acutifolia, Ldb.

Rare: only on limestone. District 2. With S. pusilla, *B. & S.*, at Arthur's Cave, Great Doward, 1898; *Ley.*

Seligeria recurvata, B. & S.

New District: 2. West face of the Great Doward, 1906; *Armitage, Binstead!*

Dichodontium flavescens, Ldb.

New District: 5. Stream at Elmer's End, Bringstye; *Binstead.*

Dicranella heteromalla, Schp.

New District: 5. Whitbourne, frequent; *Binstead.*

Dicranella varia, Schp.

New District: 5. Whitbourne, common; *Binstead.*

Campylopus fragilis, B. & S.

District 2. Conglomerate rocks, Penyard Hill, Ross, *c. fr.*, 1898; *Miss E. Armitage.*

Dicranum Bonjeani, De Not. *Var. juniperifolium, Braithw.

District 5. Bringstye Common; *Binstead.*

Dicranum majus, Turn.

District 5. Woodlands, Whitbourne; *Binstead.*

Dicranum fuscescens, Turn. Var. *falcifolium, Braithw.

Rare. District 2. Conglomerate rocks, Penyard Hill, Ross, 1898; *Miss E. Armitage!*

Fissidens exilis, Hedw.

New District: 12. Eardisley, *Binstead.*

Fissidens incurvus, Starke.

District 5. Whitbourne; *Binstead.*

Fissidens crassipes, Wils.

New District: 5. In the Teme at Whitbourne; *Binstead!!!*

Fissidens adiantoides, Hedw.

New District: 5. Whitbourne, occasionally; *Binstead.*

Grimmia orbicularis, Bruch.

New District: 11. Nash Scaur, Knill, abundantly; *Binstead!!!*

Grimmia trichophylla, Grev.

Districts: 2. Penyard Hill, Ross; *Armitage, Binstead.* 5. Walls at Bringstye, fruiting; *Binstead.*

Grimmia subsquarrosa, Wils.

New District: 14. Crib-yr-garth, 1893; *Ley.*

Rhacomitrium heterostichum, Brid.

Districts: 2. Huntsham Hill, with the next; *Miss E. Armitage.* Stone under Stanner Hill, but within the county; *Binstead!!!*

Variety *gracilescens, B. & S.

District 2. Huntsham Hill, 1906; *Armitage*; *Binstead!*

Ptychomitrium polyphyllum, Furnr.

New District: 5. A single tuft at the Ford, Whitbourne; *Binstead.*

Hedwigia ciliata, Ehrh. Var. viridis, Schp.

New District: 11. Roofs at Nash Scaur, Knill; *Binstead.*

Acaulon muticum, C. M.

New District: 5. Badley Wood Common, Whitbourne; *Binstead.* District 12. Open fallow near Pentwyn Farm, Brilley, 1905; *Binstead, Ley.*

Phascum Floerkeanum, W. & M.

New District: 6. Shucknell Hill, 1903; *Ley.*

Phascum curvicolle, Ehrh.

New District: 2. Little Doward Hill; *Binstead.*

Pottia recta, Mitt.

New Districts: 2. Little Doward Hill; *Binstead.* 6. Shucknell Hill; *Binstead.* District 3. Fownhope; *Binstead.*

Pottia bryoides, Mitt.

New Districts: 6. Shucknell Hill, 1903; *Binstead!!!* 13. Clifford Castle, on old mortar; *Binstead.*

Pottia truncatula, Ldb.

New District: 5. Whitbourne; *Binstead.*

Pottia intermedia, Furnr.

New District: 5. Poswick. Not uncommon at Whitbourne; *Binstead.*

Pottia lanceolata, C. M.

New Districts: 5. Elmers' End and elsewhere in Whitbourne; *Binstead.* 11. Nash Scaur, Knill; *Binstead ! ! !*

Tortula lamellata, Ldb.

New Districts: 3. Fownhope; *Binstead.* 7. Breinton Common; *Binstead.*

Tortula rigida, Schrad.

New District: 3. Fownhope; *Binstead.*

Tortula *cuneifolia, Roth.

Rare.

East. 5. Hedge banks at Bringstye and Badley Wood, 1906; *Binstead.*

Central. 7. Breinton, 1899; *Binstead.* 8. Brobury Scaur; *Binstead.*

North. 12. Hedge bank, Eardisley; *Binstead.*

Tortula Vahliana, Wils.

New Districts: 7. Breinton Common, during several seasons; *Binstead.* 8. Bishopstone; *Binstead.*

Tortula *angustata, Wils.

Usually on hedge banks; rather rare.

South. 2. Hedge bank, King's Capel, 1903, 1904; *Ley.*

East. 5. Whitbourne, in several localities; *Binstead.*

Central. 7. Bank at Breinton Common; *Binstead !*

North. 9. Kimbolton; *Rev. W. E. Thompson.* 12. Whitney, on a bank near the Station, plentifully, 1906; *Ley.*

West. 14. Hedge bank near Rowlstone, Woolhope Club Expedition, 1906; *Binstead ! ! !*

NOTE.—The record of this moss in *Transactions of the Woolhope Club*, 1894, p. 210, for "Moorland banks and rocks near streams," referred to a variety of T. subulata, *Hedw.* The present plant appears to affect hedge banks.

Tortula mutica, Ldb.

District 5. Whitbourne; *Binstead.*

Tortula ruralis, Ehrh.

District 5. Tedstone Delamere; *T. S. Lea.* Whitbourne; *Binstead.*

Tortula papillosa, Wils.

New District: 5. Whitbourne, and near Tedstone Delamere; *Binstead ! ! !*

Barbula lurida, Ldb.

New District: 5. Whitbourne; *Binstead ! ! !*

Barbula tophacea, Mitt.

New District: 6. Shucknell Hill; *Binstead.*

Barbula fallax, Hedw. Var. brevifolia, Schultz.

New Districts: 6. Shucknell Hill; *Binstead.* 12. Eardisley; *Binstead.* District 5. Common at Whitbourne; *Binstead.*

Barbula recurvifolia, Schp.

New District: 11. Nash Scaur, Knill; *Binstead ! ! !*

Barbula spadicea, Mitt.

New District: 14. Stone in the Grwyne, 1901; *Binstead, Ley.*

Barbula rigidula, Mitt.

District 9. Rocky bank at Richard's Castle, 1904; *Binstead ! ! !*

Barbula cylindrica, Schp.

District 5. Fruiting near Sapey Bridge; *Binstead.*

Barbula vinealis, Brid.

District 2. Rocky road bank, *c. fr.*, Hope Mansel, 1900; *Ley.* 5. Frequent at Whitbourne; *Binstead.*

Barbula sinuosa, Braithw.

District 2. Brook below Athelstane's Wood, 1898; *Ley.*

Barbula *gracilis, Schwgr.

Rare.

Central. 7. Wall top in Hereford, 1905; *Ley.*

North. 11. Nash Scaur, Knill, 1897, 1905; *Binstead ! ! !* 12. Stone at Almeley Station; *Binstead.*

Barbula revoluta, Brid.

New District: 5. Sapey bridge, fruiting; *Binstead.* District 9. Rocky bank at Richard's Castle, fruiting, 1904; *Binstead ! ! !*

Barbula convoluta, Hedw.

New District: 5. Whitbourne, but not common; *Binstead.*

Leptodontium flexifolium, Hpe.

New District: 2. On conglomerate rock, Penyard Hill, Ross, 1898; *Miss E. Armitage !*

Weisia microstoma, C. M.

New Districts: 3. Common Hill, Fownhope; *Binstead, Ley.* 5. Whitbourne; *Binstead.* 12. Eardisley; *Binstead.*

Weisia *crispata, C. M.

Rare; confined to limestone districts.

South. 2. Great Doward, in a quarry on the north-west side of the hill, 1903; *Dixon.*

North. 11. Nash Scaur near Knill; *Binstead ! ! !*

Weisia mucronata, B. & S.

District 2. Aconbury Camp Wood; *Binstead.*

Trichostomum crispulum, Bruch.

District 3. Quarry above Stoke Edith; *Ley.*

Trichostomum tortuosum, Dixon.

New District: 5. Tedstone Delamere; *Binstead.*

***Pleurochæte squarrosa, Ldb.**

District 2. On the Great Doward near the quarry, 1902; *Ley.*

Cinclidotus Brebissoni, Husn.

District 5. On the Teme at Whitbourne; *Binstead.*

Cinclidotus fontinaloides, P. B.

New District: 5. In the Teme at Whitbourne; *Binstead.*

Encalypta streptocarpa, Hedw.

New District: 5. Near Sapey Bridge, not common; *Binstead.*

Zygodon viridissimus, R. Br.

New District: 5. Whitbourne, frequent; *Binstead.*

Ulota crispa, Brid.

New Districts: 5. On an Oak branch at Bringstye, Whitbourne; *Binstead.* 10. Shady wood at Aymestry, 1905; *Binstead ! ! !* District 2. On Wych Elm at Pengethly, 1899; *Ley.* On Elder near Altwent, Little Dewchurch, 1907; *Ley.*

Ulota phyllantha, Brid.

New District: 2. On boles at the Weir, Great Doward, 1899, 1900; *Ley.*

Orthotrichum anomalum, Hedw. Var. saxatile, Milde.

New Districts: 5. Limestone wall at Elmer's End, Whitbourne, scarce; *Binstead.* 6. Shucknell Hill; *Ley.*

Orthotrichum leiocarpum, B. & S.

New District: 5. Abundant on the Sapey brook near Tedstone Delamere; *Binstead ! ! !*

Orthotrichum Lyellii, H. & T.

New District: 5. Whitbourne, and near Tedstone Delamere, fruiting; *Binstead ! ! !*

Otrhotrichum affine, Schrad. Var. *fastigiatum, Hub.

Rare.

South. 2. On willow boles by the river, Great Doward, 1906; *Ley.*

North. 12. Near Bollingham Chapel, Eardisley; *Binstead.*

Orthotrichum rivulare, Turn.

District 12. Winforton; *Binstead.*

Orthotrichum Sprucei, Mont.

New District: 5. On the Teme at Whitbourne, rare; *Ley.*

Orthotrichum stramineum, Hornsch.

New District: 5. Abundant by the Teme at Whitbourne, and by the Sapey brook near Tedstone Delamere; *Binstead* and *Ley.*

Orthotrichum tenellum, Bruch.

New District: 5. With O. stramineum at Whitbourne and Tedstone Delamere, but less abundant; *Binstead* and *Ley.* District 7. Sugwas Boat, Breinton; *Binstead.*

Funaria fascicularis, Schp.

New District: 5. Fallow fields, Whitbourne; *Binstead.*

Aulacomnium palustre, Schwgr.

New District: 5. Bringstye Common, at a single station; *Binstead.*

Aulacomnium androgynum, Schwgr.

District 2. Hedge bank at Dadnor, near Ross; *Miss E. Armitage !*

Bartramia ithyphylla, Brid.

New District: 12. Whitney; *Binstead.*

Bartramia pomiformis Hedw.

New District: 5. Hedge bank, Bringstye; *Binstead.* Districts 2. At several spots on the Great and Little Dowards; *Armitage; Ley.* 12. Near High Grove, Brilley, 1905; *Binstead, Ley.*

Philonotis *capillaris, Ldb.

Banks, rare.

North. 10. Whitcliffe, Ludlow; *Binstead!* 11. Nash, and Corton Wood, near Presteign!!! *Binstead.*

Webera nutans, Hedw.

New District: 10. On the top of Coleshill, near Kinsham; *Binstead!!* District 11. Corton Wood, Presteign; *Binstead!!!*

Webera annotina, Schwgr.

New Districts: 11. Corton Wood, Presteign, with gemmæ; *Binstead!!!* 12. Eardisley; *Binstead.* District 9. Richard's Castle; *Binstead!!!*

Epipterygium Tozeri, Schp.

New District: 13. By the Wye at Clock Mill; *Binstead.*

Bryum pendulum, Schp.

New Districts. 5. On ant hills, Whitbourne; *Binstead.* 12. On ant hills, Eardisley; *Binstead.* District 2. Wall tops, Great Doward, 1905; *Ley.*

Bryum inclinatum, Bland.

New Districts. 3. Fownhope; *Binstead.* 6. Shucknell hill, plentifully, 1903; *Ley.*

Bryum *uliginosum, B. & S.

Very rare. District 14. Wet willow boles in the old brickfield, Pontrilas, 1893, 1906; Ley.

Bryum pallens, Sw.

New District: 5. By the Teme at Whitbourne; *Binstead!!!*

Bryum bimum, Schreb.

New District: 3. Bog in the Queen's Wood, Gorsley, 1902; *Ley.*

Bryum pseudo-triquetrum, Schwg.

New District: 5. By the Teme at Whitbourne; *Binstead!!!*

Bryum intermedium, Brid.

Districts 2. Great Doward quarry, 1900; *Ley.* 8. River side, Bredwardine; *Binstead.*

Bryum cæspiticium, L. Var. imbricatum, B. & S.

New District: 11. Corton Wood, Presteign, 1905; *Binstead!!!*

Bryum capillare, L. Var. torquescens, Husn.

New Districts: 6. Shucknell Hill, 1903; *Ley.* 12. Wood Eaves, Eardisley; *Binstead.*

Bryum capillare, L. *Var. macrocarpum, Hubn.

District 14. Stream side at Walterstone, 1906; *Ley.*

Bryum Donianum, Grev.

New Districts: 5. Bank at Whitbourne; *Binstead.* 7. Breinton; *Binstead.* 12. The Quebb, Eardisley; Whitney; *Binstead.* District 2. Sandy hedge bank in Little Dewchurch parish: hedge bank at Much Fawley: hedge bank, Hope Mansel; *Ley.* In large barren tufts by the river, Great Doward; *Ley.*

Bryum erythrocarpum, Schwgr.

District 12. On ant hills, Eardisley; *Binstead.*

Bryum *rubens, Mitt.

On the ground in woods. Rare.

South. 2. Warm hill wood, 1861, *teste Dixon; Herb. Purchas!*

North. 11. Corton Wood, Presteign, 1905; *Binstead!!!* 12. Winforton; *Binstead.* This moss is found in the Reddings enclosure, West Gloucester, and should be looked for in Great Doward Woods on the Herefordshire bank of the river.

Bryum atropurpureum, W. & M.

New District: 5. Whitbourne, "frequent but barren"; *Binstead.*

Bryum murale, Wils.

New District: 5. Wall at Sapey bridge; *Binstead.* Districts 2. Wall top, Great Doward; *Miss E. Armitage!!!* 6. Tarrington; *Binstead.* 7. Breinton; *Binstead.*

Bryum *alpinum, Huds.

Very rare. District 8. On sand on the river bank, at Clock Mill; *Binstead.*

Bryum *Mildeanum, Jur.

Very rare. District 14. On the upper part of the Grwyne both in Hereford and Brecon shires; *Binstead* and *Dixon*, 1903.

Byrum roseum, Schreb.

Fruiting beautifully in a wood near Mordiford (D. 3), 1905; *Binstead!*

Mnium affine, Bland. *Type.*

District 14. In the old brickfield, Pontrilas, 1906; *Binstead, Ley.*

Mnium cuspidatum, Hedw.

New District: 5. Bringstye, in turf; and on the banks of the Teme; *Binstead.*

Mnium serratum, Schrad.

New District : 5. Banks of the Teme, Whitbourne ; *Binstead.*

Mnium *riparium, Mitt.

On boles or stone by the river bank ; rare.

South. 2. On stones by the river at two spots, Great Doward ; *Ley.*

North. 12. Winforton, on willow boles ; *Binstead.*

Mnium stellare, Reich.

District 2. Old lane on the Chase Hill, fruiting ; *Miss Armitage !*

Mnium *subglobosum, B. & S.

Moorlands ; not rare. District 14. On both the Hatterel and Fwddog range of the Black Mountain ; *Binstead, Ley.*

Fontinalis antipyretica L.

New District : 5. In the Teme at Whitbourne ; *Binstead.*

Fontinalis squamosa, L.

District 8. In the Wye at Brobury and Clock Mill ; *Binstead.*

Fontinalis *seriata, Ldb.

In the Wye ; rare.

Central. 7. Breinton, 1874 ; *Ley.*

North. 12. Clock Mill ; *Binstead.*

Heterocladium heteropterum, B. & S.

New District : 2. Harechurch Woods, Hope Mansel ; *Ley.*

Var. fallax, Milde.

Rare.

South. 2. Penyard, Ross, 1899 ; *Armitage, Binstead.* At the Seven Sisters rocks, Great Doward ; *Dixon !*

North. 12. Brilley, " abundantly " ; *Binstead.*

Thuidium *recognitum, Ldb.

On limestone soil ; rare.

South. 2. On bare limestone ground at Silverstone Farm, Hope Mansel, 1895 ; *Binstead, Ley.* 3. Near Woolhope ; *Miss E. Armitage !*

Cylindrothecium concinnum, Schp.

District 3. Littlehope, Mordiford ; *Binstead.*

Pylaisia polyantha, B. & S.

New Districts : 3. Near Woolhope ; *Miss E. Armitage !* 8. Sarnesfield, " fine " ; *Binstead.* 14. Longtown ; *Binstead.* Districts 2. In rotten willows near Much Fawley ; *Ley.* 7. Shady stump in the boggy parts of Bucknell's Wood, Madley, *c. fr.*, 1905 ; *Ley.*

Camptothecium lutescens, B. & S.

New District : 5. Road near side Bringstye ; *Binstead.*

Brachythecium glareosum, B. & S.

New District : 5. Road side near Bringstye ; *Binstead.* Districts 2. In the Lord's Wood, Great Doward, *c. fr.* ; *Miss E. Armitage.* 3. Dormington Quarries, *c. fr.* ; *Ley.*

Brachythecium albicans, B. & S.

New Districts : 2. Penyard Hill, Ross ; *Miss E. Armitage !* 5. Bringstye and Badley Wood Commons ; *Binstead.* 12. Winforton Common, 1896 ; *Binstead.* District 3. Fownhope, *Binstead.*

Brachythecium *salebrosum, B. & S.

East. 5. On rotting wood by the Teme at Whitbourne, May, 1907 ; *Binstead and Ley.* This rare moss has long been searched for in vain in this and the neighbouring counties.

Var. *palustre. Schp.

In damp meadows and wood walks ; not rare ?

East. 5. Meadow near Whitbourne ; *Binstead ! ! !*

Central 7. Breinton, " in uncertain forms, in which the seta varies from rough to smooth ; " *Binstead.* 8. Wood Walk, Dinmore, 1903 ; *Binstead and Ley.*

North. 9. Near Leominster, 1901 ; *Thompson.* 12. Eardisley, *c. fr.* ; *Binstead.*

Brachythecium rivulare, B. & S.

District 2. Brook below Athelstane's Wood, *c. fr.* ; *Ley.*

Brachythecium velutinum, B. & S. Var. *condensatum, B. & S.

District 2. Great Doward ; *Dixon*, 1902.

Brachythecium plumosum, B. & S.

New District 12. Clock Mill, Winforton ; *Binstead.* Districts 1. On a tombstone in Welsh Newton churchyard ; *Miss E. Armitage !* 14. Damp stone near Walterstone, Woolhope Club Expedition 1906 ; *Binstead ! ! !*

Brachythecium cæspitosum. Dixon.

New District 5. On willows by the Teme, Whitbourne, not common ; *Binstead.*

Brachythecium illecebrum, De Not.

New Districts : 5. Frequent at Whitbourne ; *Binstead*. 14. Plentiful on lane hedges near Walterstone and Rowlestone, Woolhope Club Expedition, 1906 ; *Binstead and Ley*.

Eurhynchium speciosum, Schp.

District 2. Shady tree root in Castlemeadow Wood, Sellack : Dropping well, Great Doward, 1906 ; *Ley*.

Eurhynchium prælongum, B. & S. Var. *Stokesii, L. Cat. Ed. ii.

South. District 2. Shady bank, Castlemeadow Wood, Sellack, 1900 ; *Ley*.

Eurhynchium Swartzii, Hobk.

District 2. Castlemeadow Wood, Caradoc, *c. fr.*, 1906 ; *Ley*.

Eurhynchium abbreviatum, Schp.

New Districts : 5. Abundant and fruiting at Whitbourne ; *Binstead ! ! !* 11. Lane hedge near Stanner, *Binstead ! ! !* Districts 2. Riggs' Wood, Sellack, *c. fr.*, 1899 ; *Ley*. 7. Wood between Wareham and Breinton Church, 1900 ; *Ley*. 10. Old lane near Stapleton, Presteign, 1898 ; *Ley*. 14. Lane hedges, &c., near Walterstone and Rowlstone, Woolhope Club Expedition, 1906 ; *Binstead* and *Ley*.

Eurhynchium pumilum, Schp.

New District : 5. Whitbourne ; *Binstead*.

Eurhynchium curvisetum, Husn.

District 2. Damp stone in Athelstone's Wood, 1898 ; *Ley*.

Eurhynchium Teesdalei, Schp.

District 14. Stream at Walterstone, Woolhope Club Expedition, 1906 ; *Ley*.

Eurhynchium tenellum, Milde.

New Districts : 5. Wall at Brockhampton ; *Binstead*. 9. Rocky road bank at Richard's Castle, 1904 ; *Binstead ! ! !*

Eurhynchium myosuroides, Schp.

New District : 5. Whitbourne, rare ; *Binstead*.

Eurhynchium confertum, Milde.

New District : 5. Whitbourne ; *Binstead*.

Plagiothecium depressum, Dixon.

New District : 7. Shady wood at Tuck Mill, Eaton Bishop, 1905 *Binstead ! ! !* District 12. Almeley Wootton ; *Ley*. Eardisley dingle, *c. fr.* ; *Binstead*.

Plagiothecium Borrerianum, Spr.

New District : 14. Wood bank in the Honddu valley, 1901 ; *Binstead ! ! !*

Var. *collinum, Wils.

Rare. District 2. Warm Hill, Hope Mansel, 1900 ; *Ley*.

Plagiothecium sylvaticum, B. & S.

New District : 5. Whitbourne and Gaines ; *Binstead*.

Plagiothecium latebricola, B. & S.

New District : 2. Shady Wood, Aconbury Hill ; *Binstead*. 6. On willows near Westhide ; *Ley*. 10. Shady wood at Aymestry ; *Binstead*. 12. Eardisley ; *Binstead*.

Amblystegium *Sprucei, B. & S.

District 2. Exposed limestone on the Great Doward ; very rare, *c. fr.*, 1899 ; *Binstead ! ! !*

Amblystegium *Juratzkanum, Schpr.

Common. District 7. Breinton, 1904 ; *Binstead*. 8. Mansel Lacy, *c. fr.*, 1904 ; 14. Brickfield, Pontrilas, *c.fr.*, very fine, 1906 ; *Binstead, Ley*. This species is at present insufficiently understood, and its distribution has not yet been worked out in the county. The specimens obtained at Mansel Lacy were pronounced by Mr. Dixon " good and characteristic."

Amblystegium irriguum, B. & S.

District 5. Whitbourne ; *Binstead*.

Hypnum riparium, L.

New District : 5. Whitbourne ; *Binstead*.

Var. *longifolium, Schp.

South. District 2. Pool near Sellack Church, 1906 ; *Ley*.

Hypnum chrysophyllum, Brid.

New District : 5. Frequent at Whitbourne ; *Binstead*.

Hypnum aduncum, Hedw.

New District : 10. On boles by the Lugg near Kinsham, 1898 ; *Binstead ! ! !*

Hypnum Patientiæ, Ldb

New District : 5. Whitbourne ; *Binstead*.

Hypnum molluscum, Hedw. Var. *condensatum, Schp.

District 2. On shady millstone grit at Howle Hill, September, 1906 ; *Ley*.

Hypnum cordifolium, Hedw.

New District: 5. At one station on Bringstye Common; *Binstead.*

Hypnum *giganteum, Schp.

On moorlands; very rare in Herefordshire. District 14. Moorland at the head of the Olchon dingle, Hatterels; *Ley.* This moss is abundant outside our area, on Radnor Forest; also in the Grwyne valley, Breconshire.

Hylocomium *brevirostre, B. & S.

East. 5. Tedstone Delamere, rare; *Binstead.*

North. 12. Mossy banks in woods near Merthyr, Brilley, 1893; *Binstead!*

Hylocomium loreum, B. & S.

New District. 5. Wood at Whitbourne; *Binstead.*

Hylocomium squarrosum, B. & S. *Var. calvescens, Hobk.

North. 12. Brilley; on stones in the shady stream course near Merthyr, 1895; *Binstead.*

Woolhope Naturalists' Field Club.

ADDITIONS TO THE LIST OF FUNGI PUBLISHED IN THE FLORA OF HEREFORDSHIRE IN 1889.

By Carleton Rea, B.C.L., M.A., &c.

Twenty years have elapsed since the last list of Fungi appeared for the county of Hereford. In the following list 342 species are enumerated which were not included in the *Herefordshire Flora* list; and, in addition, several others are relisted because they show either a wider range of distribution in the county, or that the higher condition of the fungus has since been noted within its borders. The former list also omitted to include many species that had been recorded in the "Transactions of the Woolhope Club" and elsewhere, and so the total number of fungi recorded for the county now amounts to over 1,439 species and varieties up to the present date.

BASIDIOMYCETÆ.

HYMENOMYCETÆ.

Agaricaceæ.

AMANITA PORPHYRIA (*A. & S.*) *Fr.*
Brockhill Wood near Colwall (4).

AMANITOPSIS VAGINATA (*Bull.*) *Roze.*

VAR. NIVALIS *Grev.*
Dinmore (8), Whitcliffe Woods (10).

VAR. PLUMBEA *Schæff.*
Belmont (7), Rotherwas (7), Holme Lacy (2).

VAR. FULVA *Schæff.*
Dinedor (7), Dinmore (8) Eastnor (4), Great Doward (2).

STRANGULATA (*Fr.*) *Mass.*
Eastnor (4), Sufton Court (3).

LEPIOTA PROMINENS *Fr.*
Ledbury (4).

FRIESII (*Lasch.*) *Fr.*
Downton (10).

*HISPIDA (*Lasch.*) *Fr.*
Dinedor Camp (7).

* The No. 28, pl. 27, of Cooke's Illustrations of British Fungi seems to be a form of Lepiota Clypeolaria. rather than this species.—C. R.

LEPIOTA CLYPEOLARIA (*Bull.*) *Fr.* VAR. PRATENSIS (*Bull*).
Malvern Hills (4).

METULÆSPORA *B. & Br.*
Foray 1885. Brockhampton (5).

FELINA *Pers.*
Brockhampton (5), near Colwall (4).

ERMINEA *Fr.*
Raggedstone Hill (4), Downton (10).

HOLOSERICEA *Fr.*
Dr. Bull's list, 1872. Hopyard near Stoke Edith (6).

SEMINUDA (*Lasch.*) *Fr.* VAR. LILACINA *Quél.*
Holme Lacy (2).

TRICHOLOMA TRISTE (*Scop.*) *Fr.*
Dinmore (8), Whitcliffe (10).

CARTILAGINEUM (*Bull.*) *Fr.*
Mynde Park (1).

CUNEIFOLIUM *Fr.* VAR. CINEREO-RIMOSUM (*Batsch.*) *Fr.*
Eastnor (4).

PANÆOLUM *Fr.*
Dinmore (3), Brockhampton (5), Holme Lacy (2), Whitcliffe (10), Eastnor (4).

LIXIVIUM *Fr.*
Garnstone Park (8).

CLITOCYBE RIVULOSA (*Pers.*) *Fr.*
Near Belmont (7), Holme Lacy (2), Bromyard Downs (5), Stoke Edith (3), near Colwall (4).

PITHYOPHILA *Fr.*
Dr. Bull's list, 1873. West Malvern (4).

CANDICANS (*Pers.*) *Fr.*
Eastnor (4), Brockhampton (5), Whitcliffe (10), Little Doward (2), near Woolhope (3).

INCILIS *Fr.*
West Malvern (4).

SINOPICA *Fr.*
Swineyard Hill (4), Dinmore (6).

SPINULOSA *Stev. & Sm.*
Eastnor (4).

GILVA (*Pers.*) *Fr.*
Brockhampton (5).

LACCARIA LACCATA (*Scop.*) *B. & Br.* VAR. TORTILIS (*Bolt.*) *B. & Br.*
Eastnor (4), Whitcliffe (10), Brockhampton (5).

COLLYBIA STIPITARIA *Fr.*
Near Colwall (4), Whitcliffe (10).

EUSTYGIA *Cke.*
Whitfield (13).

MYCENA ELEGANS *Pers.*
West Malvern (4).

MYCENA OLIVACEOMARGINATA *Mass.*
Fields near Belmont (7).

RUBROMARGINATA *Fr.*
Brockhampton (5).

LUTEO-ALBA (*Bolt.*) *Fr.*
Holme Lacy (2), Belmont (7), Brockhampton (5), Colwall (4),

PLICOSA *Fr.*
Near the Herefordshire Beacon (4).

IRIS *Berk.*
Dinmore (8).

AMICTA *Fr.*
Near Woolhope (3).

ACICULA (*Schæff.*), *Fr.*
Downton (10), Brockhampton (5), Foxley (8).

LEUCOGALA *Cke.*
Eastnor (4).

CLAVICULARIS *Fr.*
Near the Herefordshire Beacon (4).

PELLICULOSA *Fr.*
Base of the Herefordshire Beacon (4).

RORIDA *Fr.*
Eastnor (4), Brockhampton (5).

DISCOPA (*Lev.*) *Fr.*
Haywood Forest (7), Brockhampton (5).

PTERIGENA *Fr.*
Stoke Edith (3).

OMPHALIA HYDROGRAMMA *Fr.*
Malvern Hills (4).

*ALUTACEA *Cke. & Mass.*
Whitcliffe (10).

RETOSTA *Fr.*
Dinmore (8).

STELLATA *Fr.*
Near Hereford (7).

CAMPANELLA (*Batsch*) *Fr.* VAR. BADIPA *Cke.*
Near Hereford (7).

INTEGRELLA (*Pers.*) *Fr.*
Near Brockhill (4), Brockhampton (5).

PLEUROTUS APPLICATUS (*Batsch.*) *Fr.*
Holme Lacy (2).

VOLVARIA BOMBYCINA (*Schæff.*) *Fr.*
Brockhampton (5).

†LOVEIANA *Berk.*
Downton (10).

---

* See Grevillea, xxi. 40, but omitted in Massee's British Fungus Flora, iv.

† The mycelium noted on Clitocybe nebularis; Woolhope Club *Transactions* (1877).

VOLVARIA GLOIOCEPHALA (*DC.*) *Fr.*
Near Hereford (7).

MEDIA (*Schum.*) *Fr.*
Brockhampton (5).

PLUTEUS CERVINUS (*Schæff.*) *Fr.* VAR. PATRICIUS *Schulz.*
Near Dymock (4).

UMBROSUS (*Pers.*) *Fr.*
Haywood Forest (7), Sufton Court (3).

ROSEO-ALBUS *Fr.*
Burghill Court (7).

CHRYSOPHÆUS (*Schæff.*) *Fr.*
Dowards (2).

PHLEBOPHORUS (*Dittm.*) *Fr.*
Sufton Court (3).

ENTOLOMA LIVIDUM (*Bull.*) *Fr.*
Near Dinedor Camp (7), Eastnor (4), Dinmore (8).

PORPHYROPHÆUM *Fr.*
Leintwardine (10), Merryhill Common (7), Haywood Forest (7)

AMEIDES *B. & Br.*
Whitcliffe (10).

SAUNDERSII *Fr.*
Holme Lacy (2).

COSTATUM *Fr.*
Eastnor (4), Brockhampton (5).

CLITOPILUS POPINALIS *Fr.*
Holme Lacy (2).

LEPTONIA ÆTHIOPS *Fr.*
Eastnor (4), Brockhampton (5).

SERRULATA (*Pers.*) *Fr.*
Near Belmont (7), Holme Lacy (2), Eastnor (4). Brockhampton (5).

LEPTONIA CHALYBÆA (*Pers.*) *Fr.*
Downton (10), Haywood Common (7).

NOLANEA INFULA *Fr.*
Dinmore (8), Eastnor (4).

ECCILIA CARNEO-GRISEA *B. & Br.*
Seager Hill (3), Whitcliffe (10), near Woolhope (3).

ATRIDES (*Lasch.*) *Fr.*
Hereford (7).

PHOLIOTA PRÆCOX (*Pers.*) *Fr.*
Near Belmont (7), Eastnor (4), Stoke Edith (3), Vinesend (4), Breinton (7).

SUBSQUARROSA *Fr.*
Hereford (7).

ADIPOSA *Fr.*
Eastnor Park (4).

INOCYBE HIRSUTA (*Lasch.*) *Fr.*
Foxley (8).

LANUGINOSA (*Bull.*) *Fr.*
Haywood Forest (7), Holme Lacy (2), Eastnor (4).

CINCINNATA *Fr.*
Eastnor (4), Brockhampton (5), Whitcliffe (10).

MUTICA *Fr.*
Dinmore (8).

OBSCURA (*Pers.*) *Fr.*
Downton (10), Dinmore (8), Sufton Court (3), Credenhill (8).

DESCISSA *Fr.*
Whitcliffe (10).

LUCIFUGA *Fr.*
Dinmore (8).

GEOPHYLLA (*Sow.*) *Fr.* VAR. VIOLACEA *Pat.*
Dinmore (8), Eastnor (4), Brockhampton (5).

SCABELLA *Fr.*
Haywood Forest (7), Holme Lacy (2), Brockhampton (5).

RENNYI *B. & Br.*
Dinedor Fir Wood (7).

HEBELOMA TESTACEUM (*Batsch.*) *Fr.*
Brockhampton (5).

LONGICAUDUM (*Pers.*) *Fr.*
Dinmore (8), Brockhampton (5).

NUDIPES *Fr.*
Dinmore (8).

NAUSEOSUM *Cke.*
Dinmore (8).

FLAMMULA TRICHOLOMA (*A. & S.*) *Karst.*
Near Colwall (4), Dinmore (8).

HYBRIDA *Fr.*
Dr. Bull's list, 1873.

SAPINEA *Fr.*
Eastnor (4), Brockhampton (5).

SCAMBA *Fr.*
Stoke Edith (3).

NAUCORIA INNOCUA (*Lasch.*) *Fr.*
Sufton Court (3).

MELINOIDES *Fr.*
Near Belmont (7), Holme Lacy (2), Eastnor (4), Brockhampton (5),

*RUBRICATA *B. & Br.*
Holme Lacy (2).

SOBRIA *Fr.*
Stoke Edith (3).

* Massee says this is a Marasmius, see Brit. Fung. Flora, iii., 164.

NAUCORIA ERINACEA *Fr.*
Dinmore (8).

GALERA MNIOPHILA (*Lasch.*) *Fr.*
Stoke Edith (3).

AGARICUS XANTHODERMA *Genev.*
Stoke Edith (3), Ledbury (4), Brockhampton (5).

CAMPESTRIS (*Linn.*) VAR. SILVICOLA *Vitt.*
Dinmore (8), Holme Lacy (2), Brockhampton (5), Stoke Edith (3).

COMTULUS *Fr.*
Near Belmont (7), Holme Lacy (2), Eastnor (4), Brockhampton (5).

STROPHARIA PERCEVALI *B. & Br.*
Whitcliffe (10).

ALBOCYANEA (*Desm.*) *Fr.*
Dinmore (8), Belmont (7), Stoke Edith (3), Eastnor (4), Brockhampton (5).

OBTURATA *Fr.*
Brockhill Copse (4).

CORONILLA (*Bull.*) *Fr.*
Near Colwall (4).

THRAUSTA (*Kalchbr.*) VAR. AURANTIACA *Cke.*
Rotherwas (7).

STERCORARIA *Fr.*
Near Colwall (4), Stoke Edith (3), Brockhampton (5).

CAPUT-MEDUSÆ *Fr.*
Holme Lacy (2).

HYPHOLMA ŒDIPUM *Cke.*
Clehonger (7).

CASCUM *Fr.*
Stoke Edith (3).

PSILOCYBE SARCOCEPHALA *Fr.*
Downton (13), Eastnor (4), Brockhampton (5).

UDA (*Pers.*) *Fr.*
Near Colwall (4).

BULLACEA (*Bull.*) *Fr.*
Holly Bush Hill (4), Brockhampton (5).

SEMILANCEATA *Fr.* VAR. CÆRULESCENS *Cke.*
Holme Lacy (2), Belmont (7).

PSATHYRA SEMIVESTITA *B. & Br.*
Dinmore (8), Downton (10).

FIBRILLOSA (*Pers.*) *Fr.*
Brockhampton (5).

PANÆOLUS RETIRUGIS *Fr.*
Dinmore (8),

SPHINCTRINUS *Fr.*
Brockhampton (5).

PANÆOLUS PAPILIONACEUS *Fr.*
Holme Lacy, near Belmont (7).

PSATHYRELLA TREPIDA *Fr.*
Stoke Edith (3).

ATOMATA *Fr.*
Near Belmont (7), Rotherwas (7), Holme Lacy (2), Eastnor (4). Brockhampton (5).

COPRINUS FUSCESCENS (*Schæff.*) *Fr.*
Dinmore (8), Eastnor (4).

DOMESTICUS (*Pers.*) *Fr.*
Garnstone Park (8).

FIMETARIUS *Fr.* VAR. PULLATUS *Fr.*
Haywood Common (7).

VAR. CINEREUS (*Schæff.*) *Fr.*
Holme Lacy (2), Dinmore (8), Brockhampton (5).

BOLBITIUS BOLTONI *Fr.*
Brockhampton (5), West Malvern (4).

TENER *Berk.*
Near Colwall (4), Brockhampton (5).

CORTINARIUS (PHLEGMACIUM) BALTEATUS *Fr.*
Holme Lacy Park (2).

VARIICOLOR (*Pers.*) *Fr.*
Dinmore (8), Brockhampton (5).

RIEDERI *Fr.*
Haywood Forest (7), Whitcliffe Wood (10).

ANFRACTUS *Fr.*
Eastnor (4), Brockhampton (5), Dinmore (8).

MULTIFORMIS *Fr.*
Brockhampton (5), near Ledbury (4).

NAPUS *Fr.*
Fir Woods, Ledbury (4).

TALUS *Fr.*
Near Colwall (4).

TESTACEUS *Cke.*
Whitfield (13).

SCAURUS *Fr.*
Brockhampton (5).

CUMATILIS *Fr.*
Shobdon (10).

PAPULOSUS *Fr.*
Near Hereford (7).

(MYXACIUM) VIBRATILIS *Fr.*
Eastnor (4), Brockhampton (5).

(INOLOMA) MURICINUS *Fr.*
Dinedor (7).

CORTINARIUS (INOLOMA) PHOLIDEUS *Fr.*
Dinmore (8), Moor Park (9). Whitcliffe (10).

(DERMOCYBE) DIABOLICUS *Fr.*
Dinmore (8), Eastnor (4).

ALBOCYANEUS *Fr.*
Whitcliffe (10).

LEPIDOPUS *Cke.*
Dinmore (8), Holme Lacy (2), Eastnor (4), Brockhampton (5), Whitcliffe (10).

MILTINUS *Fr.*
Downton (10), Eastnor (4), Ledbury (4).

CINNAMOMEUS *Fr.* VAR. SEMISANGUINEUS *Fr.*
Near Colwall (4), Brockhampton (5).

ULIGINOSUS *Berk.*
West Malvern (4).

CROCEOCONUS *Fr.*
Whitcliffe (10).

RAPHANOIDES *Fr.*
Brockhampton (5), Whitcliffe (10).

(TELAMONIA) IMPENNIS *Fr.*
Dinmore (8), Eastnor (4), Brockhampton (5).

EVERNIUS *Fr.*
Brockhampton (5), Whitcliffe (10).

QUADRICOLOR (*Scop.*) *Fr.*
Eastnor (4).

BOVINUS *Fr.*
Haywood Forest (7).

BRUNNEUS *Fr.*
Dinedor (7), Whitcliffe (10).

STEMMATUS *Fr.*
Haywood Forest (7).

RIGIDUS *Fr.*
Whitcliffe (10), Brockhampton (5), Eastnor (4).

(HYDROCYBE) ARMENIACUS (*Schæff.*) *Fr.*
Sufton Court (3).

PRIVIGNUS *Fr.*
Dinmore (8).

SATURNINUS *Fr.*
Dinmore (8).

COLUS *Fr.*
Whitfield (13).

DOLABRATUS *Fr.*
Dinmore (8), Brockhampton (5).

LEUCOPUS (*Bull.*) *Fr.*
Near Colwall (4), Brockhampton (5), Eastnor (4), Whitcliffe (10).

DECIPIENS *Fr.*
Eastnor (4), Stoke Edith (3), Brockhampton (5), Whitcliffe (10).

PAXILLUS ALEXANDRI *Fr.*
Whitcliffe (1

EXTENUATUS *Fr.*
Near Hereford (7).

HYGROPHORUS (LIMACIUM) ARBUSTIVUS *Fr.*
Dinmore (8).

CERASINUS *Berk.*
Whitfield (13), Holme Lacy (2).

(CAMAROPHYLLUS) LEPORINUS *Fr.*
Brockhampton (5).

CLIVALIS *Fr.*
Holme Lacy (2), Moccas Park (13).

OVINUS (*Bull.*) *Fr.*
Between Cowleigh Wood and Croft Wood (4). Eastnor (4). Brockhampton (5).

SUBRADIATUS *Fr.* VAR. LACMUS *Fr.*
Dinedor (7), Downton (10), Sufton Court (3).

(HYGROCYBE) COLEMANNIANUS *Blox.*
Garnstone Park (8).

NITRATUS (*Pers.*) *Fr.*
Holme Lacy (2), Dinmore (8).

LACTARIUS (PIPERITES) SCROBICULATUS (*Scop.*) *Fr.*
Dinmore (8).

INTERMEDIUS *Kromb.*
West Malvern (4).

CIRCELLATUS *Fr.*
Dinmore (8).

(RUSSULARES) RUFUS (*Scop.*)
Shobdon Court (10), Brockhampton (5).

MAMMOSUS *Fr.*
Holme Lacy (2).

FULIGINOSUS *Fr.*
Croft Wood (4), Brockhampton (5).

ICHORATUS (*Batsch.*) *Fr.*
Near Hereford (7).

SUBUMBONATUS *Lindgr.*
Dinmore (8).

RUSSULA (COMPACTÆ) CHLOROIDES (*Krombh.*) *Bres.*
Dinmore (8), Dinedor (7), Holme Lacy (2), Eastnor (4) Brockhampton (5), Stoke Edith (3).

(FURCATÆ) DRIMEIA *Cke.* (= EXPALLENS *Gillet.*)
Dinedor (7), Brockhampton (5).

(RIGIDÆ) VIRESCENS (*Schæff.*) *Fr.*
Brockhampton (5), Whitcliffe (10).

RUSSULA (RIGIDÆ) CUTEFRACTA *Cke.*
"Dinedor and other places around Hereford" (7).

LINNÆI *Fr.*
Downton (10).

XERAMPELINA *Fr.*
Whitcliffe (10), Stoke Edith (3).

ATROPURPUREA (*Krombh*).
Near Hereford (7).

(HETEROPHYLLÆ) HETEROPHYLLA *Fr.* VAR. GALOCHROA *Fr.*
Eastnor (4), Brockhampton (5).

(FRAGILES) FRAGILIS *Pers.* VAR. NIVEA *Cke.*
Stoke Edith (4), Brockhampton (5).

VAR. VIOLACEA *Quél.*
Dinmore (8), Holme Lacy (2), Eastnor (4), Brockhampton (5).

VAR. FALLAX *Cke.*
Brockhampton (5).

CITRINA *Gillet*
Dinmore (8), Brockhampton (5).

AURATA *Fr.*
Dinmore (8), Near Colwall (4), Brockhampton (5).

NITIDA *Pers.*
Dinmore (8), Stoke Edith (3), Whitcliffe (10).

VAR. CUPREA *Krombh.*
Brockhampton (5).

VAR. PULCHRALIS *Britz.*
Holme Lacy (2).

PUELLARIS *Fr.*
Eastnor (4), Brockhampton (5).

ARMENIACA *Cke.*
Belmont (7), Holme Lacy (2), Eastnor (4), Brockhampton (5).

LUTEA (*Huds.*) *Fr.*
Dinmore (8), Haywood Forest (7), Whitfield (15), Downton (10), Dinedor (7), Eastnor (4), Brockhampton (5).

MARASMIUS SCORODONIUS *Fr.*
Near Hereford (7).

VAILLANTII *Fr.*
Woods West Malvern (4).

CAUTICINALIS (*With.*) *Fr.*
Merryhill Common (7), Mynde Park (1).

COHÆRENS (*A. & S.*) *Fr.*
Downton (10).

*SCLEROTIPES *Bres.*
Belmont (7).

* On the authority of Dr. M. C. Cooke, see Trans. Brit. Myc. Socy., ii., 14—C. R.

MARASMIUS EPICHLOE *Fr.*
Near Hereford (7).

POLYADELPHUS *Lasch.*
Dinmore (8).

LENZITES HETEROMORPHA *Fr.*
On an old post, apparently of Fir, Sufton Court* (3).

Polyporaceæ.

BOLETUS BOVINUS *Linn.*
Brockhampton (5)

STRIÆPES *Secr.*
Shobdon Court (10).

PURPURASCENS *Rost.*
Dinmore (8).

CANDICANS *Fr.*
Whitcliffe (10).

EDULIS *Bull.* VAR. LÆVIPES *Mass.*
Stoke Edith (3), Brockhampton (5).

FRAGRANS *Vitt.*
Near Garnstone Park (8).

IMPOLITUS *Fr.*
Brockhampton (5).

CASTANEUS *Bull.*
Haywood Forest (7), Brockhampton (5).

POLYPORUS RUFESCENS *Fr.*
Orchard near Ledbury (4), Brockhampton (5).

CUTICULARIS *Fr.*
Holme Lacy (2).

MOLLIS *Fr.*
Dinmore (8).

RUTILANS *Fr.*
Whitfield (13).

LACTEUS *Fr.*
Eastnor (4).

POLYSTICTUS ABIETINUS *Fr.*
Eastnor (4).

FOMES CONNATUS *Fr.*
Holme Lacy (2), Brockhampton (5).

NIGRICANS *Fr.*
Near Ludlow (10).

FERRUGINOSUS (*Fr.*) *Mass.*
Holme Lacy (2), Eastnor (4), Brockhampton (5).

PORIA MEDULLA-PANIS *Fr.*
Dinmore (8), Eastnor (4).

* See Grevillea, viii. 6.

PORIA HIBERNICA *B. & Br.*
Near Colwall (4), Brockhampton(5).

RETICULATA *Fr.*
On putrid wood, Hereford (7).

VIOLACEA *Fr.*
Dr. Bull's list, 1873.

TRAMETES GIBBOSA *Fr.*
Dinmore (8).

SUAVEOLENS *Fr.*
Holme Lacy (2), Stiffords Bridge (4), near Ludlow (10).

SERPENS *Fr.*
Brockhampton (5).

Hydnaceæ.

HYDNUM REPADUM *Linn.* VAR. RUFESCENS *Pers.*
Brockhampton (5), Haywood Forest (7), Whitcliffe (10).

UDUM *Fr.*
Mynde Park (1).

NIVEUM *Pers.*
Near Colwall (4). Brockhampton (5).

FARINACEUM *Pers.*
Eastnor (4), Stoke Edith (3), Whitcliffe (10).

IRPEX OBLIQUUS *Fr.*
Stoke Edith (3), Eastnor (4), Brockhampton (5), Whitcliffe (10).

GRANDINIA OCELLATA *Fr.*
Downton (10).

CRUSTOSA *Fr.*
Brockhampton (5), Eastnor (4).

Thelephoraceæ.

CRATERELLUS SINUOSUS *Fr.*
Rotherwas (7).

STEREUM OCHROLEUCUM *Fr.*
Ledbury (4), Stoke Edith (3), Near Colwall (4).

VORTICOSUM *Fr.*
Near Colwall (4), Near Kington (11).

CORTICIUM CALCEUM *Fr.*
Stiffords Bridge (5), near Ledbury (4), The Ridgeway (4).

LACTEUM *Fr.*
Near Colwall (4), Eastnor (4), Brockhampton (5).

NUDUM *Fr.*
Eastnor (4), Brockhampton (5).

SAMBUCI *Fr.*
Holme Lacy (2), Dinedor (7), Dinmore (8), Eastnor (4), Brockhampton (5).

*EPIPHYLLUM *Pers.*
Downton (10).

* Trans. Woollhope Club, 1889, p. 381; and 1890, p. 105.

HYMENOCHÆTE TABACINA (*Fr.*) *Lev.*
Holme Lacy (2), near Colwall (4), Brockhampton (5), Whitcliffe (10).

PENIOPHORA GIGANTEA (*Berk.*) *Mass.*
Eastnor (4), Brockhampton (5).

ROSEA (*Pers.*) *Mass.*
Colwall (4).

OCHRACEA (*Fr.*) *Mass.*
Colwall (4), Whitbourne (5).

PUBERA (*Fr.*) *Mass.*
Hereford (7).

CYPHELLA GALEATA *Fr.*
Moccas (13), Sufton Court (3).

THELEPHORA CLAVULARIS *Fr.*
Dinmore (8).

Clavariaceæ.

CLAVARIA MUSCOIDES *Linn.*
Near Belmont (7), Holme Lacy (2), Eastnor (4), Brockhampton (5).

SUBTILIS *Pers.*
Dinmore * (8).

FORMOSA *Pers.*
Stoke Edith (3).

STRICTA *Pers.*
Rotherwas (7).

RUFA *Fl. Dan.*
Holme Lacy Park (2), Dinmore (8), Garnstone Park (8), Moccas (13).

DISSIPABILIS *Britz.*
Haywood Forest (7), Holme Lacy (2), Eastnor (4).

LUTEO-ALBA *Rea.*
Brockhampton † (5).

ARGILLACEA *Fr.*
Dowards (2).

MICHELII *Rea.*
Dinmore‡ (8).

FUMOSA *Pers.*
Dinmore (8).

PISTILLARIA TENUIPES (*B. & Br.*) *Mass.*
Eastnor (4),

TYPHULA ERYTHROPUS *Fr.*
Brockhampton (5), Belmont (7), Dinmore (8).

PHACORRHIZA *Fr.*
Near Backbury Camp (3).

* See Trans. Brit. Myc. Soc. ii., 39.
† See Trans. Brit. Myc. Soc.. ii., 66.
‡ See Trans. Brit. Myc. Soc. ii., 39.

Tremellaceæ.

HIRNEOLA AURICULA-JUDÆ *Berk.*
Near Colwall (4), Brockhampton (5).

TREMELLA TUBERCULARIA *Berk.*
Dinmore (8), Brockhampton (5), Whitcliffe (10).

NÆMATELIA VIRESCENS *Cda.*
Eastnor Park (4).

CALOCERA STRICTA *Fr.*
Dinmore (8), Eastnor (4), Brockhampton (5).

GASTEROMYCETÆ.

Lycoperdaceæ.

LYCOPERDON HOYLEI *Berk.*
Stoke Edith (3), West Malvern Woods (4).

EXCIPULIFORME *Scop.*
Holme Lacy Park (2), Stoke Edith (3), Eastnor (4), Brockhampton (5).

SACCATUM *Vahl.*
Colwall (4), Bringsty Common (5).

CÆLATUM *Bull.*
Pontrilas (1), Eastnor (4), Stoke Edith (3), Brockhampton (5).

BOVISTA *Linn.*
Near Hereford (7), Whitbourne Hall (5), Sufton (3), near Woolhope (3).

BOVISTA PLUMBEA *Pers.*
Whitcliffe (10), Pontrilas (1), Stoke Edith (3), Holme Lacy (2), Eastnor (4), Brockhampton (5).

NIGRESCENS *Pers.*
Ludlow (10), Cowleigh Park (4), Holme Lacy (2), Eastnor (4), Brockhampton (5).

GEASTER BRYANTII *Berk.*
Haywood Forest (7).

FORNICATUS (*Huds.*) *Fr.*
Cubberley, near Ross (2).

RUFESCENS *Pers.*
Dinmore (8).

UREDINACEÆ.

UROMYCES DACTYLIDIS *Otth.*
Whitfield (13). On *Dactylis.*

SCILLARUM (*Grev.*) *Wint.*
Croft Wood (4). On *Scilla festalis.*

PUCCINIA GALII (*Pers.*) *Wint.*
Whitchurch (2). On *Galium.*

PIMPINELLÆ (*Strauss.*) *Wint.*
Near Storridge Church (4), Brockhill (4). On *Heracleum.*

MENTHÆ *Pers.*
West Malvern (4). Common. On *Mentha.*

PUCCINIA PHALARIDIS *Plow.*
Beyond Purlieu Lane (4), near Leominster (9). On *Arum* and *Phalaris.*

RUBIGO-VERA (*DC.*) *Wint.*
Stoke Edith (3), near Colwall (4). On *Bromus* and *Triticum.*

POARUM *Nielsen.*
Canal Bank, Hereford (7), Vinesend (4), Eastnor (4). On *Tussilago* and *Poa.*

CARICIS (*Schum.*) *Wint.*
Near Hereford (7), Holme Lacy (2). On *Carex riparia.*

SUAVEOLENS (*Pers.*) *Wint.*
Colwall (4), Eastnor (4), near Bromyard (5). On Thistles.

BULLATA (*Pers.*) *Schrot.*
Pontrilas (1). On *Silaus.*

POLYGONI *Pers.*
Breinton (7), Dinmore (8). On *Polygonum amphibium.*

IRIDIS (*DC.*) *Wint.*
Breinton (7). On *Iris.*

GLUMARUM (*Schum.*)
Near Colwall (4), Stoke Edith (3), On Wheat.

CHRYSANTHEMI *Roze.*
Ledbury (4), Eastnor (4), Hereford (7). On *Chrysanthemum Sinense.*

BETONICÆ (*A. & S.*) *Wint.*
West Malvern (4). On *Stachys Betonica.*

FUSCA (*Relhan*) *Wint.*
West Malvern (4). On *Anemone nemorosa.*

ARENARIÆ (*Schum.*) *Wint.*
Hereford (7). On *Arenaria trinervis,*

MALVACEARUM *Mont.*
Ledbury (4), Colwall (4), Bromyard (5). On *Malva.*

VERONICARUM *DC.*
Lyonshall Wood (12). On *Veronica.*

GLECHOMATIS *DC.*
Downton. (10). On *Nepeta Glechoma.*

ANNULARIS (*Strauss.*) *Wint.*
Downton (16). On *Teucrium Scorodonia.*

TRIPHRAGMIUM ULMARIÆ (*Schum.*) *Wint.*
Eastnor (4), Brockhampton (5). On *Spiræa ulmaria.*

PHRAGMIDIUM POTENTILLÆ (*Pers.*) *Schrot.*
Pontrilas (1). On *Potentilla.*

VIOLACEUM (*Schultz.*) *Schrot.*
The Ridgeway (4), Brockhampton (5). On *Rubus fruticosus.*

RUBI (*Pers.*) *Schrot.*
Dinedor (7), Stoke Edith (3). On *Rubus fruticosus.*

PHRAGMIDIUM SUBCORTICATUM (*Schrank.*) *Schrot.*
Stoke Edith (3), The Gullet (4), Croft Wood (4). On *Rosa canina.*

ENDOPHYLLUM EUPHORBIÆ (*DC.*), *Wint.*
Croft Wood (4), the Ridgeway (4). On *Euphorbia Amygdaloides.*

LEUCOSPERMUM (*DC.*) *Sopp.*
Whitmans' Hill Wood (4). On *Anemone nemorosa.*

MELAMPSORA HELIOSCOPIÆ (*Pers.*) *Wint.*
Colwall (4). On *Euphorbia helioscopia.*

LINI (*Pers.*) *Wint.*
Stoke Edith (3). On *Linum catharticum.*

FARINOSA (*Pers.*) *Schrot.*
Dinmore (8). On *Salix Capræa.*

ÆCIDIOIDES (*DC.*) *Schrot.*
Dinmore Hill (8). On *Populus.*

ROSTRUPII *Wagner.*
Croft Wood (4), The Ridgeway (4). On *Mercurialis perennis.*

HYPERICORUM (*DC.*) *Wint.*
Dinmore (8). On *Hypericum.*

CIRCÆÆ (*Schum.*) *Wint.*
Dinmore (8). On *Circæa.*

VACCINIORUM (*Link.*) *Schrot.*
Lyonshall Wood (12). On *Vaccinium myrtillus.*

MELAMPSORIDIUM BETULINUM (*Pers.*) *Kleb.*
Eastnor (4), Brockhampton (5). On *Betula alba.*

COLEOSPORIUM SENECIONIS (*Pers.*) *Wint.*
Eastnor (4), Brockhampton (5). On *Senecio.*

CAMPANULÆ (*Pers.*) *Wint.*
Colwall (4). On *Campanula rotundifolia.*

UREDO MULLERI *Schrot.*
Dinmore (8), Holme Lacy (2), Croft Wood (4), Brockhampton. On *Rubus fruticosus.*

MILESIA SCOLOPENDRI (*Fckl.*) *B. White.*
Ledbury (4). On *Scolopendrium.*

USTILAGINACEÆ.

USTILAGO HYPODYTES (*Schlecht.*) *Fr.*
Croft Wood (4). On *Triticum.*

SEGETUM (*Bull.*) *Wint.*
Common. On *Avena sativa.*

TILLETIA STRIÆFORMIS (*Westd.*) *Schrot.*
Ross (2). On *Dactylis.*

UROCYSTIS ANEMONES (*Pers.*) *Schrot.*
Ross (2), Whitfield (13). On Wood Anemone and *Ranunculus.*

VIOLÆ (*Sow.*) *Schrot.*
Croft Wood. On *Viola odorata.*

ASCOMYCETÆ.

PYRENOMYCETÆ.

Perisporiaceæ.

EUROTIUM HERBARIORUM (*Wigg.*) *Link.*
Eastnor (4), Brockhampton (5). On *Campanula.*

PENICILLIUM CRUSTACEUM (*Linn.*) *Fr.*
Hereford (7).

Hypocreaceæ.

GIBBERELLA CYANOGENA (*Desm.*) *Sacc.*
Stoke Edith (3). On rotten cabbage stalks.

NECTRIA COCCINEA (*Pers.*) *Fr.*
Holme Lacy (2), Brockhampton (5).

INAURATA *B. & Br.*
West Malvern (4).

HYPOMYCES CHRYSOSPERMUS *Tul.*
Croft Wood (4), Stoke Edith (3), Eastnor (4), Brockhampton (5). On *Boleti.*

ASTEROPHORUS (*Tul.*)
Rotherwas (7), Haywood Forest (7), Dinmore* (8).

ROSELLUS (*A. & S.*) *Tul.*
Dinmore (8), Downton (10).

AURANTIUS (*Pers.*) *Tul.*
Eastnor (4). On *Polyporus squamosus.*

LUTEOVIRENS *Fr.*
Merryhill Common (7). On *Lactarius deliciosus.*

POLYSTIGMA RUBRUM (*Pers.*) *DC.*
Colwall (4), Brockhampton (5).

Sphæriaceæ.

TRICHOSPHÆRIA BARBULA. (*B. & Br.*) *Wint.*
Holme Lacy (2). On Pine bark.

LEPTOSPORA CANESCENS (*Pers.*) *Wint.*
Eastnor (4). On dead stump.

ROSELLINIA MAMMIFORMIS (*Pers.*) *Wint.*
Whitfield (13).

CLAVARIÆ (*Tul.*) *Wint.*
Rotherwas (7), Eastnor (4), Croft Wood (4), Brockhampton (5). On *Clavariæ.*

CERATOSTOMELLA CIRRHOSA (*Pers.*) *Sacc.*
Holme Lacy (2). On dead wood.

TREMATOSPHÆRIA MASTOIDEA (*Fr.*) *Wint.*
Dinmore (8). On Honeysuckle.

DIAPORTHE INQUILINA (*Wallr.*) *Nke.*
Downton (10). On *Umbelliferæ.*

* According to Brefield, this is only the conidial condition of Nyctalis asterophora. *Fr.*

LEUCOSTOMA PERSOONII *Nke.*
Dinmore (8). On branches.

DIATRYPE DISCIFORMIS (*Hoffm.*) *Fr.*
Eastnor (4), Whitfield (13). On dead branches.

HYPOXYLON SERPENS (*Pers.*) *Fr.*
Whitfield (13), Moccas Park (13). On dead wood.

PORONIA PUNCTATA (*Linn.*) *Fr.*
Brockhampton (5), Lyonshall (12). On horse dung and decaying corduroy breeches.

Dothideaceæ.

PHYLLACHORA ANGELICÆ (*Fr.*) *Fckl.*
Dinmore (8).

DOTHIDELLA BETULINA (*Fr.*) *Sacc.*
Common. On Birch leaves.

RHYTISMA PUNCTATUM (*Pers.*) *Fr.*
Eastnor (4), Whitchurch (2). On living Sycamore leaves.

ELAPHOMYCETACEÆ.

ELAPHOMYCES GRANULATUS *Fr.*
Brockhampton (5).

CENOCOCCACEÆ.

CENOCOCCUM GEOPHILUM *Fr.*
Downton (10).

TUBERACEÆ.

TUBER ÆSTIVUM *Vitt.*
Holme Lacy (2).

PUBERULUM *B. & Br.*
Whitfield (13).

BALSAMIA ? sp.
Sufton Court * (3).

HYSTERIACEÆ.

HYSTERIUM PULICARE *Pers.*
Whitfield (13), Eastnor (4), Brockhampton (5). On Oak and Birch.

ANGUSTATUM *A. & S.*
Whitfield (13). On Rose.

HYSTEROGRAPHIUM ROUSSELII (*de Not.*) *Sacc.*
Belmont (7). On dead wood.

DICHÆNA QUERCINA (*Pers.*) *Fr.*
Eastnor (4), Dinmore (8). On living Oak bark.

FAGINEA (*Fr.*)
Brockhampton (5). On Beech bark.

* See *Transactions* Woolhope Club, 1878, p. 113

DISCOMYCETÆ.

Helvellaceæ.

GEOGLGOSSUM VISCOSUM *Pers.*
Belmont (7).

MITRULA CUCULLATA (*Batsch*) *Fr.*
Brockhampton (5).

LEOTIA ACICULARIS *Pers.*
Near Colwall (4), Brockhampton (5). On dead stumps.

Pezizaceæ.

ACETABULA VULGARIS *Fckl.*
Whitfield (13), Eastnor (4).

GEOPYXIS COCCINEA (*Scop.*) *Mass.*
Cradley (4).

PEZIZA VESICULOSA *Bull.*
Eastnor (4).

OCHRACEA *Boud.*
Ewyas Harold (13), Under a slab of wood in Mr. Simkins garden.

HUMARIA RUTILANS (*Fr.*) *Sacc.*
Near Colwall (4).

OLLARIS (*Fr.*) *Sacc.*
Sufton Court (3).

SUBHIRSUTA (*Schum.*) *Mass.*
Near Hereford (7), Whitfield (13).

LACHNEA LIVIDA (*Schum.*) *Phil.*
Whitfield (13).

NEOTTIELLA POLYTRICHI (*Schum.*) *Mass.*
Whitcliffe (10).

SPHÆROSPORA PHILLIPSII *Mass.*
Near Hereford (7), Dinmore (8).

DASYSCYPHA NIVEA (*Fr.*) *Sacc.*
Common. On dead wood, &c.

HYALINA (*Pers.*) *Mass.*
Belmont (7). On dead sticks.

TAPESIA FUSCA (*Pers.*) *Fckl.*
Hereford (7).

VAR. ROSEA (*Pers.*) *Mass.*
Whitfield (13).

SCLEROTINIA TUBEROSA (*Bull.*) *Fckl.*
Stoke Edith (3). On rhizomes of *Anemone nemorosa.*

HELOTIUM ALBIDUM (*Rob.*) *Pat.* VAR. AESCULI *Phil.*
Shobdon Court (10). On petioles of Horse Chestnut.

MOLLISIA CHRYSOSTIGMA (*Fr.*)
Shobdon (10). On stems of *Pteris.*

ATRATA (*Pers.*) *Karst.*
Hereford (7).

MOLLISIA FILICUM *Phil.*
Shobdon (10). On dead stems of *Lastraea Filix-mas.*

PSEUDOPEZIZA TRIFOLII (*Bernh.*) *Fckl.*
On living clover leaves.

Ascobolaceæ.

RYPAROBIUS SEXDECEMSPORUS (*Crouan*) *Sacc.*
Herefordshire.

ARGENTEUS (*B. & Br.*)
Near Hereford (7). On rabbit dung.

ASCOPHANUS CARNEUS (*Pers.*) *Boud.*
Sufton Court (3). On rotton rag.

ASCOBOLUS FURFURACEUS (*Pers.*)
Eastnor Park (4), Brockhampton (5). On cow dung.

CUBONIA BOUDIERI (*Renny.*) *Sacc.*
Near Hereford (7). On rabbit dung.

Bulgariaceæ.

OMBROPHILA CLAVA (*A. & S.*) *Cke.*
Eastnor (4), Holme Lacy (2). On dead wood.

ORBILIA LEUCOSTIGMA *Fr.*
Holme Lacy (2). On dead wood.

CALLORIA FUSARIOIDES (*Berk.*) *Fr.*
Near Colwall (4). On dead Nettle stems.

Dermateaceæ.

CENANGIUM FURFURACEUM (*Roth.*) *de Not.*
Eastnor (4). On Alder.

DRYINUM (*Cke.*) *Mass.*
Near Hereford (7). On Oak bark.

SCLERODERRIS RUBI (*Lib.*) *Mass.*
Belmont (7). On Rose stems.

Patellariaceæ.

PATELLARIA MAURA *Phil. & Plow.*
Dinmore (8). On dead wood.

KARSCHIA LIGNYOTA (*Fr.*) *Sacc.*
Holme Lacy (2). On dead wood.

Phacidiaceæ.

PHACDIUM MULTIVALVE *Kze. & Schmidt.*
Eastnor (4). On leaves of Holly.

TROCHILA ILICIS (*Fr.*) *Crouan.*
Stoke Edith (3), Eastnor (4). On dead Holly leaves.]

SCHIZOXYLON BERKELEYANUM (*Dur. & Lev.*) *Fckl.*
Dinmore (8). On *Pteris.*

EXOASCACEÆ.

EXOASCUS PRUNI (*B. & Br.*) *Fckl.*
Stoke Edith (3), near Colwall (4).

PHYCOMYCETÆ.

Mucoraceæ.

PILOBOLUS CRYSTALLINUS *Tode.*
Eastnor (4). On Cow dung.

PILAIRA ANOMALA *Schrot.*
Near Colwall (4). On horse dung.

MUCOR MUCEDO (*Linn.*)
Hereford (7), Brockhampton (5). On putrid rubbish.

SPINELLUS FUSIGER *Van Tiegh.*
Eastnor (4), Brockhampton (5). On decaying Agarics.

SPORODINIA ASPERGILLUS *Schrot.*
Eastnor (4), Stoke Edith (3). On decaying Agarics.

Peronsporaceæ.

PHYTOPHTHORA INFESTANS *De Bary.*
Near Colwall (4), On Potato.

PLASMOPARA PYGMÆA *Schrot.*
Whitfield (13).

PERONOSPORA PARASITICA *De Bary.*
Near Colwall (4). On *Nasturtium.*

Saprolegniaceæ.

PYTHIUM DE BARYANUM *Hesse.*
Hereford (7). On Cress seedlings.

EMPUSA MUSCÆ *Cohn.*
Hereford (7), Stoke Edith (3). On House-flies, &c.

Chytridiaceæ.

SYNCHYTRIUM TARAXACI *De Bary.*
Whitfield (13). On Dandelion.

DEUTEROMYCETÆ.

Melanconiaceæ.

PESTALOZZIA GUEPINI *Desm.*
Whitfield (13). On *Camellia* leaves.

HYPHOMYCETÆ.

Mucedinaceæ.

MONILIA CANDICANS *Sacc.*
Belmont (7).

CEPHALOSPORIUM ACREMONIUM *Cda.*
Belmont (7).

OVULARIA LACTEA (*Desm.*) *Mass.*
Near Hereford (7). On Violet leaves.

Dematiaceæ.

TORULA MONILIOIDES *Cda.*
Eastnor (4), Brockhampton (5). On stumps.

ANTENNATA *Pers.*
Dinmore (8). On rotten wood.

PERICONIA PYCNOSPORA *Fres.*
Belmont (7).

FUSICLADIUM PYRINUM *Lib.*
Hereford (7), Holme Lacy (2). On Pears.

CLADOSPORIUM FULVUM *Cke.*
Hereford, Eastnor (4). On Tomato leaves.

HELMINTHOSPORIUM ROUSSELIANUM *Mont.*
Belmont (7). On dead stick.

Stilbaceæ.

STYSANUS FIMETARIUS *Karst.*
Belmont (7). On decaying vegetation.

Tuberculariaceæ.

HYMENULA PLATANI *Lev.*
Holme Lacy (2). On leaves of *Platanus.*

MYXOMYCETÆ.

ENDOSPOREÆ.

Physaraceæ.

PHYSARUM NUTANS *Pers.*
Haywood Forest (7), Dinmore (8), Eastnor (4), Brockhampton (5).

PHYSARUM BIVALVE *Pers.*
Hereford Foray British Mycological Society, 1902.

CHONDRIODERMA SPUMARIOIDES *Rost.*
Hereford Foray British Mycological Society, 1902.

Stemonitaceæ.

COMATRICHA OBTUSATA *Preuss.*
Dinmore (8), Eastnor (4).

ECHINOSTELIUM MINUTUM *De Barry.*
Hereford Foray British Mycological Society, 1902.*

Tubulinaceæ.

TUBULINA FRAGIFORMIS *Pers.*
Brockhampton (5).

Reticulariaceæ.

DICTYDIÆTHALIUM PLUMBEUM *Rost.*
Belmont (7).

RETICULARIA LYCOPERDON (*Bull.*)
Dinmore (8), Holme Lacy (2), Eastnor (4), Colwall (4), Whitfield (13).

Trichiaceæ.

TRICHIA PERSIMILIS *Karst.*
Hereford (7), Eastnor (4), Brockhampton (5).

BOTRYTIS *Pers.*
Whitfield (13).

HEMITRICHIA RUBIFORMIS *Lister.*
The Ridgeway (4).

* This was the first record for Britain. See Trans. Brit. Myc. Soc., vol. ii., 54.

Woolhope Naturalists' Field Club.

Spring Annual Meeting, April 27th, 1905.

The Spring Annual Meeting of this Club was held in the Woolhope Club Room, Free Library, Hereford, on April 27th, 1905. Present—Mr. Thomas Hutchinson (president), Mr. Philip Baylis (president-elect for 1905), Mr. H. C. Beddoe, Mr. C. P. Bird, Mr. Robert Clarke, Mr. J. Cockcroft, Mr. James Davies, Rev. H. E. Grindley, Rev. E. J. Holloway, Prebendary M. Hopton, Mr. F. S. Hovil (Grafton), Rev. Augustin Ley, Mr. H. Cecil Moore (hon. sec), Rev. H. B. D. Marshall, Rev. W. E. T. Morgan, Dr. Scudamore Powell, Mr. John Probert, Mr. J. B. Pilley, Dr. G. R. Sinclair, and Mr. J. P. Sugden.

Mr. BEDDOE (as treasurer) was heartily applauded on rising to present his balance sheet, a sign of great pleasure on recovery from his recent serious illness. The general financial statement was as follows :—Receipts—To balance in hand brought forward from last account, £88 3s. 10d. ; entrance fees received, £7 ; subscriptions for 1904, £101 ; arrears of subscriptions received for 1903, £1 10s. ; excess of subscriptions, 6d. ; total, £197 14s. 4d. Expenditure—Subscription to Congress, £1 ; Messrs. Jakeman and Carver for printing, £1 19s. ; miscellaneous expenses—editorial, volumes, prints, field meetings, &c., £8 4s. 3d. ; Mr. J. B. Pilley's salary, £10 ; ditto for sundry expenses and postages, £5 5s. ; Messrs. Jakeman and Carver for printing reports, £17 3s. ; Mr. Joseph Jones for stationery, £1 11s. 8d. ; in hands of assistant secretary, 10s. ; balance in hands of treasurer, £139 1s. 5d. ; total £197 14s. 4d.

Mr. PILLEY (assistant secretary) read the annual report as follows :—

The report for the past year is not from a financial point of view quite so favourable as those of the past two or three years. The wave of depression which passed over the kingdom in 1904 appears to have made itself felt on the finances of the Club. In other respects there appears to be no falling off. The number of members on the books is 239, including 12 who were elected during the year, showing a decrease of seven. Several having left the county in 1903 will account for this. The income for the past year amounts to £109 10s., against £124 in 1903, an unusual number of members having omitted to pay their subscriptions. It is with

regret it is requisite to mention that the arrears list is large. The previous year a considerable decrease was announced, the amount having fallen to £4. During the past year it has increased to £15 10s. The issue of a new volume of *Transactions* will doubtless act as an incentive to considerably reduce the amount outstanding. There were seven resignations during the year, and we have to mourn the loss of four members by death. The obituary list includes the Rev. Preb. G. E. Ashley, who had been a member for 21 years, having been elected in 1884; Mr. J. P. Brown, who was elected in 1894, and read at the meeting at Symonds Yat in June, 1899, a most interesting paper on the Forest of Dean, on the borders of which he had lived for 50 years; Mr. E. W. Colt, one of the oldest members, having been elected so far back as 1872, and who contributed a paper on the Bacton chalice and paten, which appeared with illustrations in *Transactions* for 1888. The list closes with the name of Mr. J. Basil Masefield, a constant attendant at the field meetings. Owing to the favourable weather and the interesting localities selected for the field meetings, the attendances were very large. The number present at the May meeting at Eardisley was 51, and the June one at Crasswall 56. The meeting at Tintern Abbey (the ladies' day) was very numerously attended, and several members not having previously sent in their names, it was impossible to obtain the exact number present; it probably exceeded 120. The August meeting at Wyre Forest was not well supported, 34 only having been present. The total for the season exceeded 270, which is considerably more than the average.

The Hon. Secretary said that the new volume was one of the best they had ever had, and he was glad they had such a good balance in hand.

The President said before that meeting the committee had met and discussed places that were desirable for holding field meetings during the coming year. Mr. Baylis, the new president, had named the Forest of Dean, and had two routes in his mind, which he would explain later on. It was also suggested that they should visit Holme Lacy, provided they could obtain sanction from Lord Chesterfield. From Holme Lacy it was suggested they should go and see an interesting old pear tree down by the church, look over the church also, and then proceed by the fields to Fownhope, cross the river by the ferry, and look over Caplar Camp, Fawley Court, a quaint old residence, and return to Hereford from Fawley station. Mr. Brindley suggested Bredwardine as another place to be visited, whilst for ladies' day Symonds Yat was favoured. Another place was the Great Skyrrid, and then on to Llanvihangel Court, at the kind invitation of Mrs. Attwood-Mathews, afterwards proceeding to see an interesting old house at Alterynnis, near Pandy.

The following field meetings were fixed to take place :—Tuesday, May 30th, Bredwardine and Arthur's Stone; Tuesday, June 27th, The Great Skyrrid and Llanvihangel; Thursday, July 27th (ladies' day), Symonds Yat; Thursday, August 31st, Forest of Dean.

New members were elected as follows :—Mr. R. S. Ashton, Ross (proposed by Mr. H. Southall, seconded by Mr. C. Rootes); Mr. H. Percy Bulmer, Breinton (proposed by Mr. W. J. Humfrys, seconded by Mr. J. Carless); Rev. Canon Capes, Hereford (proposed by the Dean, seconded by Mr. James Davies); Mr. R. G. Gurney, Ledbury (proposed by Dr. Herbert Jones, seconded by Rev. H. B. D. Marshall); Mr. John Jones, Ross (proposed by Mr. T. Hutchinson, seconded by the Rev. A. W. McLaughlin); Mr. F. Littledale, Clehonger (proposed by the Rev. E. J. Holloway, seconded by Mr. H. C. Moore); and the Rev. E. A. C. Weedon, Canon Froome (proposed by Mr. J. P. Sugden, seconded by the Rev. H. B. D. Marshall).

The following candidates were nominated for ballot as members: The Rev. Walter Butt, Kempsford Vicarage, Fairford (proposed by Mr. H. C. Moore, seconded by the Rev. H. E. Grindley); the Rev. George Whitehouse, St. Weonard's Vicarage, Ross (proposed by Mr. T. Hutchinson, seconded by Mr. H. C. Moore); Mr. Grimké-Drayton, Clifford Manor, Newent (proposed by Mr. Baylis, seconded by Mr. H. C. Moore); and the Rev. A. S. Walpole, Dyndor Rectory, Hereford (proposed by the Rev. H. E. Grindley, seconded by the Rev. E. J. Holloway).

The Hon. Secretary stated that he had received a postcard from Mr. C. J. Lilwall to the effect that excavations had been recommenced at Crasswall Priory, fencing erected around the excavations, and a shed put up for the preservation of some of the best stones (hear, hear).

The Rev. H. E. Grindley remarked that the Cotswold Field Club intended to visit Hereford district on September 5th.

The Retiring President, who thanked the Club most heartily for the generous support given to him during his year of office, then delivered his address before resigning the chair in favour of Mr. Baylis. He said: Gentlemen,—It has now become my pleasing duty, before handing over this chair to Mr. Philip Baylis, your president-elect for the coming year, to thank you all most heartily for the generous support you have given me during my year of office as your President. By Rule 8 it is provided that the retiring President shall deliver at the annual meeting an address 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. Owing to the assistance we now receive from the gentlemen of the local Press who attend our meetings, and whom we welcome, and whose assistance I beg to cordially acknowledge, it appears to me that the object for which this rule was framed, namely, to keep a record of the meetings during the year, has now ceased to exist, for, owing to the assistance we get from the Press, and to the energy of our Secretary, Mr. Moore, a full and accurate account of each meeting appears in the local papers within a week or two after the meeting has taken place, and subsequently in the *Transactions* of the Club. In order, therefore, to comply with the rule, I will merely refer incidentally to each of the meetings and then pass on to some other matter. The Assistant Secretary has told us that the aggregate number of members who have attended the meetings throughout the year has been a record, and I think this goes a long way to prove that the meetings were well chosen and looked forward to with interest, and I feel sure that no one who attended them was disappointed. Our first meeting at Lyonshall was in every way successful, and it must have opened the eyes of many members to what considerable and well defined remains of Offa's Dyke still exist in the county, and the great interest attaching to them. The success of our second field meeting at Crasswall Priory, which I think was one of the most enjoyable I ever attended, was entirely due to the enterprise of our friend, Mr. Lilwall. It was indeed a surprise packet, for no one could have had any idea of the interesting disclosures we were to see when we arrived at the Priory, and the thanks of the Club are due to him and Mrs. Lilwall for this most enjoyable day. The excavations have, I understand, been extended, and I shall be glad to know what steps have been taken towards their protection and preservation. The Tintern meeting (Ladies' Day) was another great success, when your incoming President so ably pointed out the discoveries that have been recently made at the Abbey, together with the other chief objects of interest in a way that proved he is not only well read in the history of the Abbey, but that his heart is in the work he has in hand, and it is a great satisfaction to know that this great historical building is under the care of one who is so well qualified to protect and preserve it from the desecration of the tripper and the vandalism of the so-called restorer. The last meeting at Wyre Forest was a pleasant day, but I regret that the leggings our Secretary advised us all to wear were not necessary. The adders they were to protect us from were *non est*. Before leaving the subject of the meetings, I must not forget to return my thanks, as well as the thanks of the whole Club, to Mr. Moore for his exertions on our behalf during the past year. There is also one other person to whom our thanks are due—the Clerk of the Weather. He gave us a pick-me-up as we left Hereford station on the occasion of our first meeting, and a bumping stirrup cup after

we had left Cleobury Mortimer station on our return home from our last meeting. These were the only occasions on which we had any rain, and if we had depended on him for our liquid refreshment, we should have come off badly. I have to congratulate the members on the large number of interesting papers that have been written for the Club *Transactions*. Where all are so good and useful, it seems invidious to single out any or mention one more than another, but I feel that the acknowledgments of the Club are especially due to Mr. James G. Wood for giving us the benefit of his researches with regard to Offa's Dyke. I have also to congratulate the members that during the past year the Herefordshire County Council have applied for and obtained an order under the Wild Birds' Protection Acts. It was owing to the initiative of the Club that the matter was taken in hand by the Council and the county relieved of the stigma of being one of the three only counties that had not obtained an order under these Acts. A copy of the order will appear in the next volume of the *Transactions*. For the enlightenment of the public as to the provisions of the order, it cannot be too often repeated what these provisions are. Shortly, they are as follows :— By the Wild Birds' Protection Act, 1880, any person who, between March 1st and August 1st, in any year, kills or snares any wild bird, or exhibits for sale after March 15th any wild bird, is liable to a penalty of £1 for every bird named in the schedule to the Act—85 in all—and for every other bird a smaller penalty. By the order that has now been obtained for the protection of wild birds in the county of Hereford, the names of 13 other birds have been added to those included in the above mentioned schedule. The order, however, provides that the house sparrow and wood pigeon shall in this county be withdrawn from protection under the Act, so these two birds may be destroyed by anybody at any time. The order also provides that 29 species of birds are protected during the entire year from being taken or killed by anyone, and it also prohibits the taking of the eggs of 46 different species. A copy of the order can always be obtained by anyone from the County Police Office at the Shirehall, Hereford, and the police have instructions to take proceedings in all cases brought to their notice of infringements of the provisions of the order. I would urge all the members of the Club who take an interest in bird life to make themselves well acquainted with the terms and provisions of the Wild Birds' Protection Acts, and of the Order that has now been obtained, and to endeavour to educate and enlist the sympathies of their friends and neighbours in carrying out the Order. It is in this direction rather than by putting in force the penal provisions of the Acts, that I look for the greatest good to arise from what has now been done. There is hardly a bird (except perhaps the sparrow and wood pigeon) that all the year round does not do far more good than harm. Take, for instance,

that much-abused bird, the bullfinch. No doubt for about one month in the course of the year, he does a certain amount of damage to fruit trees, which might be protected from his ravages in other ways than by his destruction, but during the other eleven months of the year he is doing good, for he feeds almost entirely upon the seeds of thistles, plantain, and dock, and the same remarks apply to almost every bird you can name. I trust, however, that when it comes to the knowledge of any member of the Club that such birds as the larger hawks, the bittern, hoopoe, oriol, or other rare visitants have been killed, or when birds are found destroyed by that horrible engine the poletrap, or snared by the netter, they will not fail at once to take the necessary steps to put the penal clause of the Act into force. I have also to congratulate the members on the prospect of receiving very shortly another volume of the *Transactions*, and to convey to Mr. Moore and the other Editors, the thanks of the members for the trouble and pains they have bestowed upon its production.

It will be within the recollection of the members that I endeavoured to bring before the first and second meetings last year the subject of making a collection of the epitaphs and inscriptions on the tombstones in the churchyards of the county with the view of their being published in the *Transactions*, but owing to lack of time I was prevented doing so. I accordingly decided to let the matter remain over till this meeting. I have spoken to several members of the Club on the subject, and with one exception they all approved of my proposal. The one exception was a clergyman whose opinion I value. He seemed to think that I should not get much assistance from the clergy generally, because he feared they would consider the subject was not a fitting one for mirth and laughter. Now I can assure him, and anyone else to whom this idea may occur, that nothing is further from my intention than to make a mockery of these old-time epitaphs. My feelings on the subject are more in accord with the sentiments so beautifully expressed in those two stanzas of Gray's Elegy; you probably all of you know them, but they will bear repeating—

> "Yet e'en these bones from insult to protect,
> Some frail memorial still erected nigh,
> With uncouth rhymes and shapeless sculpture deck'd,
> Implores the passing tribute of a sigh.
>
> Their name, their years, spelt by the unletter'd muse,
> The place of fame and elegy supply,
> And many a holy text around she strews,
> That teach the rustic moralist to die."

These old epitaphs, which in many ways show the manners and customs of our ancestors, are fast disappearing under the destructive influences of time and weather, and if it is the opinion of this meeting that it is desirable that a collection of the more interesting should

be made and published in the *Transactions* of the Club, I shall be very pleased to take it in hand, and when I have got together a sufficient number I will submit them to a small committee, to be then appointed, to select such as are considered of sufficient interest to appear in the *Transactions*. With these few remarks I will now take my leave, and resign the chair to Mr. Baylis, with the hope that the meetings of the coming year may be as successful and enjoyable as those of the past, and that he will be able to look back with as much pleasure and satisfaction upon them as I do on those that were held during my term of office as your President.

Referring to the paragraph in his address, Mr. HUTCHINSON asked if it was desirable in the minds of the Club that a collection of epitaphs should be made and published in the *Transactions*.

The Rev. W. E. T. MORGAN observed that it was a matter for the clergy. A collection ought to be made, without much delay, because there were many epitaphs which would soon become extinct.

The Rev. A. LEY said he had made a collection in his own parish.

A resolution was unanimously carried "That a collection of interesting epitaphs and inscriptions on tombstones of the county be made with a view to their being published in the *Transactions*."

The Rev. W. E. T. MORGAN, who seconded the resolution, said he assumed that in case a clergyman declined to make the collection a layman would be allowed to do so.

It was unanimously decided to make a collection of interesting tombstone epitaphs in the churchyards of the county.

Woolhope Naturalists' Field Club.

FIRST FIELD MEETING, TUESDAY, MAY 30TH, 1905.

THE GLACIATION OF THE WYE VALLEY.

MYSTERY OF ARTHUR'S STONE.

Both on account of fine weather and the peculiarly interesting items of the day's programme, the Woolhope Naturalists' Field Club had a most enjoyable first field meeting for 1905 on Tuesday. The assembly comprised Mr. Mortimer Baylis, Mr. C. P. Bird (Hereford), Rev. C. Black (Colwall), Mr. W. J. Boycott, Mr. F. J. Poulton, Mr. H. P. Bulmer, Mr. G. M. Brierley, (Brobury), Mr. J. C. Brierley, Mr. J. U. Caldicott, (Tupsley), Rev. C. B. Caldicott, Col. J. E. R. Campbell, Mr. R. Clarke (Hereford), Mr. Truman J. Cook, Rev. Sir George Cornewall, Rev. H. M. Evill, Rev. P. H. Fernandez, Rev. H. E. Grindley, Rev. Dr. Harris (Bullinghope), Mr. W. M. Haywood, Rev. E. J. Holloway (Clehonger), Rev. A. Horton (Dewsall), Mr. F. S. Hovil, Mr. John Lambe, Prebendary W. H. Lambert, Mr. A. M. Lamont, Rev. C. Lighton (Mordiford), Mr. F. Littledale, Mr. J. W. Lloyd (Kington), Rev. A. H. McLaughlin, Rev. H. B. D. Marshall, Mr. H. C. Moore, Rev. W. E. T. Morgan, Dr. Scudamore Powell, Mr. W. H. Steward, Rev. C. A. Treherne (Hereford), Mr. Wadworth, (Breinton), Preb. H. T. Williamson (Bredwardine), Preb. E. H. Winnington-Ingram (Ross); visitors—Rev. Rhys Bishop (Letton), Rev. — Butt (president Cotswold Club), Mr. W. E. Clarke, Mr. E. S. Cobbold, F.G.S., (Church Stretton), Mr. A. Garstone, Mr. D. D. Marshall, Mr. D. Matthews, Mr. F. S. Prosser, Mr. Edwin Sledmere, Rev. C. H. Stoker (Brinsop), Commander C. G. Treherne (Ramsgate), Mr. Wallis, jun., and others. Mr. Thomas Hutchinson, the Vice-President of the Club, joined the party later in the day.

Letton Church was the first objective, an ancient stone edifice, with nave, chancel, south transept, and tower containing three bells, situated almost within the grounds of Letton Court. This Church, which was restored in 1883 at the expense of the late Rev. Henry Blissett, who made very little alteration in its features, was inspected under the guidance of the Rector, the Rev. Rhys Bishop. A weather-beaten oak door, a worm-eaten ladder leading to the belfry, many Norman sculptured stones, and the frequent use in its

masonry of travertine, were examined with interest. This travertine is a white concretionary limestone formed by springs holding lime in solution, some of it containing moss. It appears to be a favourite building stone in the churches of this district, especially for the arches, cutting soft when new, and becoming very hard after exposure. It is formed in the woods of the district, an instance of stone actually growing.

On the way to Bredwardine Church the Club called at Quinta, the charming residence of the Messrs. Brierley, by their invitation beforehand and cordial welcoming on the way, and the company enjoyed some light refreshments there. Crossing Bredwardine Bridge over the Wye, they assembled in the Vicarage grounds, where their attention was directed by Prebendary Williamson to a number of rare trees and shrubs, amongst them a weeping oak and a weeping spruce. Mr. Williamson, eloquently pointing to the trunk of a fallen tree, said the Club in their visit to-day would miss a venerable friend. The cedar which was measured on several occasions was a thing of the past, and only the stump remained to remind one of what was once no mean representative of the *Cedrus Libani*. In the *Transactions* of 1878 there was an interesting paper on the cedar tree by the late Canon Phillott. Speaking of the group of cedars on Mount Lebanon, he said that the girth of the largest in 1836 measured 35ft. 9in. in circumference. But in an article in Chambers's *Encyclopedia* the size of the five largest trees is said to be only 30ft. But even this was considerably larger than any we have in our land. And the Canon went on to give the size of several. At Blenheim there was one of 22ft.; one at King's Acre 14ft.; one at Moccas 14ft. 7in.; one at Bredwardine 12ft. Now this was the tree of which only the stump remained, and of which he had a few words to say. On August 25th, 1891, when the Club last visited Bredwardine, the tree was duly measured, and the circumference had increased from 12ft. to 13ft. 10in., a growth of 22 inches in 13 years, which he should say was a fair progress. A writer spoke of the cedars of Libanus as being of great age—from 50 to 80 to 100 or 1,000 years. The tree cut down at Bredwardine was quite young comparatively, though so fine a specimen. How old was it? He could not say accurately, but he would tell the company what he knew about its planting. The Rev. N. D. H. Newton came to Bredwardine in 1821 as Curate, and having purchased the advowson was instituted on his own presentation as Vicar in 1829. Mr. Newton being a wealthy man, a lover of trees and flowers, spent a good deal of money in laying out these gardens and planting them with various kinds of choice trees. Among them were the cedars, a few small specimens of which he bought, bringing them home in small pots. At that time his servant was a certain Thomas Parsons,

born in 1803, whom he (Mr. Williamson) buried in 1882, when he was 79. This Thomas Parsons was the man who actually planted the tree. The Vicar had a deep hole dug. Parsons put in the pot with the precious cedar. " Now, kick the pot," said Mr. Newton. Thomas did so, and then covered the hole and roots up with soil, probably about the year 1830. The details of the planting lingered on in the memory of the old man, from whose sister he (Mr. Williamson) heard the story, which doubtless had often been told. The tree then grew and flourished, stretching out her branches far and wide, sheltering from time to time successive occupants of the Vicarage, until at last it began to show signs of decay in 1895, and finally withered and died in 1896, the same year which witnessed the death of Miss Catherine Newton, the last surviving child of the Rev. N. D. H. Newton, who in 1830 had probably planted the cedars, a somewhat singular coincidence. The tree then was some 66 to 70 years old. He left it standing until January 20th, 1898. On that day their old friend was cut down, and kindly time since then had been covering the remains with a beautiful pall of evergreen ivy. Was there any reason for its comparatively short life? He expected that it required more moisture. Situated as it was near the terrace, with its roots spreading in an artificial embankment, he expected that as time went on and it grew larger and wider, it wanted more moisture, and the first five months of 1896, which was quite the driest on record as Mr. Southall told them, completed the ruin of this fine tree. Large trenches were cut round the trunk, and gallons of water were poured in, but all to no purpose. The hand of death could not be stayed. The moral, he thought, was this—" When you plant a cedar, see that the situation is not a very dry one." The trees of Lebanon, he believed, were near the river Khadisha—and in words familiar to many of us, " How goodly are Thy tents, O Jacob, and Thy tabernacles, O Israel! As the valleys are they spread forth, as gardens by the riverside, as the trees of lignaloes which the Lord hath planted, and as cedar trees beside the waters."

Gathering on the site of Bredwardine Castle a conversation took place as to the families connected with that ancient fortress, and it was mentioned that there were two figures of knights in the parish church, supposed to represent members of the Bredwardine family, which were not identified.

In Bredwardine Church, the Vicar (Prebendary Williamson) pointed out an Early Norman tympanum, bearing figures which appear to represent roughly Egyptian gods, and he also indicated the massive font, some herring-bone masonry, &c.

At the sound of the bugle, members formed into sections at choice, archæological, botanical, and geological.

Plate 7. To face page 162.

BREDWARDINE CHURCH. CARVING, NORTH DOOR.
Photo by A. Watkins.

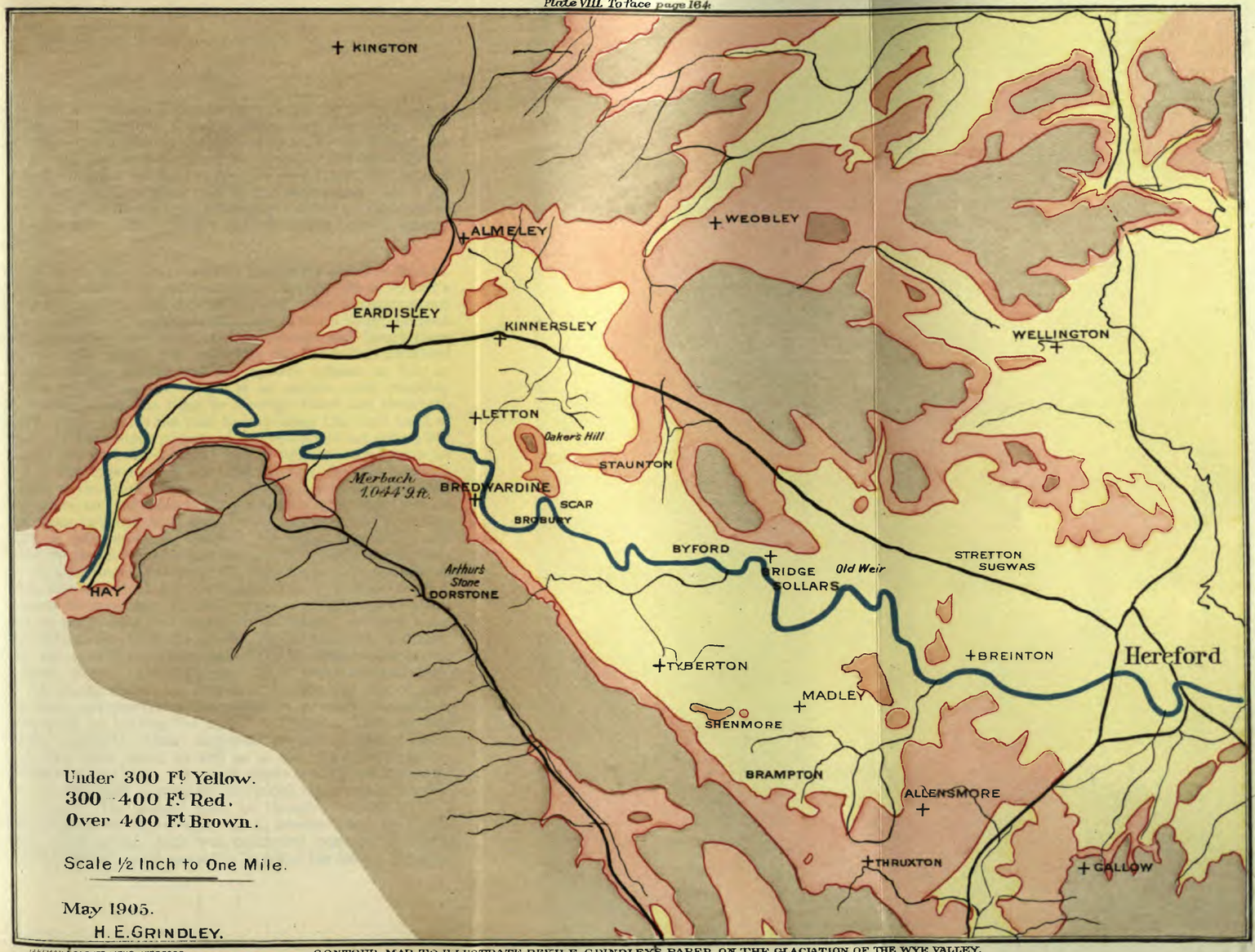
BREDWARDINE CHURCH.
SOUTH DOOR, SHOWING CARVING UNDER THE STONE LINTEL.
Photo by A. Watkins.

The Geological section, about fifteen strong, under the guidance of the Rev. H. E. Grindley, and accompanied by Mr. Cobbold, F.G.S., (Church Stretton), visited a small exposure of drift at the road junction a little above the entrance to The Quinta. Mr. Grindley explained that this was part of a sheet of drift which extended to the top of Brobury Scar, and was well seen on the westerly face of Oaker's Hill. This drift has yielded a specimen of Spongarium Edwardsi, near Brobury Church, an Upper Silurian fossil identified by Dr. Callaway. Crossing the bridge, the party viewed the drift full of boulders in the orchard on the left of the road, passed through the farmyard of Old Court, and examined the grass covered terrace of sand which borders the flat meadows by the river. This terrace is cut into by the river where it runs in an east and west direction, and in the bank are exposed in descending order :—Rough drift with small local boulders, then about 20 feet of fine sand, current bedded, followed by finely bedded red clay with thin sandy partings. The explanation of the bank of sand and clay is uncertain. It may have been deposited by a gentle stream running through an old lake or by an intraglacial river. The careful sifting of the material and the fine nature of the bedding make the former explanation the more probable. To the east of this bank, rising from the water's edge to about 10ft., was found a peculiar bed of grey clay, capped by about 3ft. to 4ft. of ordinary river alluvium, which formed the flat meadowland.

This grey clay has been since examined by Prof. Joseph Wright and found to contain marine foraminifera. (*See note below*). As to the former existence of a lake, it was pointed out by Mr. Grindley that if a contoured map be studied it will be seen that between Bredwardine and Oaker's Hill the Wye Valley is sharply contracted. At the 300ft. contour, *i.e.*, at about 100 feet above the river level, the width is less than a mile and a quarter. A similar narrow gap occurs on the other side of Oaker's Hill. These two gaps, embracing the country about Bredwardine and Brobury, and about Staunton-on-Wye, have been choked with drift brought down by a glacier from the west, and thus a dam was formed, which held up a lake extending over the flat land from below Hay to Oaker's Hill, and as far north as the neighbourhood of Almeley. At various times this dam has been broken through in different places, once probably to the north of Oaker's Hill, at another time close along its south-western slope towards the top of Brobury Scar, which was thus begun to be cut down, at another along the side of Merbach Hill, and at still another somewhere in the course of the present river channel. These different outlets would naturally be started at points where the dam was lowest, and in times of flood it is easy to imagine that one channel might not be able to carry off all the water

coming down or be stopped by accumulations, and thus a second outlet would be started over the next lowest point, and from various causes might come to be permanent. From the river cliff the party proceeded over the fields towards the Hay-road, noticing the billowy surface of the ground, so marked a feature of glacial deposits. On the high road near Weston Farm a remarkable ridge of sand was ascended, dividing two depressions, the one now occupied by the river, the other, close under Merbach, apparently an old river bed blocked across the upper end by glacial accumulations. The ridge itself suggested the kames or longitudinal banks formed by intra-glacial rivers. From the Upper Knapp the party enjoyed a splendid view over the Wye Valley down to Hereford, and attention was drawn to the peculiarly straight line which forms the south-western boundary of the valley from Merbach to Brampton, indicating that the river once flowed close at the foot of the hills by Blakemere, Tyberton, Shembre, and Brampton.

Before reaching the unenclosed land near the summit of Merbach two quarries of good contour were examined near the Woolla Farm. The southern quarry exhibited a section of massive Old Red flagstone, capped with an old soil of fragments of the underlying rock and overlaid by about 9ft. of reddish drift with rounded and scratched boulders of fine grey Welsh grits, several good specimens of which are secured. A boulder of coarse grey grit with small pebbles was also discovered, which Mr. Cobbold considered to resemble closely some rock found *in situ* in the Elan Valley near Rhayader. On a previous occasion a specimen of Rhynchonella nucula, an upper Silurian fossil, was found in a boulder of fine grey grit in this quarry, and a cast of the same species was found on this visit. The stone in the upper or northern quarry was capped with only about 4ft. of drift. No evidence of drift was found on the summit of Merbach, and from the steep slope of the last 100 feet it seemed probable that the ice had not covered the summit which had stood out as a "Nunatak" or island hill from the surrounding ice sheet. A remarkable slab of local rock was observed some way down the N.W. slope, which was so grooved and polished on one of the faces at right angles to its bedding that it appeared probable that when it was formerly *in situ* higher up the hillside it had been exposed to the grinding action of the Wye Glacier. The view from Merbach afforded an opportunity of explaining Prof. Davies's theory of River Development, which seemed to fit in well with the gaps in the Upper Silurian escarpment seen from the hill. On the way to Arthur's Stone two small boulders of some geological importance were found by Mr. Cobbold at about 900ft. The one of coarse grey grit similar to that found in the Woolla quarry earlier in the day, the other of a black slaty rock, with fossils which it is hoped to



JAKEMAN & CARVER LITHO. HEREFORD

CONTOUR MAP TO ILLUSTRATE REV. H. E. GRINDLEY'S PAPER ON THE GLACIATION OF THE WYE VALLEY.

identify. (*See note below.*) From Arthur's Stone the party made a rapid descent to Dorstone Rectory, where they joined the other contingents, being hospitably entertained to tea by the Rector, the Rev. T. P. and Mrs. Powell. Both Mr. Grindley and Mr. Cobbold were warmly thanked for their instructive elucidation of a subject which was the most important item on the programme. Mr. T. S. Aldis and Mr. H. C. Moore have previously touched on this subject in the *Transactions*. Mr. Grindley has followed it up with energy and success.

A few of the party went with Sir George Cornewall to Moccas. Other sections walked by different routes up the hill to Arthur's Stone, not forgetting to turn occasionally and view the magnificent landscape. A rest for lunch was made near Arthur's Stone, a ruined cromlech, reminding one somewhat of Stonehenge, and though there was considerable speculation regarding this so-called Druidical monument, opinions differed and the mystery remains as deep as ever. It is situated in the middle of an ancient road, probably British, leading along the ridge to Merbage Point and thence to Clock-mill, where it joins the road to Hay along the south bank of the Wye. Arthur's Stone consists of a super-incumbent slab of Old Red Sandstone, probably brought from a neighbouring quarry on the west or Dorstone slope of the ridge, or from the river which is now broken in two ways. The lower stratum has become detached from the upper, and has fallen to the ground, while the upper portion which is about two feet thick, and is estimated to be about 40 tons in weight, is split across the middle. The stone, however, is still supported by the six smaller stones upon which it was originally placed. It is surrounded at about 8ft. distance by a circle of stones of considerable size which are now mostly covered with greensward. There seems to have been an inner circle of upright stones about 4ft. high, of which only four are now to be traced. In 1872, when the Club visited this place, the late Mr. Flavell Edmunds said there certainly was a real King Arthur, who ruled the district now known as Somerset, Devon, and Cornwall. As a great national hero, Arthur was to the Briton the symbol of the glorious past of their independence, and everything remarkable or interesting seemed to be consecrated by bearing the name of Arthur. Thus we had mountains, cromlechs, stones, and other objects in distant places where Arthur never ruled, as well as in his own little kingdom, named from the hero king. Of course, where nothing was known for certain, Mr. Edmunds humorously remarked, there was a fine field for conjecture. The ground plan, he thought, seemed to be a miniature of that of Stonehenge, which, however, had no central cromlech. The circular form was conclusive evidence of British work, as the Briton's mind seemed to be full of the circle : the circle

of the heavens, the circle of the sun, the circle of the moon, the circle of the seasons, seem to have suggested the idea, which the Briton carried out in his camps, his dwellings, his temples, his burial places. Just as the Roman founded all his works on the right line and always used the square or the oblong, a square and a half. In this case Mr. Edmunds thought the cromlech was built first. Some great Silurian chief was brought thither with rude pomp and ceremony ; his body was placed on the ground, covered perhaps with a little earth ; the body of his favourite horse was laid at his feet, and the weapons by his side, and the huge " Ilech " or covering stone was brought up an inclined plane upon rollers, and so placed by the strong arms of a nation as a memorial of their lost chief to future ages. All this would be done as the old British phrase has it " in the face of the sun and in the eye of the light," and amidst a band of white-robed Druids and bards, while the armed throng formed a reverent circle around. Then, too, if we might follow some interpreters of the bards, the hollow place beneath the cromlech might be used in the initiation of neophytes. Lonely watching in the house of death has always been supposed to confer wisdom, and especially prescience, upon the watcher, who regarded it as the house of life to his spirit. Here he communed with the invisible world, and from hence he issued after his vigils (like the knight of mediæval times) pledged to a new life.

It may be added that cromlechs have been found in different parts of Europe and on the banks of the Jordan. A number of them in Wales and the country now known as Herefordshire are named Arthur's Stone. We learn from Lady Charlotte Guest's Mabinogion, or Arthurian legends, that Arthur was son of Uthyr Pendragon and grandson of Cystennyn Vendigaid, chief sovereign of the Britains and king in lineal descent of the country between the rivers Wye and Towy. In the turbulent times which followed the death of Uthyr Pendragon, the noblemen of Britain assembled to elect a successor. At length a large stone was discovered near the place of assembly in which was a sword fastened as in a sheath, and around it was an inscription in gold letters signifying that whoever drew it out was the rightful heir to the throne. Of all those who were ambitious of this dignity all made the attempt in vain. Arthur came forward and drew it out as easily as he would have drawn it out of the scabbard. This sword gave him twelve great victories over the Saxons in different parts of Britain, besides other victories. Arthur went away to die, and the site of his grave was a mystery for centuries. As the people believed he would come again, Henry II., for political purposes, pretended to have discovered his body at Glastonbury. So says the Mabinogion. But whether this cromlech is really Arthur's grave, or a

monument to his memory, or a temple for sun worship, or the worship of the god Thor, or a sacrificial altar of those or of still earlier times, or an observatory, or a boundary spot, or a place for crowning the kings, or whatever it is, as conjectured by different people, is a question remaining for solution.

Dorstone Church, the site of an ancient fortress, and the site of Snodhill Castle, were inspected by members who came that way, and Prebendary and Mrs. Powell hospitably entertained them to tea. Invitations to tea had also been extended by Messrs. Brierley, T. Dew, and others in the district.

NOTES ON THE GREY AND FINELY BEDDED RED CLAY AT BREDWARDINE.

Dr. Callaway, F.G.S., very kindly has obtained a report from Mr. Wright, of Belfast, on the specimens of these clays submitted for his examination. In his covering letter he writes : " I have received Mr. Wright's report, and enclose it, together with the mounting of forams and the fragments in No. 2 (the red clay), which appear to be all Old Red Sandstones. The occurrence of forams in No. 1 (the grey clay), is of great interest, as all forams are marine. Forams are well-known in glacial clays. Mr. Reade and others infer from them a marine submergence, while the land-icemen hold that they were shovelled up from the sea-bottom and thrust forward over the land. On the latter hypothesis the ice must have come from the Irish Sea *via* Cheshire and Shropshire ; but all your evidence shows that the movement of ice in your district was from the high ground to the west, the Radnor Forest region. I am not prepared to decide the question. . . . If the forams prove marine submergence that does not mean that the deposit containing them is marine, as the stuff may have been subsequently worked up subærially."

In a further letter Dr. Callaway writes : " There would be no difficulty in ice from the north getting to your Bredwardine area, but if it had done so, we should expect to find some evidence of it in the stones. In Shropshire there are fossiliferous glacial deposits up to 1,100ft. Either there was a marine submergence of that amount, or Irish sea deposits were pushed up by land-ice."

Mr. Wright's Report.

" I have now examined the two samples of clay and enclose a list of the microzoa found in No. 1 ; no specimens were found in

No. 2. I also enclose a mounting of what was found. . . . Considering the small amount of clay which I had to examine, the yield of forams in No. 1 was fairly good: the floatings were alone examined and were taken from the washed material which weighed only .07 oz. I enclose the few stones obtained from No. 2. The Forams are all common shallow water forms, and might be found almost everywhere in muddy places off our coast. I should say the clay is one of the latest of the Pleistocene deposits. The Foraminifera in the drift are very much smaller in size."

Belfast, June 29th, 1905.

No. 1—Weight of Clay 1.3 oz. troy, after washing .07 oz. Clay very fine, no coarse material. Foraminifera frequent.

No. 1—Miliolina subrotunda (*Montag*). Frequent.
,, 2—M. seminulum (*Linne*). Two broken specimens.
,, 3—Bolivina plicata (*d'Orb*). One specimen.
,, 4—Lagena Williamsoni (*Alesek*). Rare.
,, 5—Globigerina bulloides (*d'Orb*). One specimen.
,, 6—Truncatulina lobatula (*W. & J.*) Very rare.
,, 7—Rotalia Beccarii (*Linne*).—Very rare.
,, —Nonionina Hepressula (*W. & J.*) Very rare.
,, —Polystomilla striato-punctata (*F. & M.*) Rare.
,, 10—P. macella (*F. & M.*) One specimen.
,, 11—Ostraeads.
,, 12—Mollusca.
,, 13—Byrozoa.
,, 2—Weight of Clay 1.6 oz. troy, after washing, fine .07 oz., coarse .08. No Foraminifera.

Note on the boulder of Black Slaty Rock found near Arthur's Stone, from Dr. Callaway:—"The only distinct fossil is Dayia navicula, formerly called Rhynchonella. The slaty pieces are therefore not older than Wenlock, and are almost certainly Ludlow."

LETTON CHURCH.

By Robert Clarke.

The Church consists of a nave, chancel, south transept, and a tower on the north between chancel and nave. The nave is part of the Norman Church, the south doorway is an interesting example of Norman work, having an ornamental square-headed lintel with a semi-circular arch above, zigzag mouldings around the arch

Plate 9. To face page 169.

LETTON CHURCH, SOUTH DOOR.

Photo by A. Watkins

and jambs, and a base at the bottom. The tympanum is enriched with sunk Norman geometrical looking ornamentation.* The doorway at the west is also Norman, with a plain lintel and arch above.

Remains of herring-bone masonry are visible inside the north wall, and on the exterior of this wall, about nine feet from the ground, is a moulded projecting string course in travertine, with nail-head ornamentation; there are no windows in the north wall. A two-light Early English window is on the south side, and also a two-light Early window in the west end. The roof is plain with curved rafters. An octagonal font stands on two circular steps. The chancel is Early English, and, judging by the external masonry of the north wall, appears to have been lengthened; the two early lancet windows may have been moved eastwards, and a large two-light 15th century window inserted on the north, and a single one on the south. There is an Early English Priest's doorway in south wall.

When the plastering was removed from the walls, the earlier position of piscina was found walled up, being the same width as the somewhat later one, or may have been used as a small credence recess. In the north wall is an Early decorated cusped arched recess; no slab or effigy remains, and only dust was found in the walled grave below. The east window is of three lights, in the Early English style, with the mullions continuing straight up to the arch above, common to Herefordshire. The chancel arch is gone. The tower is separated from the nave by an Early English arch, the lower portion, judging by the position of the windows, one in the centre of east wall, and another in the north wall, nearer eastwards, may have been originally built for a transept or Chapel, and, from the appearance of the external masonry, afterwards carried up as a tower. Upon this again was formed the present wooden belfry stage.

There are three bells; two are pre-Reformation, with the following inscriptions: "Ave Maria gracia plena. Domin, deum, in the large bell. The second one: "Sancta Maria Madalena." The third: "W. E., 1744, Peace and good neighbourhood."

The South Transept is late 14th Century work; the archway from nave is gone, only the lower portion of one side of the jambs remaining, showing traces of the Early colouring.

In the east wall is an arched recess with a double course of ball flowers in the mouldings, probably the back part of the altar;

*On the door are some very early pieces of iron work, perhaps as early as the doorway itself.

remains of a coloured diaper pattern were found behind when cleaned out, during the last restoration; it was walled up before. On the right is a piscina with a ball flower ornament. In the south wall are two arched monumental recesses, one larger than the other. The arch moulds are gone, and also monumental slabs, the lower portions of jambs alone remaining. Remains of a stone seat are on the west side.

The present window in the south wall of this transept has lost its centre mullion, and is now of one light only. An original window is in the west wall, and a restored one in the east side, also a decorated doorway in the west side close to the south porch of nave. This wall was built partly across the moulded arch of the Norman doorway, the lower part of the wall was made thinner to suit the transept doorway.

In the sill of the north window in the tower are the remains of a carved foliated coffin slab, with a floriated cross in an octagonal head, around the chamfer edge is an inscription in a semi-cursive style. Canon Capes states "that it is of the end of the 12th Century," and he gives the following translation: "You who by here pass, pray for the soul of Ro . . . ." The remainder of the name unfortunately is gone. Some of the contractions resemble those about that date in the Dean and Chapter archives. Remains of coffin slabs also are in the east window of the tower and the west window of the south transept. On the south wall of the latter is a stone sun-dial with initials and date, "I. F., 1768."

There are some small mural brasses in the chancel to "Roland Parry, M.A., Rector, died Feb. 12, 1761, aged 78. Elizabeth Parry, his wife, and daughter of John Dutton Colt, of Leominster, died April 14, 1736, aged 48. Harricus Colt Parry, their daughter, died 1722, aged 3." "Edmund Chamberlain, M.A., Rector, died Aug. 12, 1712, aged 61. Joane, his wife, daughter and heir of Richard Parker, of Old Radnor, Gent., died 12 March, 1697."

On the Tower arch is a small brass plate 2 feet 3 inches above the present nave floor, "Flood at Letton, 10th February, 1795." Lower down a notch in the wall, 1ft. 5in. above the nave floor, for the flood line in 1852. The Church is dedicated to St. John the Baptist. The Vicar, the Rev. R. Bishop, states that the earliest Parish Register commences in 1673. In the Churchyard are the remains of a very fine yew tree. Also at the west end of the Churchyard is a fine specimen of the cork tree, measuring 6ft. 10in. girth at 5 feet from the ground level, and about 40 feet in height; there are two large branches above the 5 feet measurement.

BREDWARDINE AND THE "WARDINES" OF HEREFORDSHIRE.

For the occasion of the recent Field excursion of the Woolhope Club, the following paper by Mr. James G. Wood, M.A., F.S.A., F.G.S., on "Bredwardine and the 'Wardines' of Herefordshire," was prepared:

The termination of the name of our place of meeting to-day is typical of Herefordshire and Shropshire. "Wardine" represents the A.S. worign and worine. These are less usual forms of wor and worig (pronounced worthy) which, though they generally appear separately in the dictionaries, are one in origin and meaning.

Of the last-mentioned forms the latter appears, within a limited area in the South-West of England, in such place-names as Hamworthy (Dorset) and Holsworthy (Devon); while the former (wor) has an extensive range, including Minsterworth and Nailsworth (Gloucester), Tamworth (Warwick), Highworth (Wilts), Hinxworth (Beds), Sawbridgeworth (Hertford), Word (Kent), and many others.

Primarily indicating "an enclosed homestead," these words passed through many significations; ultimately meaning a collection of habitations, a street, or a vill. Without attempting to define too closely, I think that at least a large majority of the places so named were villages extending along either side of the main road, without cross streets.

"Bredwardine" was originally "Bradwardine," meaning "the broad village." The change of the "a" into "e" is exactly analogous to the occurrence of the "e" in "breadth." The name here appears to be due to the fact that the place is situated at the junction of two roads and so extended in two directions.

The other principal instances in Herefordshire are Leintwardine, Lugwardine, Pedwardine, Carwardine (near Madley), Blackwardine (on the Ermine Street, near Stoke Prior), Chickward (near Kington, Cicuurdine in Domesday), and Marden-on-Lug, which appears, in Domesday Book, as Maurdine. Besides these I have been unable to identify Mateurdin and Stivingeurdine, both of which occur in Domesday Book in the Kington district. An Inquisition in the Gloucester Cartulary shows that the present "Old Wharton," near Weston-under-Penyard, was in 1338 "Oldewortheyne." In Salop we find Wrockwardine.

I have said that "wardine" is typical of these counties. I must next mention two places now outside their limits.

Ruardean, on the borders of Hereford and Gloucester, has often, but erroneously, been supposed to owe its termination to the vicinity of the Dean Forest, like Micheldean and Littledean. In Domesday it was returned under Herefordshire, and appears in the corrupt forms of Ruuirdin and Ruedene. In the Dean Forest Survey of 1282 we have the form "Rywardin"; in documents, relating to Hope Mansel, of 1338-9 in the Gloucester Cartulary "Ruwardyn"; and elsewhere in the same Cartulary "Rowworthyn." In the Flaxley Charters it appears as Ruwarthin, Rewarden, and Ruwordin. As to the latter part of the name there is therefore no question; and I feel no doubt that the whole was originally Rugworthin, *i.e.*, "the long village on the ridge," which exactly describes it.

The same Dean Forest Survey introduces us to a village, long since disappeared, under the name of "Waldingesworthine," or "the Foresters' village," which must have been somewhere near Mirey Stock. There is nothing in the Survey to indicate that it was then in existence; the spot is mentioned only as a boundary mark. It was probably destroyed when the Conqueror brought the district under the Forest Law.

Perhaps a word of caution should be added, and that is that the Herefordshire "wardine" must not be confused with the "warden" of other counties. Warden Hills, Warden Point, the Warden Oak, etc., are common enough. There was a "Wartokesty" in Dean Forest," *i.e.*, "the path to the Watchman's Oak." Such places were watching places corresponding to the Toothills mentioned in a paper at the Almeley meeting last year.

[The following correspondence, arising out of Mr. Wood's paper, originally published in the *Hereford Times*, was left for publication by the late Editor of the *Transactions*, Mr. H. C. Moore, and is here reprinted in the belief that it will at least illustrate the difficulty of determining the etymology of local place-names. A few letters, addressed to Mr. Moore himself, are not here included as being evidently not intended for the Press. Some irrelevant matter in the correspondence is also omitted. Members of the Club may also consult the Note appended to the letters here printed.

BREDWARDINE AND "THE WARDINES" OF HEREFORDSHIRE.

To the Editor of the Hereford Times.

Sir,—Under the above title I read in the *Hereford Times* a week or two ago a paper prepared by Mr. James G. Wood, F.S.A., F.G.S., for the Bredwardine Field Day of the Woolhope Club. Apparently it was not read on that occasion, or assuredly it would have been severely criticised. And I have not seen any commentary published.

I have always understood, with the late Mr. Flavell Edmunds's "Traces of History in the Names of Places" as my authority, that Bredwardine comes from "Bre," a promontory, "dwr din," water camp—*i.e.*, "the water camp on the promontory," a description that fits the place. But Mr. Wood, ignoring this derivation, talks of "the wardines," which he says originally meant "enclosed homesteads," graduating eventually into "villages," thus Bredwardine, "the broad village."

Will "Ladylift" or some other correspondent kindly say which is correct: "Bred-wardine," or "Bre-dwr-din," similarly "dyke" or "cannon-embrasures"?

Members of the Club also appear to differ as to the derivation of Arthur's Stone.

STUDENT.

Bredwardine, Herefordshire,
July 26th, 1905.

To the Editor of the Hereford Times.

Sir,—As a rule I take no notice of anonymous letters, while I welcome all intelligent criticisms or corrections from those who give me an opportunity of estimating their value. But as my paper on this subject was accepted by those for whom it was written, it is due to them that I should ask your permission to observe upon the letter of "Student" in your paper of the 29th ult.: the more so as the questions it involves are of more than local or passing interest.

The study of place-names has of late years become a sort of fashionable pastime; so much so that I frequently see in local papers, guides, and magazines attempts, by persons obviously unqualified for the task, to arrive at the derivation of the names in a district, regardless of philology or history, or even common-sense.

The importance of correct derivations, and the responsibility of those who put forward mere guesses, which are accepted by the uncritical, are equally great.

The first thing to do when we desire to arrive at the meaning of a place-name is to discover its true original form. This sounds elementary enough; but the amateur guesser wholly ignores it. Content with the orthography of the Postal Guide, or a recent map, or the board at the railway station (all terrible sinners in their way), he sits down with Welsh, Saxon, and Latin dictionaries at his elbow, and, very often, with only a distant acquaintance with those languages in his head. Then, having in one or more of those books found some words that look more or less like parts of the modern form before him, he produces a fearful combination, probably hybrid (and so except in a very few special cases wholly inadmissible), which he authoritatively puts forward as giving the meaning of the name. Whether it be appropriate to the place in question, or others of the like name, he does not stop to consider; or if he does, he invents some out-of-the-way story to account for it, which afterwards is accepted for truth on the ground that "it has always been understood," or "it is said, etc."; and when a critic expresses doubts he is told he is ignorant of local history.

In such a search it is necessary to go back through mediæval and early charters and similar documents, noting every variation of the word; variations which are not as a rule, properly speaking, corruptions, but due to changes proceeding according to regular laws, which only a long familiarity with such documents enables us to recognise.

The next step is to consider other places with names of the same, or somewhat modified, forms; and to ascertain the particulars common to such places; always remembering that by far the majority of place-names are purely descriptive of the local features.

Further assistance is to be had from attending carefully to the local pronunciation of the name by old residents in the district. When by these and other means we have satisfied ourselves what it is we have to interpret, then, and not till then, may we open our dictionaries; but above all, do not be in a hurry, and "don't guess."

I certainly did ignore the derivation "Bre-dwr-din," for it is impossible that it can be accepted by anyone who has any notion of the genius of Welsh compounds. Will "Student" please return to his study and find for me, first, a single Welsh name of which "Bre-" forms the first member; secondly, an instance in which "dwr" has passed into "dwar"? At the same time he will perhaps explain what

a "water-camp" is; for I have not the slightest notion (unless it is a prehistoric lake dwelling like that at Llangorse with some sort of fortification added), and also how such a thing can occur on a promontory; and where the promontory is on which this "water-camp" is situated; for "bre" means a high projecting headland, such as the height of Symonds Yat; and I cannot recognise any such place at Bredwardine. I decline to accompany him into the Black Mountains to find it.

But after all, "dwr-din" does not, and could not, mean a "water-camp," for "din" as the later member, qualifies, and is not qualified by, "dwr" the earlier.

Finally, if the "war" in Bredwardine is part of "dwar," what is the meaning of it in Lugwardine, Carwardine, Wrockwardine, Shrawardine, Stonwardine, Blackwardine, and the other instances in which no "d" precedes? And what is it in Leintwardine? For the "d" of "dwr" never suffers mutilation into "t," and that name was frequently written in two words, as Leynt Wardyn. Here again Mr. Edmunds has gone wrong.

It is impossible to accept a derivation for Bredwardine which does not fit all the other "Wardines." "Student" has failed to suggest any.

Now for the early orthography of "Bredwardine." It is not mentioned in Domesday; though many places in all directions around it are. The presumption therefore is that the vill originated later; and so we should expect a Saxon, rather than a Welsh, origin for its name, but I will not press that.

The earliest mention of the place which I have as yet found is in a grant on August 20th, 1227, to Abbey Dore of "the land above the park of Bred worthin." Here the last two syllables are in the exact Saxon form (misprinted as "worpin," the Saxon character as written in my paper being mis-read), which I said was the original of "Wardine." Almost contemporaneous are the entries in the Testa de Nevill for 1227 and 1243 in reference to the fee of "Bradwardyn."

In the Lincoln taxation of 1291 it occurs twice as "Bredewardin," and once as "Bredwardin."

In the Feudal Aids we have Bredwardyn (1303, 1346, and 1431), Bredewardyn (1316), Bradwardyn (1428). In an Inquisition of 1343, Bradwardyn.

About this time, by a deed so mutilated that the date is irrecoverable, Philip the ferryman of "Bradewardyn" granted to the monks of Clifford free passage over his ferry.

It occurs as " Bradwardyn " in two places in the Valor Eccles : (1525) in the accounts of Wigmore Abbey, and also in the Ministers' Accounts of the Abbey 31 H.viii. ; and as " Bredwardyn " in the Valor as to the Vicarage.

Leland (1550) and Camden (1610) know only of Bradwardine, the latter connecting the place with the family of Thomas Bradwardin, Archbishop of Canterbury (1349).

It is therefore abundantly clear that the first syllable is not Bre- ; but Brad-, Brade-, Bred-, or Brede-.; all well recognised forms of " brad-," i.e., " broad." The name, originally Bred- or Bradworthin, has gradually passed into Bredwardine. Similarly Bradfortun (near Evesham) of the Saxon Charters became the Bratfortune of Domesday, and Bratforton of to-day. Bradeworth (in Devon) of the Lincoln Taxation is now Broadworthy.

If any further evidence is needed of the identity of " worth " and " wardine " I may add that Brockworth, near Gloucester, was, in Domesday, Broccwardinge.

I have heard that my derivation " broad " has been objected to because the parish of Bredwardine is long and narrow. But we have nothing to do with the configuration of the parish, which ultimately took its name from that of the " worth " or village street by the church. Why that village street was called " broad " I have already suggested ; but many other reasons propose themselves.

As to Arthur's Stone," I think that those who have investigated the numerous " Arthur " Stones, Seats, Springs, Quoits, &c., &c., and compared situations feel no doubt as to the derivation ; and that it has nothing whatever to do with King Arthur ; and that Arthur Stone has nothing in common with Dorstone, which is itself a corruption ; but that is too long a matter to go into now.

JAMES G. WOOD.

Lincoln's Inn, London,
August 2nd, 1905.

To the Editor of the Hereford Times.

Sir,—I am very much obliged to Mr. James G. Wood for his able letter in last week's *Hereford Times* amplifying his derivation of Bradewardine the broad village, in contradistinction to the late Mr. Flavell Edmunds's Bre-dwr-din, the water camp on the promontory. The rain to-day releases me from harvesting, but I am far removed

from such books of reference as would enable me to reply as perfectly as I wish to Mr. Wood's questions. Lincoln's Inn would suit me better than Bredwardine for this examination.

Let me explain that I wrote anonymously merely out of modesty, and that I have quite an open mind in this discussion and am willing to learn. I expressed not only my own curiosity but a general feeling of inquiry in the parish.

Mr. Wood's researches on the subject are a valuable addition to the county history, but he goes no further back than the 13th century, and we all know how variable people were in spelling during the centuries agone, even in Shakespeare's time. That is not far enough back to get at the root of the word. If so, the argument might apply to other places, and we should say Hereford was always Hereford, and never Caerfawydd.

As to Mr. Wood's first question whether " Bre " forms the first member of any Welsh name, I cannot say offhand. It is the only part of Mr. Edmunds's derivation I don't like, although I consider that the hill behind the Lion Inn is a promontory, and we have a somewhat similar prefix in Brobury. Mr. Wood truly observes that it is easy to appropriate root words which may sound suggestively, but which may be entirely unconnected with the place. Without being serious one might amuse oneself by taking " Brae " from the Danish " Brahe " a ruler (which, too, is not so absurd as it might seem at first glance in connection with Bredwardine) ; or " bri " honour ; or " ber " a boundary ; or " burgh " a fortification ; or " Aber," as we have a small river or brook running into the big river Wye—all as applicable to a British place as the Gothic " Braid."

Mr. Wood's second question : for an instance where " dwr " has changed into " dwar." Well, Mr. Edmunds quotes from Lady Brilliana Harley's letters (temp. 1640—50) the spelling of Lugg dwrdin for Lugwardine. I have not the opportunity of verifying this extract, but intend to inspect the original if possible.

Third question : what a water camp is. I take it that it means a camp near much water, as for instance Dinedor (" dindwr "), the camp near the (river) water, or " dwrdin " the water camp. Dinedor is another instance where the " din " has been altered into " dine." I am aware that " din " might mean a hollow between hills, such as is to be seen near Dinedor camp, and above Bredwardine village. But whether " camp " or " hollow " is meant, I must point out that " dwr " (water) is conspicuously in evidence at all these places. I find that Marden, in Herefordshire, was anciently " Mawardin," which Mr. Edmunds defines to come from Maes y-dwrdin, the field of

the water camp. Camps to guard the water were as necessary as "wardens" (hill camps) to guard the county. A friend of mine has even conjectured that the old "warden" may have helped in the formation of Bredwardine. But admitting for the sake of argument that Bredwardine means Bradeworthin, the broad village, might there not be a name behind it with the meaning advanced by the late Mr. Edmunds? May I refer Mr. Wood to Llanfairwaterdine, near Knighton, for a "fearful" but euphonious "combination" of Welsh and English, where the Welsh "dwr" is Anglicised into "water"?

STUDENT.

Bredwardine, Herefordshire,
August 9th, 1905.

To the Editor of the Hereford Times.

Sir,—As I have been appealed to by your correspondent "Student" on the above very interesting subject, I am bound to say that I am in the main in agreement with Mr. Wood in his interpretation of the origin of the word "Wardine" as a constituent in the names of places, so far as its being a variant of "worth," "worthy," "worthen," "worthin," "worthing," &c., and that, like those forms, it denotes, or has come to denote, a collection of "homesteads," otherwise a "village." In its root form, however, (Saxon "Weorthi," a field or farm) as also in its other variants "warden" or "warten" it conveys simply, as I believe, the notion of an enclosed or fenced off space, being thus the Saxon or Early English equivalent of the Norman "Haia" (Hay), another not infrequent constituent of place names in Herefordshire and along the Border.

But, whilst I am forced to conclude that the form "Wardine" is a variant of "Worthin," &c., it is remarkable that (so far as I know) "Wardine" as a place-name never occurs alone, and as a constituent of such names, only in Herefordshire and Shropshire, and there must be some reason for this which it would be interesting to discover. It is invariably, as I think, found in conjunction with some prefix descriptive either of its character or position (as an enclosure). Thus "Bredwardine," which may be, as Mr. Wood says, "Broadwardine," and Lugwardine, which speaks for itself. But what of Leintwardine, Pedwardine, Carwardine, Mawardine (Marden), and others in Herefordshire, and Shrawardine, Richwardine, Fulwardine, Wrockwardine, &c., in Shropshire? I have my own notion of some of these, but I should like to hear the suggestions of some other of your antiquarian readers.

Student" will see from this that I do not agree with the late Mr. Flavell Edmunds in his very ingenious, but I fear unscientific, attempts to see "Welsh" in these names, though the matter is one on which it becomes no one to dogmatize. It is not, for example, like the great Shakespeare-Bacon question, one in which our way is clear as daylight.

It may not, perhaps, be out of place to add that in Duncumb's Glossary of Herefordshire Words, as also in Jacob's Law Dictionary, a "Worthine of Land" is described as "a certain quantity of ground so called in the Manour of Kingsland." This may be the same word with a modified or localised application.

Looking through the Brilliana Harley Letters (casually, it is true), I do not find the name Lugwardine in the form in which Mr. Edmunds says it there takes, or indeed in any other form, and it is not indexed. But even if Lady B. so wrote it, no one, I think, who knows that dear good lady's delightful disregard of the conventionalities of spelling would attach any etymological importance to the fact. A writer who could transform Lincoln's Inn into "Linconsine," Don Quixote into "Donqueshot," and Aurum Potabile into "Orampotabily" would be equal to any other charming eccentricity in the way of orthography.

LADYLIFT.

London, August 16th, 1905.

To the Editor of the Hereford Times.

Sir,—I feel much diffidence in asking to be allowed further space in order to observe on the letters in your issues of August 12th and 19th; but the interest which my former communication appears to have evoked may justify it.

I will first deal with the letter of "Ladylift," as we are mainly in accord on the subject. I do not, however, feel with him that it is remarkable that "wardine" should not occur alone, but only as the constituent of a compound name. This is just what we should expect of a word which I have shown to be generic, requiring a special prefix to make it useful as a name. The same is of course true of its other forms "worth" and "worthy" (as in Tamworth, Minsterworth, Woolfardisworthy, &c.); while those forms do not appear as names by themselves, unless "Word," in Kent, is an instance, which is doubtful. It does not appear to me more remarkable than that such

words as "ham," "ton," "stead," &c., which are frequent constituents of place-names, do not appear by themselves. "Wardine" is only another name of the same class.

I should like to see a transcript of the manor document of Kingsland, which mentions a "worthine of land" before accepting either Duncumb's or Jacob's explanation. I know of several serious philological blunders in the latter's Law Dictionary.

As to the other names which "Ladylift" would wish to see explained, we must of course seek a common origin for the first members of Leintwardine and of Leint-hall Starkes, &c. I suspect in these cases it is a personal name. Pedwardine may be Peter-Wardine. and Carwardine may be Carrwardine (the vill on the rock), but I am writing away from my library and other means of applying to these names the rules I have already indicated, and so only throw out these as suggestions for investigation; and for the same reason I will pass by Marden and Shrawardine. Richwardine is, I apprehend, Hrycg-wardine (on the ridge), from which I showed that Ruardean is derived. Ful-wardine is doubtless the muddy-wardine, corresponding exactly to Ful-ham in Middlesex. For Wrockwardine we must discover the original place-name which the Romans Latinised into Uriconium, and has come down to us in Wrekin; and then we shall know what the name was which the Saxons, by affixing ceaster, made into what we call Wroxeter, and, by affixing worthin, made into what we call Wrockwardine.

"Student" thinks he has found salvation in Llanfair-waterdine, in which he supposed that "dwr" has been Anglicised into "water." Suggestions of this kind make me wonder whether those who propound them suppose that our place-names were arranged by some polyglot commission. "Waterdine" has nothing to do with water, except that being wat-erdine (i.e., Wad-worthin) it is the vill "at the ford" over the Teme. This is a good instance of an addition of a Saxon title to an existing specific Welsh place-name. It is quite different from the made-up combinations of Welsh and Saxon syllables, which I said are wholly inadmissible.

If "Student" really thinks that "din-dwr" would mean the same as "dwr-din," I must take leave to say it is absolutely contrary to the well understood principles of Welsh compounds. I do not stop to explain Dinedor, as that is quite a different matter altogether. Nor will I follow him into Danish and Gothic words, which in this district are obviously inappropriate.

"Student" says I have not gone further back than the 13th century. That is not so. I went back to Domesday, and showed

that Bredwardine was not to be found there, and so most probably did not then exist. I also showed the forms in which the analogous names in these counties appeared in the 11th century. But he says if we did not go far enough back "we should say that Hereford was never Caerfawydd." I will ask him one more favour: that is to produce a single document which is evidence that Hereford was ever so called. I mean a document not stating it as a bygone fact, but as an existing fact at the date of the document. I believe it to be an entire mistake. "Caerfawydd," "the camp among the beech trees," was exactly translated into "becebyrig," now "Backbury." Someone, not knowing where Backbury was, assumed it was Hereford; and hence the blunder grew. I know a list of Welsh Bishops, including Caerfawydd; but I may accept that as meaning Hereford when the locality of "Weeg" in the same list is proved, not guessed at. The British name of Hereford was Henfford (i.e., the old road), as I explained when writing on the Watling-street. The Saxons perpetuated the same idea by the name "Hereford," (i.e., "the army road"); a name which they constantly (sometimes as here-path or here-weg) applied to the Roman roads.

There is no connection between "warden" and "wardine." The former word comes from the Saxon "weard," and the "e" never appears in any of the forms of "wardine" at any period early or late. We have no more right to assume that it has been lost than had Mr. Edmunds the right to insert a second "d" in Marden (which never occurred) in order to apply his derivation of "dwrdin." Pray, is Sutton walls the "din," and the Lugg the "dwr" in that case?

JAMES G. WOOD.

At St. David's College, Lampeter,
August 24th, 1905.

To the Editor of the Hereford Times.

Sir,—As I find myself in substantial agreement with Mr. Wood on the above subject, there is no need, I think, for my replying at any length to his last very interesting letter.

I should like, however, with your permission, just to say that when I spoke of it as "remarkable" that "Wardine" as a place-name, is never found alone—that is, without some prefix—I was comparing it with "Worth" and its other forms, which I was under the impression are. For, if they are not, what is the origin of "Worth" as a place-name by itself, found twice at least in Kent,

once each in Sussex and Cheshire, once (in connexion with Matravers) in Dorset? Also of "Worthen" in Shropshire, and "Worthing" in Sussex, and again in Norfolk?

If these names singly are the names also found in combination, I still think I am justified in considering it as "remarkable" that they differ from "Wardine" in this respect. Also that, unlike "Wardine," they are found in all parts of the country, whereas "Wardine," I believe, is found only—and that in combination—in Herefordshire and Shropshire.

I would also ask leave to say that I am not so sure as Mr. Wood that there is "no connexion" between "Wardine" and "Warden" (as a place-name), but that is a somewhat abstruse etymological matter which I will not go into.

I should like, however, to ask—If Pedwardine be Peterwardine, as Mr. Wood suggests, whether we may see there any connexion with the German Peterwardein (in Austria) or the Dutch Leenwarten? And, if not, why not?

LADYLIFT.

Hereford, August 30th, 1905.

NOTE.

The foregoing correspondence having left the etymology of Bredwardine undecided, the present Editor was induced to seek further light on the point elsewhere. Through the good offices of a mutual friend he received from Sir John Rhys, Celtic Professor in the University of Oxford, the following reference to Bredwardine in the Welsh poems of Lewis Glyn Cothi (15th cent.). It occurs in Poetical Works, Oxford, 1837, Part I., p. 81, poem xxiii., in lines addressed to Lewis ab Gwateyn (or Watkin), of Bredwardine:

"Da Lewis wrth deuluwr,
Ab Gwāteyn Vrodorddyn dwr."

Meaning—

"Good is Lewis ab Gwateyn,
the tower of Bredwardine to a domestic bard."

The Vrodorddyn of the poem by "the law of initial mutation" becomes Brodorddyn, the nearest the Welsh bard could get to the English name.

The Professor adds "Lewis Glyn Cothi is very fond of English words, so I do not think he settles the 'wardine' controversy."

A Cambridge scholar also looked up the lines in Cothi, and adds the opinion "I do not think the fact that Bredwardine is mentioned in this poet is any argument for the name being Welsh. The poems are full of English place-names in Welsh spelling."

The same correspondent refers to Brawordine in Devonshire as probably the same word, and certainly not Welsh. To this may be added the Bedwardine in Worcester, which Dr. Nash, quoted by Allies, derives from Beod or breod, or bread, and explains it as the 'worth' or enclosure assigned for the bread of the monastery. Thus Oxford, Cambridge, and, there may be added, an Edinboro' correspondent ali claim Bredwardine as Teutonic, and not Celtic.

Woolhope Naturalists' Field Club.

SECOND FIELD MEETING, JUNE 27TH, 1905.

THE GREAT SCYRRID AND LLANVIHANGEL COURT.

This meeting of the Club will long be remembered by those present for the magnificent panorama which delighted the eye from the summit of the Skyrrid and for the matters of natural and archæological interest which engaged the attention of the company, for the gracious hospitality of the lady of Llanvihangel Court, and for the superb weather which favoured the gathering. The following account of this meeting is based upon notes furnished by "A Hereford Visitor" to the *Hereford Times* of July 1st. The company included the following:—Members: Mr. Philip Baylis, L.L.M., F.Z.S. (President), Mr. R. Bamford, Mr. C. P. Bird, Rev. C. Black, Mr. F. J. Boulton, Mr. W. J. Boycott, Mr. W. E. Britten, Mr. J. U. Caldicott, Lieut.-Col. Campbell, Mr. G. Child, Mr. R. Clarke, Mr. Truman J. Cook, Mr. J. E. P. Davies, Mr. E. J. DuBuisson, Mr. H. Easton, Rev. H. M. Evill, Mr. C. J. Fricker, Rev. P. H. Fernandez, Mr. E. A. Gowring, Rev. H. E. Grindley, Rev. Preb. Edward Harris, D.D., Mr. E. J. Hatton, Rev. E. J. Holloway, Mr. F. S. Hovil, Mr. J. J. Jackson, Mr. F. R. James, Rev. A. G. Jones, Mr. H. E. Jones, Rev. E. King-King, Preb. Lambert, Mr. W. P. J. Le Brocq, Rev. C. G. Ledger, Rev. C. Lighton, Mr. C. J. Lilwall, Mr. T. Littledale, Mr. W. G. Lloyd, Mr. J. W. Lloyd, Mr. F. W. Morris, Rev. A. H. McLaughlin, Rev. H. B. D. Marshall, Mr. T. D. Morgan, Rev. Andrew Pope, Mr. Alfred Parker, Dr. Scudamore Powell, Mr. J. Probert, Mr. H. W. Pumphrey, Dr. G. R. Sinclair, Mr. A. Pole Small, Rev. H. Somers Cocks, Mr. H. Southall, Rev. F. S. Stooke-Vaughan, Mr. R. A. Swayne, Rev. R. Hyett Warner, Mr. A. Watkins, Mr. T. Hutchinson, Mr. H. Cecil Moore, and Mr. J. B. Pilley (assistant secretary). Visitors: Mr. A. H. Boulton, Mr. D. N. Campbell, Mr. W. E. Clarke, Rev. W. D. Barber (Victoria, British Columbia), Mr. Quintin Miller, Mr. D. R. Derham-Marshall, Captain A. W. W. Pope, Rev. M. R. Onslow (Bedstone), Mr. F. W. Williams (Bromyard), Mr. L. J. C. Riley, Mr. P. C. Hull (Hereford), Mr. F. E. Burkett, Rev. H. E. Knight (Thruxton), Mr. Browne-Davies (Crickhowell), Rev. C. H. Stoker, Mr. W. H. Woodcock (Hereford).

Following the directions of the programme and the guidance of Mr. Herbert Jones, of Ewias Harold, the Ross Road from Abergavenny Junction was taken as far as the telegraph pole marked No. 80, when the route diverged through meadows and then by a somewhat toilsome ascent to the objective of the meeting—the summit of the Skyrrid. Here a natural hollow covered with turf permitted a welcome pause for contemplation, and the enjoyment of the beautiful scenery stretching from the Skyrrid as far as the eye could reach. The Great Skyrrid or Holy Mountain reaches a height of nearly 1,600 feet above sea level, and being isolated from surrounding hills, can easily be distinguished at a great distance in all directions and, mathematically, should be discernible at something under fifty miles.

This conspicuous elevation naturally attracted the attention of Archdeacon Coxe when he made his "Historical Tour in Monmouthshire," in which work he eloquently and enthusiastically includes in his view the Skyrrid and the Sugar Loaf as they appeared more than a century ago :—"Although the summit of the Skyrrid is less elevated than that of the Sugar Loaf yet its insulated situation, abrupt declivity, and craggy fissures produce an effect more sublime and striking than the smooth and undulating surface of the Sugar Loaf. On the north-east and east is seen an extensive and fertile region stretching from the centre of Herefordshire to the valley of the Usk, which though a succession of hill and dale, yet appears a vast plain, broken by a few solitary eminences and bounded by distant hills, gradually losing themselves in the horizon. The spires of Hereford Cathedral gleam in the distant prospect, the remains of Grosmont Castle are faintly distinguished under the Graig and Garway, and the majestic ruins of Whitecastle tower above the Church of Llandewi Skyrrid. To the south the gentle swell of the little Skyrrid, rises like an hillock above the town of Abergavenny, the feathered hills of Clytha, tufted with the Coed-y-Bunedd and backed with the Pencamawr, beyond which appears the estuary of the Severn. To the south-west the eye catches a glimpse of the Usk pursuing through copse and mead its serpentine course under a continued chain of wooded acclivities. To the west and north-west I looked down on a grand and dreary mass of mountains extending from Abergavenny beyond the frontiers of Herefordshire and domineered by the elegant cone of the Sugar Loaf. The Black Mountains form the northern extremity of this chain, and are intersected by the sequestered valley of the Honddw. Beneath me yawned the abyss of the fissure on the mountain, which appears to have been caused by some violent convulsion of nature and according to the legends of superstition, was rent asunder by the earthquake at the crucifixion of our Saviour : hence it is also denominated the Holy

Mountain. The earth of this spot is likewise considered as sacred and was formerly carried away to cure diseases and to sprinkle the coffins of those who were interred. I ascended to the highest point of the mountain at its north-eastern extremity, where a small circular cavity is formed near the verge of the precipice ; it is supposed to be the site of a Roman Catholic Chapel, dedicated to St. Michael, from which the Skyrrid has derived one of its appellations of St. Michael's Mount."

In the notes of a Hereford Visitor, we are reminded that members were asked to search on the summit (1,596 feet) for possible vestiges of the site of St. Michael's, mentioned by the Archdeacon. Here stood (according to evidence before the Anti-Popery Committee in 1678) "a ruinous chapel and a stone with crosses upon it, where Mass was performed and sermons preached. We are led to understand from an account of the families of Bailey, of Bailey Baker, and Baker Gabb, that in March, 1678, a committee of the House of Commons was appointed, of which Sir John Trevor was chairman, to consider "the danger the nation is in by the growth of Popery, and the remedies to prevent the same," with power to send for persons, papers, and records. Amongst others summoned to give evidence was John Arnold, a former owner of Llanvihangel Court.

In his evidence before the committee referred to, Mr. John Arnold said, "that he hath seen a hundred papists meet at the top of a high hill called St. Michael's Mount, where is frequent meetings eight or ten times in the year ; as he is informed Mass is said, and sometimes sermons is preached there." John Scudamore before the same committee said "that he saw very great numbers of people at their devotions on the top of an high hill in Monmouthshire called St. Michael's Mount, where there is a ruinous chapel, and a stone with crosses on it, which he took to be an altar, and he hath seen people with beads in their hands kneeling towards the said stone, both within and without the chapel, and he has been informed that Mass is often said there, and some papists have affirmed in his presence that they have heard as good sermons preached there as ever they heard in their lives."

In the notes of the Rev. John Davies, of Pandy, published in the *Hereford Times*, July 14th, 1877, and referring apparently to the above chapel, it is pointed out that upon the top of the Scyrrid there was a mediæval church, of which a few traces remained, at that time. It was dedicated to St. Michael, the patron saint of sailors. All the present remains of the chapel are two stone posts, thought to have formed the entrance. From this spot, writes our "Hereford Visitor," one obtains quite a new idea

of the Black Mountains, and a lovely view of the well-defined Longtown Valley is seen, together with the commencement of the Golden Valley. Immediately below was Llanvihangel Court, and to the left the celebrated slip, towards which the party descended and traversed.

LLANVIHANGEL COURT.

*It seems quite uncertain when the original building known as Llanvihangel Court was erected, but the south-eastern front is known to have been re-built in the year 1559 (a stone half-way up the wall bears the date) by Rhys Morgan, the then proprietor of the estate. Another owner, the Hon. Edward Harley, was auditor of Imprest to Queen Anne, and brother to Robert, first Earl of Oxford and Mortimer, the Lord High Treasurer; while yet another, Mr. Hugh Powell, as a token of gratitude to his patron and friend, the late Hon. Thomas Harley, bequeathed to the grandson of that gentleman, the Hon. W. P. Rodney, the mansion, together with the principal portion of his landed estates. The mansion up to 1802 was usually assigned as the jointure house for the widows of the Earls of Oxford.

Accomplishing the descent the party in due time reached the Court, where Mrs. Attwood-Matthews gave the members a hearty welcome, receiving her guests at the entrance hall door. The luncheon provided was elegant and sumptuous, and welcome and refreshing after the exertions of the morning. The tables were laid in the spacious entrance hall and dining room, and at the close the PRESIDENT said before they left those hospitable walls he was anxious to return thanks for the good things provided. As a rule members of the Woolhope Club went about with a biscuit in one pocket and an apple in another, and were quite content to get a drink in between. It would be the ruin of the club if they were frequently regaled as they had been that day. They all heartily thanked Mrs. Attwood-Mathews for her great kindness and hospitality.—Mr. BAMFORD suitably responded on behalf of the hostess.

All present then went over the house and surroundings. Unfortunately, owing to the extensive additions, several of the rooms were in a state of disorder, but those completely furnished occasioned much interest. The house is well built throughout with the stone of the district; the walls are two thick on a substantial plinth, and there are massive stone quoins at the angles. The windows are mullioned of the Tudor period, and in regard to the additions on the north side the Tudor style is being copied. A stone bears the

* White's "Guide to Abergavenny."

following inscription:—"Designed by B. St. John Attwood Mathews, 1903." In the hall was seen, facing the entrance, the large iron back with fleur-de-lys which had been originally put up by the Arnolds. This was found in use as a footbridge in the grounds, and happily restored to its proper position. On the northern side of the hall is a seat, below a raised dais, for the retainers. Unfortunately a cellar has been built over this dais. Close by are two enormous earthenware jars, originally used for oil and wine, and brought over in the ships of the Spanish Armada. There are also a number of valuable ancient weapons and paintings, whilst the furniture is in complete harmony with the hall. The exit from the hall to the staircase is through a gateway erected by a former tenant for the purpose of excluding hounds when admitted to the hall. In the passage at the foot of the staircase hangs an old oil painting representing a view from the grounds in which the fissure in the Great Scyrrid is a prominent feature. The Blorenge and the Sugar Loaf are readily recognised, and a chapel surmounts the Great Scyrrid.

The staircase is very broad and built of massive pilasters and railing of Spanish chestnut. The back-staircase, which for generations was the only staircase, is retained in its original character. Massive beams, principals and joists in the rooms and roof are visible everywhere, and Mrs. Attwood-Mathews is having removed the "daubings" of previous tenants. A wide passage leads to the King's room, a small paneled room which is at present undergoing extension by the addition of a Tudor annex. A large four-posted bedstead is here installed, upon which is inscribed "King Charles I. slept on this bed at Llanvihangel Court, 1645." This carved oak bedstead was purchased by Mrs. Mathews from Mr. Harley, of the Record Office. A coat of arms with "C.R." on it is over the door. On removal of the plaster, the old oak ceiling has been brought to light with massive oak beams. Removal of plaster has also exposed a stone mantelpiece with traces of a chariot and wheels as a sort of fresco in black. The Tudor room, now occupied as the principal bedroom, has napkin paneling. The ceiling of the dressing room is of dark oak.

The Queen Elizabeth's bedroom has a ceiling of ornamental plaster, all finger work. This was originally a larger room; the same plaster ceiling can be seen extended beyond the present partition into a lobby which opens into a small room, now a dressing room, which is said to have been the chapel. The latter is lighted by a good window, but Mrs. Mathews has opened out a small window on the northern wall. An inspection of the exterior shows that this is not an addition, but a restoration of a built-up original Tudor

light. A similar window was re-opened in the dining room. Included amonget the extensions is an annex of a style unique in our country. The building with a portico is lighted by lights capped with semi-circular arches and a massive circular column. This is the model of an Egyptain Temple, and will contain the costly collection of Egyptian curiosities so valued by the owner. Mrs. Mathews has not discovered any old secret hiding place. Helmets from the field of Omdurman—massive, heavy, with chain armour suspended for protection of face and neck, a marvellous set of Oriental sketches by Mrs. Mathews, which were to be sent for exhibition to Bond-street in July, to say nothing of local views, a rare collection of china, etc., are only a few of the rich adornments of the mansion.

In the "Guide to the Town and Neighbourhood of Abergavenny," quoted above, we read:

"The mansion is surrounded by groves of venerable oaks and Spanish chestnuts, while the noble avenue of firs (supposed to be the finest in the kingdom) give a weird picturesqueness to the scene that is very striking. The Government, on one occasion, offered Mr. Powell £10,000 for these alone. They are not the common Scotch firs, as some have been led to believe, but of a kind which are very seldom met with. At Llanvihangel they sow themselves, and spring up spontaneously in the woods. The chestnuts appear to be also of great antiquity, but although much pains have been taken to gain information as to the possible date when these avenues were planted, hitherto all researches on the point have proved fruitless."

Our account of the day's proceedings would be incomplete without some reference to former owners of the house in which we were so hospitably entertained. Without going back to a remote antiquity we find, relying upon "Hereford Visitor," that in 1678 Llanvihangel Court was in possession of John Arnold, already referred to, a descendant of Sir Nicholas Arnold, to whom the grant of Llanthony Abbey was made by the Crown. John Arnold was the active opponent of the Roman Catholics, who gave the evidence mentioned above. On account of his hostility, it is said, an attempt to assassinate him was made in London by a man named Giles, a native of Usk. This was in the year 1680, when he was elected Member of Parliament for Monmouth and would be a well-known character both in Wales and London. His son, Nicholas Arnold, sold the Llanvihangel estate to the Harley (Earl of Oxford) family, from whom it was purchased in 1801 by Hugh Powell, of the Bridge, Llanvihangel Crucorney, and he dying unmarried in 1821, devised the estate to the Hon. William Powell Rodney, from whom it

descended to the late owner, Mr. Harley Rodney. The latter in 1903 sold the Mansion House with a large portion of the estate to the late Mr. Benjamin St. John Attwood-Mathews, J.P., D.L., formerly of Pontrilas Court. To his widow the Club was indebted for the present opportunity of seeing the many objects of historical interest belonging to the mansion, and reminiscences of her extensive travels in Egypt and other parts.

LLANVIHANGEL CRUCORNEY CHURCH.

The Rev. A. R. BLUNDELL, for more than 30 years Vicar of the parish, in the course of an interesting paper, produced a map nearly 300 years old. It was dated 1610, and upon it was clearly marked the chapel of St. Michael on the top of the mountain. He said: "The meaning of Crucorney, I am inclined to think, may be found in Brittany. In the commune of Carnac, in the Morbihan, is a small almost disused church, Eglise de St. Michel (Llanvihangel). It dominates a district, being on a Mont St. Michael, and is not a parish church. About three-quarters of a mile from it, and at the foot of the hill, is a parish church, Eglise de St. Cornely, with the Croise de St. Cornely (Crux Cornolü), and not far from it the Fons Cornolü, much visited by pilgrims. Eglise de St. Michael seems to me to bear the same relation to Eglise de St. Cornely that the ancient Church of St. Michael on our Skirrid Hill must have borne to our present parish church. May be this church of St. Michael was in some sense our mother church, but the daily worship of our forefathers was at a Crux Cornelü on the site of our present church, and as the population increased our church was built where it now is, on a spot already consecrated, more accessible and convenient. One can easily imagine how time would soften the abbreviation Cru-Corn to Crucorney. If I am right in my supposition, our real patron is St. Cornelius, though the greater St. Michael hovers over him. There may be some among us who would gladly revive the old cult, and who still dimly honour him, preferring him to St. Michael and his host: for St. Cornelius is the guardian of horned cattle. In Carnac miraculous cures of cattle are stated to be still taking place. A sprinkling from his fountain and a walk round his cross and they are good for the dairy or the plough. St Cornelius seems in other ways to have been distinguished, and we may well be proud of him, for I found in his church two windows with the following inscriptions:—(1) 'St. Corneille par sa prière et sa benediction étient un incendie dans la vielle de cornelle." (2) "St. Corneille par sa prière ressucite la fille d'un Senateur Romain.' The following on another window is interesting as a link with Monmouthshire:—'St. Cardo débarque pour precher la doctrine du Christe et cruit dêja, voir derriere lui

les croix dressées et les églises edifiés que son zêle religieux fit elever plus tard.' St. Cadoc, who thus first brought Christianity into Brittany, was, I believe, the son of St. Woolos (Newport, Mon.). Other Welsh Saints, too, are common to Brittany and Wales. Though they owe much to Wales, it appears to me the modern Bretons are not grateful. They seem to me to put down all their blessings to Irish monks. Maybe they regard the present Welsh as a degenerate race that has deserted its ancient faith. To make good my case, I suppose I must prove St. Cornelius was a British Saint. The only thing I can think of is that near Bridgend there is a small parish named Cornelly. About two miles from Mont St. Michael I went to another little village named Crucuno, pronounced Crucuney. I could get no information of the meaning of the word beyond Cru now has a secondary meaning 'elevation' or small hill from a Crux, having always been elevated on such. With ourselves we sometimes hear the big mouthful, Cornelius, cut down to Corney, e.g., Corney Jones."

LLANVIHANGEL CRUCORNEY CHURCH.

The Church is generally supposed to be dedicated to St. Michael and to have been built in the 14th century. Style, Early English. The oldest portions of the building are the north and south walls of the Chancel and the western wall of the Nave. The weather-worn appearance of this western wall inside the tower seems to point to the tower being added at a later date. The South Porch also is an addition.

The Chancel retains its original waggon roof of oak, three windows (Early English), and a large perpendicular window, a later insertion, on the south side, beneath which is the piscina. The eastern wall had to be re-built in 1886. The Altar Stone, measurements 7ft. 5in. by 3ft. 6in. by 5½in., was in that year found buried in the Church and restored to its original position. The stained-glass eastern window is considered one of Kemp's best.

The Nave, being much out of repair in 1835, instead of being restored, was then wholly pulled down. Old people have told me the walls were so well built that it was hard work to get them down. With them was destroyed an oak roof, admitted to have been the finest roof in this part of Monmouthshire, which had been allowed to get into a ruinous condition. The Nave was then re-built with nondescript windows, deal roof, and a ceiling, flat, plastered, whitewashed. A three-decker pulpit and desk, and great square pews allotted to the chief houses in the parish, completed this work when

the old Font had been banished (fragments of this may be seen in the Vicarage garden) and a new font-, like a great egg-cup, substituted. In 1887 the Nave was re-seated with oak benches, free and unappropriated, the plaster on walls removed and these rough pointed. The present windows were inserted between 1887 and 1897. These are perhaps a little more ornate than the original windows probably were, but in this I was overruled: and the dripstones over them are also perhaps a mistake. The flat whitewashed ceiling still remains, but I am not without hope we may some day get a roof more like the original.

The South Porch was doubtless an addition of later date. In 1897 the plaster and whitewash of 1835 was removed from the roof of the Porch and a fine specimen of an oak roof discovered and restored.

The Tower, as stated above, appears to have been built some time after the Nave. There is in it provision for the hanging of five bells. Of these only two remain. The small bell is probably much the older: maybe, older than the tower itself. The big bell is a very beautiful tenor and was cast at Chepstow. There is a legend that the Church lost the other three bells under the following circumstances. One Nicholas Arnold lived at Llanvihangel Court about 1690. He was a village tyrant, seldom left the village, and was hated by the inhabitants. On one rare occasion, when he started for London, the bells were rung. The Squire, hearing them on the road to Abergavenny, turned back, had the bells taken down, and sent them into Breconshire.

The Registers, with some gaps, go back to 1640. There is a fine Chalice (1674), gift of John Arnold, with his arms engraved. There is a Tithe Barn between the Vicarage and the Churchyard. An old man of this parish once told me that when he was a boy he was employed by the Vicar in harvest time to visit all the corn fields in the parish and put "a green twig" in every tenth sheaf. The Vicar's cart followed and carried these sheaves to this barn.

A. R. BLUNDELL.

The rev. gentleman was heartily thanked for his highly interesting paper.

LLANVIHANGEL CRUCORNEY AND THE SKIRRIDS.

By James Wood, M.A., F.S.A., Etc.

"It is said that Llanfihangel Crucorney means 'the Church of St. Michael and the Angels at the corner of the crag.' This involves three errors. There is nothing in the name about an Angel other than St. Michael himself. In 'Mihangel' the 'ng' is the aspirated form of 'g,' which here replaces 'eh.' Therefore, though the last five letters spell 'angel' they have nothing to do with it in this case. In composition after 'Llan,' the initial 'm' becomes 'f' (incorrectly written 'v' which does not occur in Welsh); just as the initial of Mair (Mary) appears as 'f' in Llanfair. The railway from Abergavenny to Pandy runs in a valley which, from near Llanfihangel station, carries the water of the Cevenni southward into the Usk, and in the other direction carries the Honddu northwards into the Monnow. This valley separates the Sugarloaf (Pen-y-fal) and the other spurs and outliers of the Black Mountains from the lower range of hill forming the eastern flank of the valley, and stretching from Skirrid fach, east of Abergavenny, to Campston Hill, east of Pandy. This range of hill was formerly known as Bryn Corneu (pronounced Cornee), or 'the hill of the peaks.' 'Corn' (in English 'horn') represents what in the north is called 'a pike'; such as the Langdale pikes in Westmoreland. So the highest point of the Brecon Beacon is 'y fan corn-du' or 'the point of the black horn.' We may compare the Alpine, Matterhorn, Weisshorn, etc. On this range of hill again there was a 'Crug.' This appears in the ancient boundaries, as stated in the Liber Llandavensis, of Llanfetherine, which was co-terminous in part with Llanfihangel, and included a large part of the range. The 'Crug' should therefore be sought on the boundary, and probably near the head of Nant-y-grug, due east of the present Llanfihangel Church. 'Crug' (pronounced Creeg) is a barrow, tumulus, or hillock, generally artificial; and then usually sepulchral. Only last week I visited the Crug-yr-Avan, on the Glamorgan hills, which has lately been opened and proved to be sepulchral. The word must not be confounded with 'craig' a rock. It frequently appears as Crick, as in Crickhowell, which is Crughywel. Llanfihangel Crucorney is therefore 'The Church of St. Michael on the Hill of the Peaks.' According to Professor Rees, there were, in Wales and the Marches, 94 churches and chapels dedicated to St. Michael, of which 13 occurred in Monmouthshire. Of the peaks which I have mentioned, the highest is the Skirrid fawr (The Great Skirrid), which derives its name from 'Ysgariad,' i.e., separation or parting, owing to the great fissure on the summit, which is one of its geological curiosities. The Lesser Skirrid (Skirrid fach) takes its name in relation to its brother peak, though it has no fissure of its own. Archdeacon Coxe (1801) said that the Skirrid has been called St. Michael's Mount, and others have repeated his statement. I have found no authority for it. Llanfetherine deserves a short notice. It is properly Llan-Gwytherin (not Llan-Merin, as Professor Rees supposed), a name which occurs again in Denbighshire, where Gwetherin-ap Dinged founded the church in which St. Winifred is reputed to have been buried. Dingad, his father, is commemorated at Dingestow, near Monmouth (formerly Dingatstow), while St. Winifred's spiritual father and instructor, St. Beino, after education at Caerwent, settled under the benefaction of Ynyr Gwent, at Llanfeyno (the Church of St. Beino), north-east of Llanthony. The connection between these dedications in the south and the north deserves further investigation."

Mr. Wood having seen Mr. Blundell's paper added, some days after the meeting, the following remarks to his former contribution, which are here printed for further elucidation:—

"I agree with Mr. Blundell that there is much to be said as to the connection between Wales and Brittany, and to show you that I have been working on those lines I send you a cutting with a recent note of mine on St. Wennol, showing how he left Gwent for Brittany, and how, 500 years after, his memory was brought back to Wonastow. But I can by no means agree with Mr. Blundell's suggestion as to the derivation of Crucorney. The first syllable can have nothing to do with crux or cross. There is no name in which such a change occurs. Cross always appears as "cross" ('groes' in composition as in 'Bwlch-y-groes'), in which 'oe' equals 'oy,' so it could never become 'u.' It did become 'e,' as in 'Gresford,' near Wrexham, which was 'y' (Groesffordd). 'Corney' I cannot connect with 'Cornelius.' Mr. Blundell suggests that that name may occur in Cornely, near Bridgend. But those places (for there are two) are frequently mentioned in the Neath and Margam Charters, and were 'Cornelau' that is the plural of 'Cornel,' a corner or angle, and these were, in fact, the north-west and south-west corners of Ogmore Down. There is no known dedication to St. Cornelius in Wales. There was one in the diocese of Bayeux,in Normandy, and there it is important to notice that the name became St. Cornier. The 'l' does not disappear, but becomes 'r.'

"I know nothing of the Carnac instance mentioned by Mr. Blundell; but it looks suspiciously as if the Bretons had invented a dedication to account for a name. This has happened often enough in Wales. Cornely there may have had the same origin as in

Glamorgan. A spring at some corner may have got the name, a cross may have been set up to mark the spring, and so the "ffynnon cornelau' and 'Cross Cornelau' suggested a dedication for the church when it came, and from that of course would follow the legends. But I am, contrary to my wont, being led into speculation of the possible. In the case of 'Crucorney' no such speculation is open when we have documentary evidence that the hill was 'Bryn corneu,' and on it was a crug."

GEOLOGY OF THE SKYRRIG.

A word or two as to the geology of the Skyrrig. The "Hereford Visitor" who reported our meeting observes "that the geological formation is old red sandstone with patches of cornstone at the northern and southern extremities of the summit. For geological references to Skyrrid Fawr the *Transactions* for 1868, p. 40, may be consulted, "Symonds' Records of the Rocks," p. 234, and "Memoirs of the Geological Survey," No. 232, 1900, pp. 16, 17, 18.

To this brief reference may be added the following notes by the Rev. H. E. Grindley, on the

GLACIAL DAM AT LLANVIHANGEL.

"On the 1-inch Ordnance Drift Map a patch of glacial sand is marked around Llanvihangel station running out as a spur from the west side across the valley at a height of 500-550 feet. It is mapped as extending about three-quarters of a mile across the valley and three furlongs north of the station and four furlongs to the south, up and down the valley. In the deepest part of the railway cutting north of the station the solid rock is exposed, capped by a considerable thickness of sand, and coarse river drift. A little east of the cutting the deposit reaches the height of 547 feet, O. D., and thence all along its north boundary forms an escarpment facing a stretch of levelflood-plain whose surface cannot be much above 420 feet O. D. This escarpment is covered with wood and seen from the road between the village mill and the railway is steep enough to resemble an artificial embankment. Southward the surface of the ground slopes gently with the usual billowy outlines of fluvio-glacial deposits traceable but not strongly evident. At the eastern end of this mass of drift, and on the left hand side of the main road to Abergavenny, is a marked depression in the grounds of Llanvihangel Court, suggestive of an old river bed. About half a mile south of the Court the bank bounding this depression on the east takes a curve towards the axis of the main valley, and seems lost in the mass of

superficial detritus which has been washed down from the Scyrrid, just where a sand pit occurs a little above the 500 feet contour (see map). The whole sand and drift deposit and the river bed close under the hill resemble the features above Bredwardine examined in the last excursion. Before attempting to point out the importance of this glacial deposit in determining the present direction of the river drainage, I should like to draw attention to the contour of the district at the height of 600 feet O. D. The general trend of the hill-slopes at the level agree with those that would be formed by a river flowing S. S. W. from Pandy to join the Usk at Abergavenny; in fact a continuation of the direction of the upper Monnow from Longtown to Pandy, somewhat diverted to the westward. Where the Afon Honddu would join such a supposed river there would naturally be a broad flood plain as we find about Llanvihangel, and the united streams would flow straight down towards Abergavenny. At present, instead of taking this course the upper waters of the Monnow now turn sharply to the north-eastward, and the Afon Honddu makes a similar bend above Llanvihangel, while a river, the Abergavenny river, quite insignificant compared with the spacious valley in which it flows, occupies the southern part of this old valley. I would suggest that the glacial deposit already described sufficiently accounts for the change in direction of the Afon Honddu from almost south to north-east, and probably also for the similar change of the Monnow, though possibly to adequately explain this another dam should be looked for about Pandy. I have only spent one afternoon walking over the Scyrrid to Pandy, but I believe some such process as the following would suffice for the formation of the Llanvihangel dam: Imagine the steep valley of the Afon Honddu filled with a glacier having its gathering ground on the Black Mountains. This glacier would discharge a river heavily laden with sediment, which could only be carried by the waters as long as the bed of the stream was sufficiently steep and confined. This sub-glacial stream would debouche into the broad flat bottomed valley about Llanvihangel, the power of the current to carry its load would be consequently diminished, and the sediment spread out as we see it now. In course of time the shrinkage of the glacier and the diminished volume of water would make it impossible for the stream to surmount the mass of sediment it had formerly deposited, which thus would constitute a dam across the valley. Meanwhile the Monnow cap at Pontrilas had been more rapidly lowered, perhaps owing to softer rocks, or to a greater volume of water. The waters of the Afon Honddu and the upper Monnow, now prevented from flowing south by a dam of sand, would work backwards over the watershed between Pandy and Pontrilas, along the beds of their former tributaries, and so establish a drainage system running north-east. I have not filled in all the details of the operation, but merely outlined the

chief stages in it. For instance, there was probably a time before the valley towards Abergavenny was completely dammed when the river escaped by the depression observed in the court grounds. From a study of the maps and a walk taken some months since from Pontrilas along the hill to Pandy, I had come to the conclusion that somewhere between Llanvihangel and Abergavenny there must exist a large mass of superficial deposits as a dam to account for the striking bend of the two rivers. If the theory of the former southward flow of the upper waters of these rivers be correct, the deposit at Llanvihangel seems to afford a reasonable explanation of their direction north-eastward.

A visit to the old house Allt-yr-ynys had been contemplated, but circumstances precluded it and it was reserved for a future occasion.

Hereford was reached at 7-40, all having been charmed by the day's outing.

Woolhope Naturalists' Field Club.

THIRD FIELD MEETING (LADIES' DAY), THURSDAY, JULY 27TH, 1905.

SYMONDS YAT.

The third meeting this year of the Woolhope Naturalists' Field Club was held on Thursday, when ladies were invited. The rendezvous was Symonds Yat, where the President, Mr. Philip Baylis, who is his Majesty's Deputy-Surveyor for the Royal Forest of Dean, did everything for the comfort and convenience of the party, and proved himself a genial host. The gathering, which proved a most enjoyable one despite the occasional storms, was participated in by about eighty to ninety ladies and gentlemen, among those present being :— *Members :* The President (Mr. Philip Baylis), Mr. J. E. Ballard, Mr. C. P. Bird, Mr. William Brown, Mr. H. C. Moore and Mr. T. Hutchinson (joint hon. secs.), Rev. C. B. Caldicott, Mr. J. U. Caldicott, Col. J. E. R. Campbell, Rev. W. S. Clarke, Mr. R. Clarke, Mr. W. E. Clarke, Mr. S. H. Deakin, Sir Edward Elgar, Mr. E. J. Hatton, Mr. A. H. Lamont, Mr. T. W. Morris, Mr. G. H. H. Philpotts, Mr. A. Simpson, Dr. G. R. Sinclair, Mr. Edwin Stooke, Mr. J. E. H. Stooke, Mr. J. P. Sugden, Mr. R. A. Swayne, Mr. G. Wheeler, Mr. H. W. Apperley, Rev. E. Gedge, Mr. Spencer H. Bickham, Rev. A. Ley, Mr. J. B. Pilley (assistant sec.). *Visitors :* Mrs. E. Ballard, The Misses Bird (2), Mrs. Chave, Miss Chave, Miss Clarke, Mrs. Deakin, Miss Durrant, Mrs. Lamont (Clifton), Mrs. Levason, Mrs. H. C. Moore, Miss Elgar, Miss May Grafton, Mrs. and Miss Simpson, Mrs. Morrison, Miss Wheatley, Mrs. Stooke, Mrs. Hutchinson, Miss Turnard Moore, Miss Pye, Miss Swayne, Miss Wheeler, Miss N. Ballard, Miss Gedge, Miss C. Gedge, Miss Bargrave-Wyborn, Dr. Bargrave-Wyborn, Mr. G. Baxter, Mr. F. C. Brown (Cheltenham), Mr. J. T. Cole, Colonel E. Cecil-Douse, Dr. Foster (Gloucester), Mr. Arthur Hereford (Pencarreg), Dr. Limington-Ask (Devon), Mr. F. Wheeler, Mr. D. N. Campbell, and Mr. John Ballard.

By the arrangement made by the President, Crown woodmen were provided to act as guides. The party walked parallel with the railway line as far as the " Slaughter." a distance of one mile, where those who felt disposed ascended through the wood to the Double View, the village of Staunton and the Buckstone.

The name of "Slaughter" at once suggests some scene of bloodshed, and one is left to conjecture whether perhaps this is not the scene of one of those bloody battlefields whereon mayhap Caractacus and Ostorius Scapula fought. A charming walk is that to the Double View. For some distance the party skirted the borders of Monmouthshire and Gloucestershire until "Bellman's Oak" was reached, or rather the place where the original oak once stood. Three hundred yards west of this oak is the Near Harkening Rock, which is of Old Red Conglomerate, whilst the Far Harkening Rock is some three-quarters of a mile distant. Their name, it seems, is derived from the fact that here the hunters when deer hunting gathered to judge in which direction the hounds were hunting. Given fair weather, a fine view is to be obtained from the Double View, but Thursday was unfortunately misty. On the right stretch the Malverns, Titterstone Clee, Brown Clee, Garway, Graig, the whole range of the Black Mountains, with the Pen-y-Gadr Fawr beyond these. From the Buckstone the billowy expanse of woodland—the Forest of Dean—is to be seen, whilst the Cotswolds and the Somersetshire Hills are visible away on the horizon. Looking Hereford way can be discerned Backbury Hill, Caplar, and Ladylift, with the Malverns yet again in view.

The Buckstone was a Loggan or rocking stone. It has a circumference of 55 feet, and rested formerly on a base of only two feet in diameter. Until 1885, when it was overthrown by a party of tourists, this stone was capable of being oscillated, but it has since been secured, so that the pleasure of moving many tons by a push could not be enjoyed.

Staunton Church, which is not a long walk from here, is rather an interesting structure, consisting of a nave, north and south aisles, a central tower, chancel and south porch. A curious feature about the capitals of the pillars is that they are on different levels, thus forming unequal bows to the arches. The stone pulpit is interesting and curious. For many years it was built up and hidden in a buttress, in order to save it from the vandalism of the Puritans, and one is rather pleased that it survived that age of fanaticism. The font is of late Saxon or Early Norman. Until 35 years ago this piece of ancient masonry was outside the church at the east corner of the entrance porch, but fortunately it was in good enough a condition to be re-used, and now serves its old-time purpose. The rector made the members and their friends most welcome, and pointed out the various features of note. Just outside the churchyard is the old village cross, a well preserved piece of masonry eight feet high.

Those who did not journey to Staunton went to visit the caves in the rocks, about half a mile from the "Slaughter," and here

Plate 10. To face page 198.

STAUNTON CHURCH, GLOS., STONE PULPIT AND STAIRS.

Photo by A. Watkins

ladders were erected for those who wished to explore. A little further on some of the party crossed the Wye in the Crown boat to ascend the Great Doward and the Little Doward Hills. It was a steep, toilsome walk to the Great Doward, and the " umbrageous shade " was most acceptable. The two principal caves, of which King Arthur's Cave is the chief, are quite close to the path, such as Creswick might have painted. These relics of primeval time were explored with much interest, and their channel-like depths gave quite a shiver, by no means decreased when the discoveries made herein were recalled. In the excavations which have been from time to time made the remains of the cave lion, hyena, and such carnivores have been discovered, together with the bones of the mammoth, reindeer, bison, and rhinoceros, conclusively proving that these were larders, as it were, of the beasts of prey of that prehistoric time. Somewhat remarkable is the fact that here were found the remains of the long-haired rhinoceros (R. tichorrhinus), bones of which are found in great numbers in Siberia and Northern Russia. Although comparatively few bones and teeth of the European bison have been found in these caves, yet sufficient evidence has been obtained to prove that this animal also at one time roamed the woods by the Wye and quenched its thirst therein in the evenings of time unchronicled and untold.

In these caves, too, human bones were unearthed in the superficial deposits, and none have been found in a fossilised state. Flakes of flint and scrapers have been found in such positions as would lead to the conclusion that human beings contemporaneous with the visit of the hyena's occupation came to these caves. A fact which points to this is that there is no flint in the district, and so must have been taken there. As far as can be calculated from all data, the period at which the Wye caves were inhabited by these denizens was the close of the glacial period, when the animals were driven from the distant north by the extreme cold. It is held by several authorities that the bed of the river which once poured through this valley was much nearer to the caves than at present, and that the present Wye has worn its way down deeper into the gorge.

The Little Doward camp is of considerable size, taking in the whole summit of the hill. A number of mounds and tumuli are said to exist within and around the camp, and towards the high ground is a large low square mound. Tradition has it that this was originally a British camp, but that it afterwards became a Roman camp. Legend says that Caractacus once held it. From the military point of view it commanded not only the river below, but the highway on the other side from Isca Silurum (Caerleon) through Blestium (Monmouth) to Ariconium beyond Ross. It is probable, too, that

such vantage ground was useful to the Romans as a signal station. A drawing of the Doward camp is given in the *Woolhope Transactions* of 1884. The northern position is of an irregular oval shape, and is 14 acres in area. It is enclosed by a single defence on the steep side towards the river, but with double embankments and ditches on the northern and western sides. Towards the south the other portion of the camp exists, being in area six acres. It is naturally protected by the perpendicularity of its rocks.

Those who took a keener interest than the rest in the collection of botanical specimens did not halt at either of the above mentioned places of interest, but proceeded to the High Meadow Woods, ascending to a height of 700 feet. Hence some of the party, under the ciceroneship of one of the woodmen, diverged to the Far Harkening Rock, a precipitous hill (500 feet above sea level) of limestone. The spur of the promontory being narrow was limited only to two or three at a time, and the walk had to be made with the greatest care. From here Monmouth was discernible.

The botany of the district has been the occasion of a number of papers which are to be found in the *Transactions* of the Woolhope Club. The florula of this limited district is unique.

Mr. B. M. Watkins, alluding to the florula of the Doward Hills, in a paper read before the Woolhope Club in 1881, said that the total number of Phanerogamic plants sufficiently distinct from one another (whether as species, sub-species, varieties) to have a separate name assigned to them in the London Catalogue of British Plants, is 652; of the 94 natural orders which comprise the British flora, 74 being here represented. Of this total 592 are native; four fall under Mr. Watson's class of denizens; 13 are colonists, and 27 are introduced plants. The Doward Hills have a proportion of rather more than one-half of the whole county flora—a remarkably high average considering their restricted area.

Subsequently the different sections wended their way back to the Royal Hotel, where tea was partaken of. In a subsequent discussion concerning wild birds, the President stated that in the Forest of Dean every effort was made to preserve them, the sporting tenant only being allowed to shoot his game. The only birds that were not preserved were the magpie and the jay, which were so destructive.

The following were elected members of the club: Mr. P. B. Barneby (Trewyn), Mr. F. C. Brown (Cheltenham), Mr. E. F. Cockcroft (Cusop), Mr. P. Leighton Earle (Hereford), and Dr. Wyborne-Bargrave (Whitchurch).

THE FLORULA OF THE DOWARD HILLS.

The following paper entitled "Notes on plant additional to the Florula of the Doward Hills" was prepared by the Rev. Augustin Ley for the Ladies' Meeting of the Club, held on Thursday:—

In 1881 the late Mr. Burton M. Watkins issued, through this Club, a paper giving a full list of the Flowering Plants and Ferns noticed up to that date upon the Doward Hills. (The Mosses were added by myself in a paper published in the *Journal of Botany* and in our own *Transactions* in 1890.) It is a remarkable list, of just over 600 species besides named varieties, attesting both the richness of the vegetation and the industry and capacities of Mr. Watkins, and other observers whose work he incorporated.

The present small paper aims at carrying his work forward a few steps: treading in the footsteps of the dear friend and other dear friends who have gone before. The writer experiences few greater pleasures than to carry forward the work they delighted to do: to tread the footsteps which Messrs. Lingwood and Wilmott, Rev. W. H. Purchas, and more than all Mr. B. M. Watkins, month by month and year after year, trod over Doward rocks and woods, and carry forward a few more steps the work they brought to so great a degree of perfection.

For the present paper would be impossible were it not that science of all kinds, natural history not less than other kinds, is practically inexhaustible. In the lists which follow there will be found some 110 fresh records from these hills. Now the fact which strikes one first and foremost, in contemplating these lists, is the fact that, when a tract of country of little over 2,000 acres—the area of a small Herefordshire parish—has been explored by keen eyes with knowing men behind them for over half a century, yet still year by year additions to the recorded vegetation of this tract should be made at the rate of five or more fresh records in each year. This is not to be accounted for to any great extent by the sub-division of species which has taken place in the interval, nor by the more extended and accurate knowledge of plants which has been attained in the same interval (except in the case of the single genus Rubus); because many of the records are for old and well recognised species: nor entirely by both these causes, together with the more thorough investigation which naturally goes along with the lapse of years. There remains yet another cause contributing to this inexhaustibility of Natural History. But let us dwell first for a moment on the happy inexhaustibility of Nature. Rejoice, you who love the exploration of Nature! She has still her secrets waiting for you.

They lurk in her woods and hedges and rocks. They wait but your skilled industry to unfold themselves to your delighted senses.

Take an instance of this in the Pyrus cordata, Desv., " Briggs' Pear " as it is called from its first discoverer in Britain. This plant was first known from Mount Elbruz in Persia. It was subsequently discovered plentifully in West France, and at one or two other intermediate stations, *e.g.*, Mount Athos ; and an attractive legend connects its curious distribution with the wanderings of the Celtic tribes*. Then it was discovered in Cornwall by the late Mr. Archer Briggs. Now it is found to be an inhabitant of Herefordshire : and its bushes have been looking down on generations of botanists from the top of the Great Doward quarry, saying to each " Here is a secret ! Read it if you can ! " The secret is not yet entirely disclosed : for there are numerous seedlings of this Pear in the wood near by ; yet, during the five years I have had it under observation, it has not been known to flower or fruit ! How then does it spread ?

The other cause alluded to above, as undoubtedly contributing to bring the fresh records up to the total which they show, is one of some scientific interest : namely, the migrations of plants. Here one might claim some degree of genuine scientific importance for a series of observations as accurate as possible of the vegetation of a very limited area carried on for an extended series of years ; the insight which such a series affords into the migratory habits of plants. It is not often that one can feel sure that any specified plant has not been an inhabitant during unnumbered ages of the area it occupies now. Some plants have a habit of hiding themselves during a long series of years, and then reappearing : and the chance of missing over old inhabitants of the place is thereby indefinitely increased. Still, if the migration of plants can ever be proved, it is through such a series of observations as has been carried on upon these hills.

There is at present, covering a space of a good many square yards in the riverside jungle at the Weir, the pretty and rare Stellaria nemorum, L. (Wood Stitchwort). Now this plant is, during May, a very conspicuous plant, looking, with its deeply cut petals, quite unlike its nearest relations, S. Holostea, L., and S. aquatica, Scop. The spot was one well known to Mr. Watkins and others : one feels morally certain that, in the years they botanised there, the Wood Stitchwort was not there. It is a plant on migration. It certainly was not aided by man. It is far from man's unthinking and subversive railway trains and spoil heaps. How is the plant spreading itself ? The answer in this instance is easy to give with some

* See on this subject an interesting paper by Mr. M. T. Masters in the *Journal of Botany*, 1876, p. 225.

certainty. By means of the river. It was first noticed by Sir G. Cornewall by the river in Deepwell wood, Moccas. Next, Mr. Le Brocq found it on a stream near Eardisley ; then I myself found it on the head of the Monnow near Craswall ; then again on the river at Caplar and Carey. Now it has established itself on the river at Great Doward. These records, taken together, leave no room for doubt that this rare plant is a real native of Herefordshire : but they point to migration : and they give, within quite narrow limits, the date of the arrival of the plant on the Lower Wye in Herefordshire. This is the interest of the thing ; and another interest remains in the future : will the plant make good its colonisation, and become a permanent factor in the Doward Flora ? In my opinion it is likely to do so, since it seems to be permanent at its other stations. Still, here is an interesting subject of observation.

Take another instance of migration. On the river, at and above the Fishhouse, the pretty Forget-me-not, Myosotis sylvatica, Hoffm, is now often to be found. It is found under similar circumstances in many places in Herefordshire, chiefly by rivers and brooks. This plant is a native of the North Midlands of England, its southernmost native county being usually thought to be Worcester. But if you look in our " Herefordshire Flora," you will find that a few years ago (in the '70's and '80's) it was unknown in Herefordshire. Since that period it has been greatly helped by its extensive cultivation in gardens. It is trying its best, by man's help, to advance southwards in Britain. Will it succeed ? One cannot say : its difficulties are not yet surmounted. We can only wish such a gem of Nature God-speed ! But though in this case aided by man, it is still a natural process, having a scientific interest, which we are watching.

On the west face of the Great Doward, near the bone caves, are some shallow limestone quarries, which a few years ago had been disused for many years. About the year 1880 the Rock Stonecrop Sedum rupestre, L., appeared in quantity in one of these quarries. I reported the occurrence to Mr. Watkins : he replied that he knew the spot well, and that the plant had certainly been absent from there until within a very few years. It is not one of the stonecrops commonly cultivated on walls and in gardens ; and whence it came to the quarry cannot be ascertained. But it was a plant trying its best to establish itself in thoroughly natural surroundings. Now the quarries are again being worked : man has in this instance been a destroyer, and the plant is gone.

One more instance may be given of the use of a series of observations such as these, this time of the negative kind. You can watch plants dying out. Here again, except in case of such total extinctions as are caused by drainage or building operations, it is of course

hard really to be sure that the plant has disappeared for good and all. But you can watch what looks like the process. A few years ago the Wild Lettuce, Lactuca virosa, L. was to be found on the Little Doward: now it will be searched for there in vain. It has not been pillaged by collectors, but it has probably succumbed to the tongues of the deer. The same fate befell the rare orchid, Epipactis ovalis, Bab. some years before. Of course some unforeseen change in outward surroundings may come, and prove that these lamented extinctions in our native Flora have really not taken place: still, the hope is, in these instances, a forlorn one.

LIST OF PLANTS ADDITIONAL TO THE FLORULA OF THE DOWARD HILLS.

NOTE.—Where no authority is quoted, the writer is responsible for the record.

PART I.—FLOWERING PLANTS AND FERNS.

Caltha palustris, L. Var. Guerangerii, Bor.
At the Dropping Well, 1889.

Cardamine pratensis, L. Var. *dentata, (Schultz)
Hedgebank near Whitchurch village, 1905.

Var. *paludosa. Petermann
River side vegetation at the Lower Ferry, 1905.

Barbarea †intermedia, Bor.
Wood path near the Bone caves, 1889.

Barbarea †præcox, R. Br.
Near gardens at the Lower Ferry, 1902, 1905.

†Hesperis matronalis, L.
Six to eight large plants by the river below the Weir, 1901.

Nasturtium amphibium, R. Br.
River side between the two Ferries, 1905.

Polygala oxyptera, Reichenb.
At several spots on the Great Doward, 1894.

Stellaria nemorum, L.
River side thicket at the Weir, abundantly; first in 1899.

Stellaria umbrosa, Opitz
River bank at the Fish house, 1895; thickets at the Weir.

Stellaria major, Koch
With the last at the Weir, 1903.

Hypericum perforatum, L. Var. angustifolium, Gaud.
Bushy fields, Great Doward, 1900.

†Impatiens glandulifera, Royle
Thickets at the Weir, 1904.

Melilotus arvensis, Wallr.
Near Crocker's Ash, 1894; *Purchas, Ley.*

Trifolium filiforme, L.

In short turf at the Old School, Great Doward, 1900.

Vici angustifolia, L. Var. Bobartii, Koch

In the great quarry; also on the north side of the Great Doward, 1905.

Prunus Cerasus, L.

Conglomerate rocks near the Old School, 1900, 1905. Clearly native.

Prunus Padus, L.

One small bush in a hedge near the great quarry, 1900. Introduced ?

Fragaria †elatior, Ehrh.

In some quantity in thickets at the Weir; also in dense wood near the great quarry, native? Path side near the Lower Ferry, 1890, 1905.

Rubus.

In consequence of the increased knowledge in this genus and the extensive changes in nomenclature which have taken place in recent years, it has been thought best to re-write Mr. Watkins' list, adding the sign * where the record is a new one.

Rubus idæus, L.

Abundant throughout the area.

R. plicatus, W. & N.

In the Lord's Wood, on sandstone; very local.

Var. *Bertramii, G. Braun

Lord's Wood, with the type.

R. imbricatus, Hort

Hedge near the Dropping Well, 1881. Longclose Wood, Little Doward, abundantly. Hedge near Whitchurch village, 1904.

R. Lindleianus, Lees

Common.

R. rhamnifolius, W. & N.

Common.

R. *pulcherrimus, Neum.

Lord's Wood, Great Doward, 1888. Longclose Wood, Little Doward: both on sandstone.

R. *Godroni. Lecoq & Lamotte

Lane near Whitchurch village, 1892.

Var. clivicola, Ley

Near Wyaston Leys, Little Doward.

R. rusticanus, Merc.

Abundant.

R. macrophyllus, W. & N. Var. Schlechtendalii, W.

Hedge near the Dropping Well.

R. Sprengelii, W.

On the sandstone, Lord's Wood; local: 1890.

R. *hypoleucus, Lefv. & Muell.

Near Wyaston Leys, Little Doward, abundantly, 1893.

R. *pyramidalis, Kalt.

Roadside near Wyaston Leys, Little Doward

R. leucostachys, Sm.

Abundant: the white flowered form.

R. lasioclados, Focke. Var. *angustifolius, Rog

Abundant on Great Doward.

R. *Borræanus, Genev.

Longclose Wood, Little Doward, 1904.

R. *criniger, Linton

Longclose Wood, Little Doward, 1894; *Purchas, Ley.*

R. *adenanthus, Boul. & Gill.

Hedge between the village and the great quarry, 1908.

R. echinatus, Lindl.

Common.

R. Babingtonii, Bell Salt. Var. *phyllothyrsus (Frider

Lord's Wood, near the Bone Caves, 1901.

R. *ericetorum, Lefv.

Longclose Wood, Little Doward, 1903; *teste* Rogers.

R. *cavatifolius, P. J. Muell.

Longclose Wood, Little Doward, in small quantity, 1893.

R. fuscus, W. & N. Var. *macrostachys, P. J. Muell.

Little Doward, on limestone.

R. *pallidus, W. & N.

Lord's Wood, on the sandstone, rare; 1888.

Var. *leptopetalus, Rog.

Lord's Wood, on the sandstone, locally abundant; 1888.

R. scaber, W. & N.

Sandstone in the Lord's Wood, 1884; the form formerly attributed to *R. Bellardi*, W. & N. Scarce.

R. longithyrsiger, Bab.

Abundant throughout the Lord's Wood, on sandstone and limestone.

R. *botryeros, Focke, *form*

Local; in one spot near the entrance of the Lord's Wood, 1888.

R. foliosus, W. & N.

Not rare.

R. *rosaceus, W. & N.

Near the northern entrance of the Lord's Wood, on sandstone.

Var. infecundus, Rog.

Abundant.

Var. Purchasianus, Rog.

Abundant on the sandstone and conglomerate, on both hills.

Form hirtus, Flora of Herefordshire

With the last, on the conglomerate.

R. dasyphyllus, Rogers

Abundant.

R. Kœhleri, W. & N. Var. *cognatus (N. E. Brown)

Lord's Wood, Great Doward; Longclose Wood, Little Doward, abundantly.

R. *divexiramus, P. J. Muell.

Sandstone, on both hills, abundantly; first in 1884.

R. *hirtus, Waldst & Kit. *sp. coll.*

Lord's Wood, near the northern entrance, 1901.

R. dumetorum, W. & N. Var. ferox, W.

Common.

Var. *britannicus (Rog.)

Wood border by the river, 1904.

Var. diversifolius (Lindl.)

Not common.

Var. tuberculatus, Bab.

Not common. I have not seen the plant well marked.

R. corylifolius, Sm. Var. cyclophyllus (Lindeb.)

Common.

R. cæsius, L.

Abundant. Vars. **tenuis*, *ulmifolius*, and *intermedius* of Babington occur.

Rosa *glauca, Vill.

In the great quarry, 1903.

R. *systyla, Bast.

In the Lord's Wood, on sandstone and limestone; first in 1891; *Rogers, Ley*. Lane hedge near the Old School, 1892.

Cratægus Oxyacantha, L. Var. *oxyacanthoides, Thuill.

Wood near the great quarry, 1891; *Rogers, Ley*: apparently native, but rare.

Pyrus cordata, Desy.

Rocks overhanging the great quarry, and in the coppice wood adjoining. One shrub in the great quarry; first in 1887.

Pyrus communis, L. Var. *Pyraster (L.)

One tree on a lime point on the east face of Great Doward; one shrub in the great quarry.

Pyrus Malus, L. Var. *acerba, DC.

Common in the Lord's Wood, &c.

Pyrus *latifolia, Syme *(torminalis* × *Aria* **Hedlund)**

Two small trees in Lord's Wood, near the bog, 1886.

P. *intermedia, Ehrh. (*Mougeotii* **sub-sp.** *angliea* **Hedlund)**

Several spots in the Lord's Wood; first about 1875.

Epilobium obscurum, Schreb.

Wood path, Little Doward, 1894.

E. *Lamyi, F. Schultz

Garden ground on the Great Doward, 1888. Wood path, with the last, Little Doward, 1894.

Chrysosplenium alternifolium, L.

Thicket at the Weir, 1903.

Galium Mollugo, L. Var. *insubricum (Gaud.)?

In the great quarry, 1902, 1906.

Arctium minus, Bernh. Var. pubens, Bab.
Near the Keeper's Lodge, Great Doward.

A. intermedium, Lange. Var. subtomentosum, Ar. Benn.
East flank of the Little Doward.

†Centaurea alpina, L.
Near the great quarry, with *Anchusa sempervirens*, L.

Picris hieracioides, L.
On Great Doward; not rare.

Lactuca virosa, L. Has not been found for a good many years, and has probably become extinct.

Crepis †biennis, L.
Field at the summit of Great Doward, 1888. Road side near the village 1901.

C. †taraxacifolia, Thuill.
Road side near Whitchurch village, 1901. Lord's Wood, 1905.

Hieracium Pilosella, L. Var. nigrescens, Fr.
In the great quarry, 1894.

H. Pilosella, L. Var. concinnatum, F. J. Hanb.
In the great quarry, and on bare ground on the north of Great Doward, 1904.

H. lasiophllum, Koch Var. planifolium, F. J. Hanb.
Great Doward, on the limestone; east and west fronts of the hill. (This is the *H. pallidum* of Mr. Watkins' list).

H. stenolepis, Lindeb.
Lime points near the great quarry, rare.

H. pachyphyllum, Purchas.
(*H. cæsium*, Mr. Watkins' list). Limestone, on the east and west sides of Great Doward.

H. serratifrons, Almq. Var. crassiceps, Dahlst.
(*H. murorum*, Mr. Watkins' list). Abundant in the great quarry and in other places.

H. scanicum, Dahlst.
Abundant in and near the great quarry.

H. *sciaphilum, Uecht.
Abundant.

Var. amplifolium, Ley
Common on the Great Doward (These three were formerly combined under the name *H. vulgatum*, in reality a very different plant.)

H. tridentatum, Fr. Var. *decipiens, Ley
Bushy bank near the great quarry, on sandstone, 1890.

Pyrola minor, L.
"In the Lord's Wood, on the north side, Great Doward"; *Miss Deane!*

Mentha sativa, L. Var. subglabra, Baker
River side at the Weir.

Mentha *gracilis, Sm.
River side thicket at the Weir, 1906.

Origanum vulgare, L. Var. megastachyum, (Link)
Common on the Great Doward.

Scutellaria galericulata, L.
Fine and abundant in a shady spot at the base of the Little Doward, 1893; *Linton, Ley.*

Anchusa sempervirens, L.
Hedge near a cottage, Great Doward, 1898; again at another spot, 1899.

Mysotis †sylvatica, Hoffm.
On the river bank in the wood above the Fish house, 1890. Small orchard on the north-east face of the Great Doward, 1892.

Salix decipiens, Hoffm.
Thicket at the Weir, 1899.

Salix hippophæfolia, Thuill.
Thicket at the Weir, 1877.

Juncus supinus, Moench. Var. *subverticillatus, Sm.
Damp hollows in the Lord's Wood. 1904.

Eriophorum angustifolium, Roth
With *E. latifolium, Hoffm.*, at the bog, Great Doward, 1889.

Festuca rottbœllioides, Kunth.
Lord's Wood, near the Bone Caves, 1905.

Festuca sylvatica, Vill.
Shady conglomerate near the Old School, 1886. Beech copse (on limestone) above the great quarry.

Bromus mollis, L. Var. *glabratus, Doell.
Wall top at the great quarry, 1905; *Bickham, Ley.*

Asplenium Trichomanes, L. Var. incisum
Dry shady limestone rocks on Great Doward.

Athyrium Filix-fœmina, Roth. Var. molle, Roth
On conglomerate at the Old School, Great Doward, 1905.

Lastræa Filix-mas, Presl. Var. paleacea, Moore
Wood at the north flank of the Little Doward, 1893.

Part II.—MOSSES.

Weissia calcarea, C.M.
In fruit at the Dropping Well, Great Doward, 1892.

Weissia tortillis, C.M.
Quarry on the north side of Great Doward; *Dixon.*

Seligeria recurvata, B. & S.
On the west side of the Great Doward, 1906; *E. Armitage, Binstead!*

Seligeria acutifolia, Lindb Var. longiseta, Lindb.
With *S. pusilla*, B. & S., in the Bone Caves, Great Doward, 1898.

Phascum curvicolle, Ehrh.
On the Little Doward, 1901; *E. Armitage, Binstead.*

Pottia recta, Mitt.
With the last on the Little Doward, 1901; *E. Armitage, Binstead.*

Pottia Starkeana, C.M.
Dry limestone ground at the top of the Little Doward, 1898.

Pleurachæte squarrosa, Lindb.
Summit of the Little Doward, 1901; steep bank at the south of the great quarry, 1903; *Binstead, Ley.*

Grimmia commutata, Hubn.
Conglomerate rocks on the west face of Little Doward, 1893.

Rhacomitrium hetrostichum, Brid. Var. gracilescens, B. & S.
Conglomerate on the north face of the Great Doward, 1906; *Armitage* and *Binstead!*

Zygodon Mougeotii, B. & S.
In small quantity on conglomerate below the Old School, Great Doward, 1905.

Ulota crispa, Brid.
The moss recorded by me under this name in 1890 has turned out to be *U. intermedia*, Schpr.; from fruiting specimens in 1904.

Ulota phyllantha, Brid.
Oak and willow boles at the Weir, 1893. Again in 1900; *Binstead, Ley.*

Orthotrichum affine, Schrad. Var. fastigiatum, Hub.
Willow bole below the Weir, 1906.

Orthotrichum leiocarpum, B. & S.
Oak and ash boles between the Weir and the Dropping Well, 1893. Again at the Weir, 1900.

Bartramia pomiformis, Hedw.
Conglomerate on the West face of the Little Doward, 1893; *E. Armitage!* Shady sandstone near the Old School, Great Doward, 1905.

Bryum pendulum, Schp.
Wall top at the Lower Ferry, 1905.

Bryum intermedium, Brid.
On the ground in the great quarry, 1900.

Bryum erythrocarpum, Schwgr.
Wall top at the great quarry, 1904.

Bryum *rubens, Mitt.
Clearing in the Lord's Wood, Great Doward, 1909.

Bryum cæspiticium, L. Var. *imbricatum*, B. & S. was again found on the Little Doward; 1901 and subsequent years.

Bryum Barnesi, Wood, and *B. versicolor*, Braun, must be erased from our lists, having been determined by Dr. Braithwaite to be states of *B. atropurpureum*, W. & M.

Bryum argenteum, L. Var. *lanatum, B. & S.
Western face of the Little Doward.

Mnium riparium, Mitt.
Banks of the river above the Fishhouse, and at the Weir, Great Doward, 1900.

Cryphæa heteromalla, Mohr
Little Doward; *Binstead!*

Heterocladium, heteropterum B. & S. Var. fallax, Milde
Great Doward; underneath the Seven Sisters rocks, 1903; *Dixon.*

Thuidium recognitum, Lindb.
At the great quarry, 1898. South face of the Great Doward, 1900; *E. Armitage!!*

Brachythecium glareosum, B. & S.
In abundant fruit in the Lord's Wood, 1898; *E.Armitage!!*

Brachythecium velutinum, L. Var. condensatum, B. & S.
On the west side of the Great Doward, 1903; *Dixon.*

Eurhynchium speciosum, Schp.
At the Dropping Well, 1906.

Eurhynchium murale, Milde Var. julaceum, Schp.
Stones by the river at the Weir, 1905.

Plagiothecium sylvaticum, B. & S.
Fruiting on the conglomerate near the Old School, Great Doward, 1892.

Amblystegium varium, Lindb.
Stones in the rill at the old mill, Whitchurch village, 1905.

Amblystegium irriguum, B. & S.
With the last, 1905.

Amblystegium Sprucei, B. & S. *(teste Dixon).*
Exposed limestone on the east face of Great Doward, *cum fr.*, 1899; *Binstead, Ley.*

Hylocomium brevirostre, B. & S.
In the Lord's Wood, Great Doward, 1898; *Binstead, Ley.*

Hylocomium loreum, B. & S.
With the last, 1898; *E. Armitage!!!* Again at other spots in the Lord's Wood, 1900.

Woolhope Naturalists' Field Club.

FOURTH FIELD MEETING, AUGUST 31ST, 1905.

The almost limitless interest of the Forest of Dean—furnishing as it does food for inquiry on all the subjects included in the range of a Naturalists' Field Club—constitutes this Crown domain one of particular favour with the members of the Woolhope Club, who have visited and re-visited it on many occasions. Another visit was paid to this fruitful research ground on Thursday, the fourth field meeting of the year, and a very enjoyable and instructive day was spent.

The Hereford members assembled at Barr's Court well before time, and departing at ten o'clock took train for Speech House Road. From Lydbrook Junction, which was reached at close upon eleven o'clock, a special service conveyed the company to their destination. The majority of the party detrained at Serry Ridge, and the Speech House Hotel, about three miles distant, was made for. A capital luncheon was laid out, and to this the members sat down with a well-whetted appetite. The company included the President (Mr. Philip Baylis), the Rev. Preb. Winnington Ingram, the Rev. Preb. W. H. Lambert, the Rev. D. W. Abbott, Mr. E. J. Baker, Dr. Wyborn Bargrave, Mr. C. P. Bird, Mr. W. J. Boycott, Mr. T. C. Brown, Mr. W. Brown, Rev. C. Burrough, Mr. R. Clarke, Mr. J. E. P. Davies, Mr. P. Leighton Earle, Mr. H. Easton, Rev. H. M. Evill, Mr. E. A. Gowring, Rev. J. E. Grasett, Dr. E. Harris, Mr. J. T. Hereford, Rev. Preb. Hopton, Mr. A. G. Hudson, Mr. J. J. Jackson, Rev. A. G. Jones, Mr. H. E. Jones, Rev. C. G. Ledger, Rev. Claude Lighton, Rev. A. H. McLaughlin, Rev. H. B. D. Marshall, Mr. T. W. Morris, Dr. Scudamore Powell, Mr. H. M. Purchas, Col. M. J. G. Scobie, Mr. J. P. Sugden, Mr. R. A. Swayne, Lieut.-Col. Evan Thomas, Mr. E. T. Woodward, Preb. Williamson, Mr. T. D. Morgan, Mr. A. Simpson, Mr. W. Pilley, Mr. T. Hutchinson, and Mr. H. C. Moore, (hon. secretaries). Mr. J. B. Pilley (assistant hon. secretary), Mr. J. Probert, Mr. A. P. Small, Mr. E. P. Popen, Mr. E. J. Hatton, Canon Basley, Mr. Hughes (Northumberland), Mr. C. Staunton, Rev. Godfrey Biddulph, Rev. E. A. Burrough, Rev. A. G. Ledger, Mr. T. J. Findley, Mr. Douglas Fenner, Mr. Michael Froude, Mr. W. Boycott, and Rev. E. Owen.

After the luncheon, the PRESIDENT announced the names of the newly accepted members of the Club, and went on to propose the health of the King. He subsequently proposed a vote of thanks

to Mr. Carter, the Traffic Manager of the Severn and Wye Valley Line, for the excellent service which he had rendered the party in the matter of the train arrangements.

Mr. CARTER briefly replied.

The company, under the directorship of the President (the deputy-surveyor H.M. Royal Forest of Dean) then made a tour through portions of the Forest abounding in historical associations, mineral wealth, and natural history productions. Near the Speech House Hotel used to be vestiges of the old Roman roads, but these have disappeared under the new rule of the County Council. Vestiges, however, exist in other parts of the forest, Coins, scoriæ, and tortuous passages in the limestone rocks, called " scowles," also afford evidences of Roman occupation, the southern invaders coming here for the iron ore, numerous veins of which they worked.

To the east of the Hotel and about a quarter of a mile distant is the Spruce Fir ride, a beautiful avenue of trees some two miles in length leading to Danby Beeches. Quite adjacent to the Speech House are a number of fine holly trees, some of which have attained no inconsiderable girth. Some oak trees in the vicinity, which have been the subject of measurement on past occasions by the Club, also exhibit huge girths, the four principal trees being the " Three brothers " and the " Newland oak," a forest monster of forty-three feet six inches girth at five feet from the ground. Towards tea time the company drew near to Whitemead House, the residence of the President. Here a brief halt was made, and at the kind invitation of Mr. Baylis we sat down to tea, much to everyone's pleasure.

The party, after a very pleasant half-hour, wended their way to the station, a quarter of a mile distant, carrying with them very pleasant memories of Ye Speech House and Whitemead.

The following paper was prepared by Dr. Moore for the Meeting :—

THE NAVIGATION OF THE WYE.

In 1905 considerable interest was aroused by certain suggestions put forward by Mr. C. Curtis, with regard to the improvement of the Wye near Hereford for boating and other purposes. His suggestions are summed up in the following paper, which was communicated to " a most representative meeting of citizens of Hereford known for many years," who were assembled to discuss " the improvement and advancement of Hereford as a residential city and tourist resort." (*Hereford Times*, January 28th, 1905.)

" For some time past there has been a strong and growing feeling in the minds of many citizens, that some steps should be taken to improve the boating and pleasure excursion facilities of our beautiful River Wye.

It is thought that if something could be done in this direction it would prove not only a great boon to the inhabitants of the city and county of Hereford, but would also be a considerable attraction to visitors, and undoubtedly be the means of inducing many to take up their residence in the neighbourhood.

It seems that the time is now opportune for the formation of a committee to thoroughly discuss the matter ; and for this purpose a scheme has already been suggested which it is proposed should be carried out largely by public subscriptions, and which briefly is as follows :—

It contemplates the deepening of many shallows by the removal of rocks and sandbanks on many of the worst streams ; and the construction of a temporary weir this side of the Lugg's mouth, between five and six miles, by water, below the city, which would be the means of opening up this beautiful stretch of the river (at present of no use for boating purposes), as well as for some miles above the Wye Bridge during the summer months, whilst the fishing would not be in any way interfered with.

The weir would be regulated by winches, so as to give the required height in summer, but during the winter months the weir would be thrown entirely open, so that the water could flow its natural height and form no obstruction in times of floods.

This scheme necessarily calls for careful investigation, entails considerable work, and the collection of much information before the practicability of it being carried out can be determined, but the difficulties are by no means insurmountable.

The scheme also includes the opening up and improving of our lovely riverside walks, and for this purpose the railway companies should be approached to sanction the attachment of a railed footway alongside the Eign Railway Bridge, and if possible to the Hunderton Bridge as well, so that pedestrians may extend their walks along the riverside.

Knowing the interest the Council take in furthering any movement that has for its object the improvement and welfare of the city and county, and for increasing the means of healthful recreation, it is earnestly hoped that the matter will receive every consideration at their hands, so that the scheme may be brought to a successful issue."

This paper provoked much discussion, and suggested to me the desirability of recording details of other schemes and matters of interest in connection with the navigation of the Wye.

As recently as the eighteenth century our country roads, though practicable for horse traffic, were very generally so tortuous, rough, and, after rain, so deep in mud, that heavy merchandise could not be conveyed over them. Such traffic might be easily carried on by rivers where the country was flat, but only with great difficulty in rivers like the Wye, where floods were frequent and where stoppages and trans-shipments at rapids and shallows were generally necessary. The canalisation of such rivers became in time a matter of serious study, and so continued until improved highways and then railways made water transit of less importance. The history of the Wye navigation from early times may be gathered from ancient records, from Acts of Parliament, and from the accounts of travellers in search of the picturesque. In very early times vessels that navigated the Severn came up the Wye as far as the tide would carry them, and, by the help of weirs, as far as Monmouth. The accounts of household expenses of Joan de Valence, the widowed Countess of Pembroke, when she kept the Christmas of 1296 at her Castle of Goodrich, show how the Wye was used for traffic at that time. A barrel of venison—probably from Ireland—was taken by a hired boat from Bristol to Monmouth and thence by road to Goodrich, the messenger being away for seven and a half days. A pipe of wine was carried similarly, the man who came with the boat to Monmouth being paid for eleven days. These were heavy articles that could not be divided, but fish and cloth from Bristol were landed at Chepstow, and carried on pack horses to Goodrich. In those days, when fish formed a large proportion of the diet of the people, the navigation would be obstructed to some extent by fishing-weirs, of which the Countess had one at Goodrich. It was also obstructed by mill weirs, and the owners of all these had their legal rights.

The use of the river by barges must have increased with the growth of population and trade. In the first attempt to convert the Wye above the flow of the tides into a navigable river the previous existence of a traffic in goods and passengers is recognised. Indeed, the need of some kind of conveyance cheaper than that by road, between Bristol and Hereford, and perhaps beyond Hereford, was urgent. The act of 1555 (2 and 3 Philip and Mary) for "re-edifying" four mills on the Wye at Hereford shows that in the 19th year of Henry VIII. these mills had been ruined by persons who by "wrongful suggestion" had obtained the King's authority for that purpose. It seems probable that these persons must have been

interested in the unobstructed navigation of the river past the city, for the citizens were very largely interested in the preservation of the corn mills and fulling mills that had been destroyed.

From "Papers relating to the History and Navigation of the Rivers Wye and Lugg," published by Mr. John Lloyd in 1873, may be gathered the particulars of the scheme of Sir William Sandys, of Ombersley Court, Worcester, and his associates for rendering navigable the lower part of the Wye from Hereford to the Severn. Sandys, who was the pioneer of river navigation, obtained in 1661 his Act of Parliament for the removal of impediments and the building of Weirs with locks upon the river and a towing path to be used by men or horses. Boats were to be provided to go weekly, carrying passengers and merchandise, between Hereford and Bristol, at rates one-third less than rates previously charged for conveyance by land or water. Persons who had before used boats on the river were to be at liberty to continue their traffic. Although the Act gave power to make towing paths for horses, it does not seem that such paths were actually provided.

The scheme, however, of Sandys was unsuccessful, and the inhabitants of Hereford and the vicinity of the river continued to suffer from the great cost of conveying goods from Bristol, and the difficulty of carrying their corn and timber and bark to a market. But in 1688 it was proposed to render the river navigable at the cost of the county throughout its course downwards from the Hay. All the mills with their weirs and all the fishing weirs were to be removed and the shallow places deepened. After strenuous opposition from owners of weirs and from parishes that would not be benefited by expenditure to which they would have to contribute through a county rate, the Act for making navigable the Rivers Wye and Lugg was passed in 1695.

Mr. Lloyd gives "an authentic and probably accurate" account of the mills and weirs on the Wye existing at the time of this Act, classified according to their use and condition. I will place them in the order in which they stood upon the stream :—

*Monnington Weir, 2 miles ; *Bridge Sollars Weir, 2 miles ; *Sugwas Weir, 2 miles ; *Hereford Weir—Fulling Mills, 6 miles, Corn Mills, 2 miles ; *Fownhope, 1 mile ; *Hancocks, 1 mile ; *Carey, 2 miles ; *Foy, 3 miles ; *Wilton, 2 miles ; total, 23 miles. Lydbrook Weir, out of repair ; Park Weir, out of repair ; Chit (or Jet) Weir, out of repair ; Old Weir, out of repair ; Bishop's Weir, out of repair ; New Weir, used in connection with iron works ; Martin's Weir, out of repair ; Hadnock's Weir, out of repair ; *Monmouth Weir ; New Weir, out of repair ; Ital's Weir, out of repair ;

Bick's Weir or Bigsweir, out of repair; Coedithel's Weir, out of repair; Brook Weir, out of repair; Plumb Weir, out of repair; *Lin Weir, in the tideway near Tintern; *Ash Weir, in the tideway near Tintern; *Wall Weir, in the tideway near Tintern.

It will be observed that all the weirs down to Wilton were used for working mills; some of these, like New Weir, may have been used also for fishing. All the weirs below Wilton of which there is any account were fishing weirs.

Those marked with an asterisk were removed and their owners compensated under the Act of 1695. At Bridge Sollars, Sugwas, Hereford, and Fownhope, timbers used in the foundations of the mills still remain, and the weirs can be traced in other places.

But the list of weirs does not appear to be complete, for there is evidence of several other weirs used probably for fishing. Below Wilton is a place called Weir End. The fishing weir at Goodrich Castle does not seem to be accounted for; the Duke of Beaufort was compensated for "Tintern or Abbey Weir," as well as for Ash and Wall Weirs"; and the following additional weirs are noted in Mr. Stooke's "Tourist Map of the River Wye"—

Ridingstream Weir, above Coedithel; Stone Weir or Fish House Weir, below Tintern; Hook Weir, below Tintern; Trough's Weir, below Tintern; Walter's Weir, below Tintern; Chit Weir, above Chepstow.

The removal of the weirs left only New Weir, near Symonds Yat, remaining. At that time the refining of iron was still a profitable industry, and water power was used to work the hammers by which the soft masses from the puddling furnace were flattened out as the first step in the manufacture of wrought iron. New weir remained until the use of wood as fuel was superseded by coal, and after being damaged by a flood it was removed in 1814.

But it was found that the destruction of the weirs did not have the desired effect. The removal of obstacles and the opening up of new channels had, in fact, so quickened the flow that, except in times of great flood, there was insufficient depth of water in the river. So, in 1727, another Act was passed for the erection and preservation of weirs and mills for improving the navigation above the town of Ross. The Act (13 George I.) sets out with a statement that "the pulling down of weares and mills has been found by experience to prejudice the navigation by occasioning very great shoals and flats so that at low water the said rivers (Wye and Lugg) are not passable in many places," a result which the opponents of the former Act had foretold. The Survey made by Isaac Taylor in 1763, consisting of

a map with details,* shows the next scheme for improving the navigation. Isaac Taylor (see Dictionary of National Biography) was born at Worcester in 1730, and died in 1807. He was a man of varied accomplishments. He worked originally as a brass founder, then as a silversmith, and as a surveyor, and settled in London. He then became a portrait painter and engraver, and was a very highly prized friend of men like Garrick, Goldsmith, Bartolozzi, and Fuseli. He was the father of Isaac Taylor of Ongar.

I do not know how he became interested in the navigation of the Wye. It may be he was employed to make this survey, or the growing demand for a thorough organisation of the traffic by the river may have induced him to hope that such a scheme would be adopted by parties concerned. It was the first scheme drawn up with the skill and forethought of an engineer, and the draughtsmanship is excellent. It provided for the formation of twenty-two weirs, which, with the then existing New Weir below Symonds Yat, would divide the river from Bigsweir to Eigne, below Hereford, into twenty-two lengths. Each weir would be five or six feet high, would pound back the water as far as the base of the weir above it, and its slanting direction across the river was carefully considered. By Sandys' Act a stream of sixteen inches high and twelve inches wide was to be made near the bottom of each weir for the passage of salmon. Taylor's scheme provided for the passage of salmon by making a portion of the top of the weir of twenty feet in width fifteen inches lower than the rest. The locks were large enough to pass the common barges, and floodgates were provided at the opposite ends of the weir to release the water when necessary for the security of the weirs or to prevent damage to adjoining lands. The author gives his reasons for thinking that no weir below Bigsweir is necessary, and he considers that if the river is treated as proposed, five or six men will draw barges of thirty or forty tons. This would be against the stream, and the use of horses to tow the boats does not seem to have been contemplated. His estimate, set out in full detail, amounts to £20,900.

It is evident that the author of this scheme studied on the spot the mode of carrying on the river traffic. He takes account of the tides, the barges, and the modes of propelling them below and above the limit of the tidal flow. His locks were to be 66ft. long and 17ft. wide in the clear. He notes that the spring tides reach as far as Redbrook, which happens in exceptional cases now. He says "Trows come, or may come to Landogo" for three or four tides every spring, and barges may always go down

* See Taylor's paper, with map, at end of this Volume.

to Landogo to unload. Except for three or four of the neap tides they may go down as far as Brockwear with the advantage of the tide. A "Trow" was an ungainly vessel, with broad bows and rigged sloop-fashion, that came from Bristol as far as the tide would carry it. The barge was a flat-bottomed vessel drawn by a string of men, who were aided by a large square sail when the wind was favourable. Mr. Julian Waugh, of Monmouth, remembers such vessels in use, when the principal traffic to Monmouth was by the river. There was a rapid stream just below the bridge, and when a barge going up the river reached that spot a long rope, fastened to it, was taken round pulleys that were fixed flatwise on the top of the parapet. Then by pulling the rope along the bridge the barge was brought over the rapid.

Incidentally Isaac Taylor tells us something of the weirs existing in 1763, which by his scheme were to be done away. He alludes to Brockweir as if it was then existent, and fixes his first, or lowest, lock above it "at Bixweare 4 or 5 yards below *the present* ware." It will throw the water over "New Ware," which will be done away with. This new weir had been built of piles and wattle, and Taylor suggests that the materials may be used to raise Bixweare. Elsewhere he gives alternative estimates for the use of such materials where stone quarries are not near.

As his 11th weir at Homford will throw the water over the weir end below Wilton bridge, it seems as if the obstacle was then existent. It was not one of those destroyed under the Act of 1695, and it seems possible that weirs had been made without authority after that date. As to his 14th weir at Foy, he says "great part of the materials may be taken from the *weare above.*"

Carey weir is the 18th, and is to be made by increasing the breadth of the *old weir*, which will then serve. The 22nd and last of these weirs will be "near the bottom of the fall at Eyne below the rocks" and will raise the water four or five inches at the bridge at Hereford.

I do not see that anything came of Isaac Taylor's scheme of 1763, but it is clear that the longing of the people of Hereford for cheap water-carriage still continued.

There is in the Record Office of the Clerk of the Peace in Hereford a Survey dated July, 1779, containing an excellent section of the river from Wye Bridge, Hereford, to Tintern, a distance of 58 miles, in which the river falls 147 or 148 feet. It was drawn by Robert Whitworth and shows eleven weirs or dams :—

1. Just above Eyne Wharf, 1½ miles below Hereford.

2. Between Hampton Stank and Oxford, 4½ miles below Hereford.

3. By Old Mill—upper end of Fownhope stream, 9 miles below Hereford.

4. Upper end of Carey shoal, nearly 14 miles below Hereford.

5. Hoarwithy Ferry, 16 miles below Hereford.

6. Old Weir by Ingateston Boat, 23 miles below Hereford.

7. Upper end of Homford, 2 miles below Wilton Bridge, and about 30 miles below Hereford.

8. Courtfield Ferry near Upper Lydbrook, about 36 miles below Hereford.

9. Upper end of Hadnock's stream, 46 miles below Hereford. There was a weir called "The Old Wear," near Coldwell Rocks, and another "The New Wear" near the present Symonds Yat railway station.

10. Upper end of Halfway stream, nearly a mile and a half below Monmouth Bridge, and 49½ miles below Hereford.

11. Tintern Weir, 58 miles below Hereford. There was another "New Wear" situated about 5 miles above the Tintern Weir. Bixweir Rocks are situated in this map 4 miles above Tintern Weir.

A Hereford newspaper for February 3rd, 1790, contains an advertisement of a committee meeting for improving the navigation of the Wye. They had met at the Swan and Falcon, Hereford. but by this time committees had been formed for promoting canals to Ledbury and to Leominster. The Wye Committee invited a conference to consider whether it would be most for the benefit of the county to improve the navigation of the river or to make one or both of these canals. On the 19th March, it was decided at the conference that a Hereford and Gloucester canal would be of great utility and that a subscription should be opened. A paragraph in the paper referred to of March 24th, says that farmers will want fewer horses, and can supply the plough with oxen which are less expensive to keep, have fewer diseases, and are valuable when killed. Prognostications of ruin on the one hand, and of unexampled prosperity on the other, that would result to the tradesmen and farmers of the county of Hereford from improving the navigation of the Wye had for a century been made by different sets of people according to their special interests.

Another plan in the Record Office dated 1805, for the improvement of the Wye, is by Henry Price, and shows the river from Hereford to Tintern. It was made in order to apply to Parliament for powers to improve the river.

But such schemes must have been paralysed by the prospect of the canal to Gloucester, the Act of which was passed in 1791. The estimated cost was £75,000, but, owing to unforeseen difficulties, it was carried no further from Gloucester than Ledbury, after an expenditure of £100,000. It was not until 1838, when canals were being superseded by railways, that the completion of the canal was again taken in hand. It was opened to Hereford in 1845, and an end was put to schemes for improving the navigation of the Wye.

NOTE.

The canal referred to in the foregoing paper had a very short existence. The Great Western Railway purchased the interests of the shareholders in furtherance of their own operations, and presumably to secure the traffic for their new line between Hereford and Gloucester, *via* Grange Court, which was opened in June, 1855. From that time the canal was practically superseded, but persons interested in the history of the city and neighbourhood may trace portions of its course near Widemarsh Street and at other points; and the Canal Road suggests its former position.

Old inhabitants of Hereford may be interested to know that there are still in existence account books going back as far as 1827, shewing particulars of the traffic by barges (glorified in the accounts into sloops!) between Bristol and Hereford. These barges carried one or more sails, and were navigated by persons certified to be competent. As the sails could only be used with favourable winds, recourse was had to horses, and sometimes men, for hauling the barges when necessary up the river. The accounts shew that soap, lead, bricks, and other heavy goods, came to Hereford, and that cider, bark, and wool, &c., were taken on the return journey to Bristol. At least one member of the Club remembers the "sloop" Wellington, Peacock master, engaged in this now departed navigation; the route of the barges was by the Avon to Avonmouth into the Severn, thence to below Chepstow, where they entered the Wye.

Lest these barges should lower the dignity of the Wye, it may be mentioned that in February, 1823, a brig of 170 tons burden was launched opposite the Castle Green, and that a steam vessel called the Paul Pry was launched during a flood and floated down the river. The Ecclesiastical Commissioners purchased the ship-building yard, and this industry disappeared from Hereford for ever.—R. H. W.

REPORTS OF DELEGATES TO BRITISH ASSOCIATION, 1905.

From a Member.

We bid welcome home to our members, Rev. J. O. Bevan, our delegate to the British Association, and his companion Mr. Luther Davis, of Abergavenny, after their travels of twenty thousand miles by sea and land. The following letters written on board the s.s. *Durham Castle* in the Mediterranean Sea, bearing upon some of the many places in South Africa visited by them as members of the British Association, will be read with great pleasure and interest.

Union Castle Line, s.s. *Durham Castle*,
In the Mediterranean Sea,
October 13th, 1905.

To the President and Members of the Woolhope Naturalists' Field Club, Hereford.

Gentlemen,—I have the honour herewith to present my customary Report of the annual meeting of the British Association for the Advancement of Science. The meeting this year was of phenomenal interest, as it took place six thousand miles away from home in South Africa, thus involving a long voyage and a tour throughout many of the British Dependencies in that continent, as well as a visit to places under the Spanish and Portuguese dominion, the total distance traversed being just over twenty thousand miles.

The President was Professor G. H. Darwin, M.A., LL.D., F.R.S., F.R.A.S., and the name of the president of each section will be found in the special papers which I append, together with the composition of the various sectional committees, also the titles of the papers read before the various sections at Capetown and Johannesburg. The meetings at these two centres together constituted the formal meeting of the Association. I also enclose a miscellaneous collection of papers referring to our meetings and the visits paid to certain important cities and centres, and forward a printed copy of the various presidential addresses. I commend particularly to your notice that delivered by the President of the geographical section and that of the president of the educational section.

Generally speaking, the papers bore chiefly upon South Africa—its geology, physiography, mining industry, agriculture, educational and other problems. These papers will be published in a separate volume at the expense of leading citizens of Johannesberg.

The results of the meeting, I venture to think, will be manifold, and affect public opinion both in the Mother Country and the Colonies.

The industrial problems are of pressing interest and great magnitude, referring as they do to Colonies which together are of vast extent and alike present features peculiar in their physical, climatic, social and political conditions.

To enable the precious residue to be economically and thoroughly extracted, mining for gold and diamonds must be conducted more than ever on the most refined and scientific principles. The introduction of the yellow man as a consequence of the alleged paucity of black labour has raised difficulties of its own, at the same time rendering still more complex the already difficult problem of the treatment of the coloured races throughout Africa.

Antagonism between Briton and Boer would be a matter of deep regret, as it is only by a union of the best qualities in the two races that the possibility will be realised of the fusion of the white race in the face of an overwhelming majority of the coloured race, this fusion being the only safeguard against a terrible upheaval, should it unhappily occur.

Agriculture, too, is beset by many difficulties and even perils, caused by the arid nature of the soil, the difficulties of water storage, of transport, of labour, forest fires, the insect pests, and the diseases to which the flocks and herds are periodically subject.

Of course it must be remembered that we visited these various Colonies during their winter, and that the northern and western districts had had an exceptionally long period of drought. Owing to the character of the rainfall and the baked condition of the soil, the rain is not so effective as it is in a country like our own. Still, the rainy season works a marvellous change in many districts, although there are regions where the change is not strongly marked and others which remain desert throughout. Despite all these discouragements one could not fail to be struck by the adaptability and unfailing resource displayed by our Colonial brethren, not only in respect of agricultural but also of mining operations.

Although it is apart from the special record of the meeting, it may be interesting to refer to one or two matters in connection with our homeward journey. The mention by my colleague of the Victoria Falls, naturally leads one to consider the toil, expense, and suffering involved in their discovery by the great missionary explorer Dr. Livingstone, and in the further discovery of Lake Victoria Nyanza, the never-failing well spring of the main branch of the great world-river, the Nile. Half a century has wrought a phenomenal change in the position of affairs. In respect of Mombasa and the lake before mentioned the distance so painfully traversed by the original investigators in the course of weary months of travel can now be safely covered in a comfortable carriage on the Uganda Railway in the brief space of forty-eight hours. At Port Florence, the terminus on the shores of the Inland Sea, a steamer awaits the voyager to convey him to Uganda, which presents so many features interesting alike to the philanthropist, the traveller, and the sportsman.

On the return voyage it was intended that our party should call at Zanzibar, from which place Livingstone originally started on his great quest, and that we should take the railway at Mombasa and penetrate to Nairobi, about 330 miles into the interior. Owing to the incidence of plague at Zanzibar and Nairobi, we were compelled to abandon a portion of our programme, but the opportunity was still afforded us of taking the rail at Mombasa and making our way along a highly romantic route of sixteen miles through the tropical forest to Mazeras, a spot rendered memorable by the formation, many years ago, by a missionary named Krapf, of the first station for freed slaves in East Africa—the necessity being created by the iniquitous traffic carried on by certain powers in connection with raids into the interior.

The Conference of Delegates was unavoidably postponed until the arrival of the main body of the Association in the home country. By reason of the delay of the *Durham Castle* and the East Coast party I shall miss this Conference, which is appointed to be held in London about the 22nd inst. I will take pains to acquaint myself with the proceedings, and to communicate to the club any information I can acquire or any formal suggestion made by the Corresponding Societies Committee to the various affiliated bodies.

The next meeting of the Association will be held at York in September, 1906, with Professor Ray Lankester, Director of the Natural History Museum at South Kensington, as president.

I may mention, in conclusion, that during our tour in South Africa and the return journey I have had the pleasure and advantage

of the society of one of the members of our Club, Mr. Luther Davis, solicitor and notary public, of Abergavenny, who has been kind enough, at my request, to supplement this report with some observations of his own.

I have the honour to be, gentlemen,

Your obedient servant,

J. O. BEVAN,

M.A., F.G.S., F.C.P., F.S.A., Assoc. Inst. C.E.
Rector of Chillendon, Dover.
Formerly Vicar of Vowchurch, Hereford.
Delegate to the British Association.

Gentlemen,—Having had the privilege of perusing the Report of the Rev. J. O. Bevan, the respected delegate from our club to the British Association, I have much pleasure in acceding to his request to supplement it with some of the results of my own experience.

The visit to Cape Colony, and tour through Natal with its battlefields, the Transvaal and Orange River Colonies ending at Kimberley (where Sir William Crookes, D.Sc., F.R.S., delivered a brilliant lecture on "Diamonds,") the Association journeyed to Bulawayo, where a museum containing a most interesting collection of local antiquities and natural history and other specimens, was opened by the President, Professor Darwin.

The Matopos was next visited and the grave of Cecil Rhodes, and the Shangani monument to Major Alan Wilson and his comrades at the "World's View" inspected. At the grave side, the view from thence being one of great sublimity, an appropriate memorial service was conducted by the Rev. J. O. Bevan, which was numerously attended.

The tour was then continued northwards to the Zambesi River to see the Victoria Falls. For the geology of the Gorge we would refer you to the report by Mr. Lamplugh, F.R.S., who was specially deputed by the Association to visit the locality; which report took the form of a paper to combined sections C and E at Johannesburg.

Returning to Bulawayo the party divided, and those going home by the East Coast route returned through Rhodesia, calling

at Salisbury and Umtali and embarking at Beira, in Portuguese East Africa, on board the special steamship *Durham Castle.*

En route we stopped at Mozambique and Mombasa and rounded Cape Guardafui. In due course we entered the Red Sea. In the Strait of Bab-el-mandeb Perim Island was sighted. Skirting this island in daylight we were fortunate in obtaining a good view of the waterworks, &c., on the harbour side, and of the fortified lighthouse on the summit, which you will be interested to learn was constructed in 1860 by our ex-President, Mr. H. Cecil Moore, then Lieutenant of the Royal Engineers, who, at that time, occupied the position of governor of the island.

When Suez was reached, advantage was taken of the block in the Suez Canal, caused by the foundering of the dynamite transport *Chatham*, to pay a visit to Cairo, the Pyramids of Ghizeh and Sakharah, and the Barrage across the Damietta and Rosetta branches of the River Nile.

During the voyage home a series of conferences was held on board, which are of more than passing interest as they represented in some cases matured opinions as the result of the actual visit to Africa. The subjects dealt with were :—

"Egypt," by Colonel Sir Colin Scott Moncrieff, R.E., G.C.S.I., K.C.M.G.

"Some Physiographic Problems of South Africa," by Professor W. M. Davis, of Harvard University, U.S.A.

"The early Portuguese in Africa," by Professor Cordier, Paris.

"The former land connection of Africa with other Continents," by Professor W. B. Scott, of Princeton University, U.S.A.

"Colonization," by Mrs. Hopkinson (head of Swanley Horticultural College and member of Committee of the South African Colonization Society), when the consensus of opinion of the conference was that South Africa under present conditions did not offer prospects of success to agriculturists of small capital.

"Personal experiences of Stromboli, and the Catastrophe of Martinique in 1902," by Dr. Tempest Anderson, F.G.S. It happened that we passed the Island of Stromboli in the night, therefore we took the opportunity of seeing the volcano and of witnessing its eruption.

" Evolution of the map of Africa," by Mr. H. Yule Oldham, M.A., F.R.G.S., in which reference was made to certain maps of the world according to the ideas of the ancients and those who lived in the Middle Ages. In relation to the latter, the " Mappa Mundi " of Hereford was used by way of illustration.

" Some Botanical Features of South Africa," by Professor Weiss, D.Sc., F.L.S.

I had the advantage of participating in a " Trek " from Bloomfontein to Kimberley, passing Paardeberg (where General Cronje made his last stand) ; and of investigation in other directions. My observations therefore lead me to concur most thoroughly in the conclusions at which Mr. Bevan arrives ; and we both desire to express our gratitude for the magnificent welcome, hospitality, and kindness, both public and private, which were everywhere extended to us throughout Africa. To mark the sense of the appreciation of the British Association for the warmth of that reception, its members have combined to raise a sum which now approaches £1,000, the interest of which is intended to be devoted annually to provide a gold medal for a leading student in a South African University.

In connection with our tour there is a wealth of subjects to which one might advert, but I will content myself, in conclusion, with referring to two—one of which is of archæological interest, the other of great imperial and even international importance.

The first is in relation to the ruined cities of Mashonaland, a specimen of which was visited by a section of our party at Umtali, though time did not permit of a general visit to the more characteristic remains of Zimbabwe. The whole subject was treated in an exhaustive manner in a paper by Mr. D. Randall McIver, read before the Association at Bulawayo. He differs from certain conclusions by the late Mr. Bent, and believes that the remains bear no reference to Phallic worship, that they have a later date—about the 16th century—than that originally assigned, and that they were constructed by native tribes for residence and defence. In any case the magnitude of the remains and their involved character are very surprising.

The second subject bears upon the linking together of The Cape and Cairo by an iron band that should stretch thus right across the Continent. We traversed many miles of this communication from The Cape northwards, and were especially privileged in being present at the opening of the now famous bridge, the highest in the world, thrown across the Zambesi river just below the Victoria Falls.

This function was performed by the President of the British Association in the presence of a company of Imperial officials, members of the Association, and others, and possessed a marked character by reason of the nature of the link thus formed in the face of great engineering difficulties, and of the position occupied by that link—viz., across a gorge (the beginning of a canyon forty miles long) through which rush in their narrow bed the waters draining half a Continent which have just been precipitated for the width of a mile four hundred feet into the yawning chasm beneath. The combination of the miracles of Nature and art more than ever justifies the appellation accorded to the spot by the discoverer, Dr. Livingstone, just fifty years ago, " The Wonder of the World."

I have the honour to be, gentlemen,
Your obedient servant,

LUTHER DAVIS.

Woolhope Naturalists' Field Club.

ANNUAL MEETING, MONDAY, DECEMBER 11TH, 1905.

THE SNARING OF WILD BIRDS IN HEREFORDSHIRE.

In the absence of the President (Mr. Philip Baylis), Mr. Henry Southall was voted to the chair at the annual meeting of the Woolhope Naturalists' Field Club, held in the Woolhope Room, at the Free Library, Hereford, on Monday afternoon. There was a large attendance of members, those present including Preb. H. T. Williamson, the Rev. R. Hyett Warner, Rev. H. B. D. Marshall, Rev. Eustace King-King, Rev. W. E. T. Morgan, Rev. A. G. Jones, Rev. K. O'Neill, Rev. H. M. Evill, Rev. P. H. Fernandez, Mr. H. Cecil Moore and Mr. T. Hutchinson (hon. secs.), Mr. H. C. Beddoe, Mr. P. L. Earle, Mr. C. P. Bird, Mr. J. Carless, Mr. Robert Clarke, Mr. Luther Davis, Mr. E. Stephens, Mr. J. Davies, Mr. H. E. Jones, Mr. G. W. Wheeler, Mr. H. Scott Hall, Mr. R. A. Swayne, Mr. J. Probert, Mr. W. E. H. Clarke, Mr. J. B. Pilley (assistant sec.), and others.

BIRD CATCHERS BEWARE.

The CHAIRMAN referred to the operation of the Wild Birds' Protection Act, which had been put into force in Herefordshire, through the initial steps towards obtaining the necessary order being taken by the Woolhope Club. The Act had been beneficial, as a number of rare birds had lately been seen in the county. There were more goldfinches and kingfishers than there used to be, and several scarce birds had also made their appearance in the county. He thought the Club did quite right in asking the County Council to apply for the order putting the Act in force, and he hoped they would keep the County Council up to the mark.

Mr. HUTCHINSON agreed with Mr. Southall. There was no doubt that goldfinches had increased. Within the last few days, however, he had heard of bird catchers being seen about the roads in several districts of the county, principally the Hereford and Leominster districts. These people caught the birds with lime. He thought it was very desirable that when these men were seen the matter should be mentioned to the police. The men themselves should also be told that they were breaking the law, and the police

should be put on their track. The Club did not want to be too severe, but men came down from Manchester and other places to catch the birds and cart them off. These were the people they should try to stop.

The CHAIRMAN remarked that the police had told him they would be glad of any information which would assist them in carrying out the law.

Mr. PILLEY said he had heard of bird catchers being within five miles of the town, and he had seen the Superintendent of Police, who would, he believed, instruct his men to keep a sharp look out in the future. He would like to mention that the Wild Birds' Protection Act was not in force in Breconshire nor Radnorshire, and one of the members of the Club had informed him that not long ago he saw some men near Hay with a large number of wild birds in a cart, and that gentlemen thought it would be very desirable to write the County Council for Breconshire and ask them to put the Act in force.

Mr. O'NEILL said he had himself seen bird catchers near Hay.

Mr. MORGAN remarked that bird catching also went on in Radnorshire.

THE RAVAGES OF STARLINGS.

Mr. SWAYNE suggested that the club might give the County Councils some advice as to what birds to protect. Some birds had become so numerous that they had become intolerable pests, especially the starling. Starlings had, in the neighbourhood in which he lived, become so numerous of late years that very soon, he believed, the people would be unable to grow any fruit at all. He thought the starling ought to be excepted from protection the same as the wood-pigeon and sparrow. They had almost cleared off orchards of apples, as well as other fruit.

Mr. HUTCHINSON said the committee which was originally appointed included in the list the starling and the blackbird, and they got a reply from the Home Secretary to the effect that their list was much longer than any he had received from any other part of the country, and he declined to grant the order unless the number of birds was curtailed. The committee therefore adopted a list which had been accepted by Gloucester. He would like to point out that the selection did not rest with the County Council, but with the Home Secretary.

Mr. SWAYNE observed that it was a curious thing that a man living in London always thought he knew more about the country than the people who lived in the country (laughter).

Mr. BEDDOE said he found it impossible to protect a tree of Jargonelle pears which he had in his garden (laughter).

Mr. DAVIES proposed "That the County Council of Breconshire and Radnorshire be respectfully asked to take into consideration the desirability of obtaining an Order for the protection of Wild Birds, with the view of co-operating with the adjoining counties that have already taken that course."

The resolution was unanimously carried.

CRASSWALL PRIORY EXCAVATIONS.

Mr. MOORE read a letter from Mr. C. J. Lilwall, who has charge of the excavations at Crasswall Priory, in which the writer said: "I may say first of all that for a few weeks in the summer my men excavated further west, the idea being to give more room for erecting a shed. In doing so we came upon the base of what looked like an altar tomb, and on lifting the pavement we found a large stone coffin containing human bones. The whole of the ruins of the church have been well secured. This work was difficult, as the ground is, in many places, so uneven, but an excellent job has been made of this. On taking my carpenter and mason over a short time ago, we came to the conclusion that the best way will be to erect the shed against the south wall of the chancel, and so covering the sedilia and piscina, so saving them from the rubbish that continually keeps falling from the wall above. This wall, since the trees growing on it have been cut down, threatens to lean towards the interior of the church, and we shall take it down to the level of the roof of our shed. I hope to get this work done within the next week or so."

Mr. MORGAN raised the question of the suitability of the position of the shed, which is being built to contain the finds. An opinion was expressed that it would be better to leave the matter entirely to Mr. Lilwall, who was on the spot, but the hon. sec. promised to write him on the subject.

ELECTION OF PRESIDENT.

Mr. MOORE proposed that the Rev. R. Hyett Warner, of Almeley, be elected President of the Club for the ensuing year. Mr.

Warner had been a member of the Club for many years, and had contributed several papers to the *Transactions*. He, therefore, thought he would be a very suitable gentleman for the post.

Mr. CARLESS seconded, remarking that he was sure Mr. Warner's appointment would be generally acceptable to all the members.

Mr. BEDDOE heartily supported, and Mr. Warner was elected by acclamation.

THE VICE-PRESIDENTS.

The Rev. Dr. E. Harris (Bullinghope), the Rev. C. H. Binstead. and Mr. J. Carless were elected vice-presidents of the club.

CENTRAL COMMITTEE.

The Central Committee, consisting of Preb. Lambert, Mr. J. Carless, Mr. Robert Clarke, Mr. A. Watkins, and Mr. C. P. Bird, was re-elected, with the following as *ex-officio* members: The President, Vice-Presidents, Hon. Secs., Mr. H. Cecil Moore and Mr. T. Hutchinson; hon. treasurer, Mr. H. C. Beddoe; hon. auditor, Mr. James Davies; assistant secretary, Mr. J. B. Pilley.

THE REV. J. O. BEVAN AS THE CLUB'S DELEGATE.

The Rev. J. O. Bevan was unanimously elected the club's delegate to the British Association for the Advancement of Science and also to the Society of Antiquaries.

THE BRITISH ASSOCIATION IN SOUTH AFRICA.

The next business was to receive the reports of Mr. Bevan and Mr. Luther Davis on the visit of the British Association to South Africa.

Mr. MOORE stated that Mr. Bevan's first report had already been published, and he had received from him a supplemental report, which read as follows:—

Chillenden Rectory, Dover, Nov. 4th, 1905.

To the Chairman and Members of the Woolhope Club.

Gentlemen,—On my arrival in England I found that the Conference of Delegates of Corresponding Societies had been postponed until the end of October, so as to enable those members to attend who had undertaken the long eastward voyage home.

It accordingly met in the rooms of the Linnæan Society on Monday and Tuesday, October 30th and 31st, under the presidency of Dr. A. J. Woodward, of the British Museum. There was a fair attendance.

The proceedings were opened by an address by the President, in which he deprecated mere " picnic " meetings, and set up a high standard of work and endeavour for our local societies.

Next, Dr. Martin introduced a discussion on " The Law of Treasure Trove " in an elaborate paper, setting forth the legal facts in connection with this much misunderstood subject. The paper and discussion proved exceptionally interesting and informing to geologists and archæologists.

Secondly, " The Question of Copyright as affecting Scientific Societies " was treated by Mr. M. W. Brown, North of England Institute of Mining and Mechanical Engineers. By him and succeeding speakers were laid down the strict aspects of the case in respect of lectures and contribution of papers to scientific bodies.

In the afternoon the Curator, Prof. Stuart, conducted the delegates over the museum of the Royal College of Surgeons, Lincoln's Inn Fields, and explained the more interesting physiological and pathological specimens.

The Royal Societies' Club, St. James's Street, entertained us to dinner, and a most enjoyable evening was spent, thanks to the kindness and hospitality of our hosts.

On the 31st, Prof. Boulger delivered his address on " The Preservation of our Native Plants." He treated of the havoc going on, and suggested various remedies, general and legal.

The same afternoon the delegates attended the meeting of the General Committee of the British Association. Various questions of interest were dealt with, amongst others being the invitation to hold the meeting of 1907 in Leicester.

On the whole the papers read and discussions consequent thereupon were of exceptional interest and value. The details will be found in the printed report, which will be dispatched to you in due course.

I am, Mr. Chairman and Gentlemen,

Faithfully yours,

J. O. BEVAN.

Mr. Luther Davis (Abergavenny), also reporting on the meeting of the British Association in South Africa, said it was highly interesting and successful, adding that now when the people of this country were on the eve of a General Election, the feeling which was uppermost in the minds of all who had recently been to South Africa was that when all the questions came before the people of England for solution, as they soon would, they should bear in mind all that appertained to South Africa ; they should take care to sift everything to the bottom, and when there was a tendency to crowd so many subjects upon them they should bear in mind that while they had done a great deal for their fellow Colonists in that country, the warmth and heartiness with which they received the members of the Association showed that no more loyal subjects of his Majesty existed in any other part of the Empire (applause).

Rare Birds in Herefordshire in 1905.

Mr. J. B. Pilley presented the following paper on " Rare Records in Herefordshire in 1905," to the Ornithological Section :—

A very unusual variety of the Blackbird (Turdus menula) was shot in the garden at Aymestrey House, Aymestrey, on July 15th. The plumage was entirely cinnamon brown. There being some doubt as to the species, the bird was sent to South Kensington, where it was identified. It has been set up, and is now in the museum. A specimen of the Greenshank (Totanus canescens) was shot by Mr. F. J. Andrews, at Stretton Court, on August 29th. Another Greenshank was in company with it. Mr. Andrews kindly presented it to the museum. This is a rare visitor, having only been recorded in the county about half a dozen times. One of those rare stragglers from the sea, a Leach's or Forktailed Petrel (Procellaria leucorrhoe) was picked up dead at the latter end of September, near Moccas Court, and sent in for the museum by Mr. Geoffrey Cornewall. Unfortunately, it was too far gone for preservation. This is only the third example of this species hitherto recorded for the county. A specimen of the Hooded Crow (Corvus cornix) was trapped at Kentchurch, about the middle of October, and brought in for identification. It was kindly given by the owner to the museum. Another example of this species was obtained in the same locality a few years ago. There appears to be some doubt whether this is a distinct species, or only a variety of the common crow. I have some eggs I received from Scotland where the Hooded Crow is common, and they appear to me to be larger than those of the common crow, and to differ in their colour. A pair of Kingfishers (Alcedo ispida) nested this year less than half a mile from the centre

of Hereford, and brought off a brood. One of the young was killed by a cat. Twenty or more years ago this species frequented the same locality, and had been seen at the pool in the Castle Green and elsewhere. It does not appear to have been seen until the present year. In reply to enquiries, the writer has been told by anglers that it is much more common on the Wye than formerly. A friend stated that he had seen on the same day the locality of at least four nests between Hereford and the Weir. Another mentioned that on one occasion, when angling in a sheltered spot, a Kingfisher alighted on his rod and remained until an involuntary movement on his part disturbed it.

The Nightingale (Daulias luscinia) which several years ago was stated to have been heard at Aylestone Hill, the Castle Green, and elsewhere, has again been heard near Hereford. During the month of May several persons heard it in a little coppice near Litley, within two miles of the city. This species of bird occurs every spring at Mordiford and Fownhope. I had the pleasure some years ago, during a walk through Haughwood and the outskirts, of hearing four or five different birds in song. The Rev. C. H. Binstead reports that one day in the latter part of November, he counted 17 Siskins (Chrysomitris spinus) feeding, a short distance from his house at Breinton. Small flocks of about half a dozen may be seen in the autumn where the alder grows, but this flock appears unusually large.

To the above we have to add that on December 31st, 1904, a red-breasted Merganser (Mergus serrator) a male bird in good plumage, was found in an exhausted condition at Shirlheath, Kingsland, by Mr. Stephens, of Green Park. It was identified by Dr. Williams, of Kingsland.

Re-Publication of "Transactions."

Mr. Moore reported progress in the work of re-publication of *Transactions*, from 1852 to 1865 inclusive, of which he said fifty pages were printed.

The Chairman said the club was very much indebted to Mr. Moore for the immense trouble he took in preparing the volumes of the *Transactions*. It entailed considerable work, and the way in which the volumes were published reflected great credit on Mr. Moore, and in recognition of what he had done he (the Chairman) begged to move a hearty vote of thanks to Mr. Moore (applause). No club he knew of issued such a publication as their *Transactions*.

Mr. Williamson seconded, acknowledging the energy and ability which Mr. Moore threw into the work.

The vote was carried with acclamation.

Mr. Moore, in reply, said he had a good deal of work to do which had often kept him up into the early hours of the morning, but he was well rewarded for any trouble he had taken by any pleasure he had afforded the other members of the club (applause).

New Member.

It was announced by the Chairman that Mr. C. O. Hudson, of Coleford, who had been proposed by the President, had been elected a member of the society.

Collecting Epitaphs.

Mr. Hutchinson acknowledged the receipt of numbers of churchyard epitaphs from members of the club, and said he wished to thank the gentlemen who had sent them for the trouble they had taken. He had as yet had no time to devote to the arrangement of them, but hoped soon to be able to deal with them all.

Woolhope Naturalists' Field Club.

SPRING ANNUAL MEETING, APRIL 26TH, 1906.

LAND-LOCKED SALMON AT WHITBOURNE.

THE WILD BIRDS' PROTECTION ACT.

MR. BAYLIS ON FORESTRY IN ENGLAND.

The Spring annual meeting of the Woolhope Naturalists' Field Club was held in their room at Hereford Public Library, on Thursday. Present—Mr. Philip Baylis (the retiring president), the Rev. R. Hyett Warner (president-elect), Mr. H. C. Beddoe, Mr. C. P. Bird, Mr. Joseph Carless, Mr. Robert Clarke, Mr. W. E. H. Clarke, Mr. James Davies, Mr. Gilbert Davies, Rev. H. E. Grindley, Dr. E. Harris, Mr. F. Saunders Hovie, Prebendary M. Hopton, Mr. Thomas Hutchinson, and Mr. H. C. Moore (hon. secs.), Rev. Eustace King-King, Rev. Augustin Ley, Prebendary W. H. Lambert, Rev. H. B. D. Marshall, Mr. George Marshall, Rev. K. O'Neill, and Mr. James B. Pilley (assistant secretary).

Arising out of the minutes, Mr. MOORE said the "Burghill Mound" had been removed, but an authority said it was merely an earthwork, not to be classed amongst the old mounds.

Mr. MOORE proceeded to say he had received a letter from Sir Richard Harington, mentioning that several small salmon, from 3½lbs. to 1½lbs. had been taken in the moat surrounding his house. He was much puzzled as to what they would be, and sent one to the South Kensington Museum, when it was pronounced to be a "typical young salmon." The largest was eaten at table; the flesh was quite pink, and very good. The others had all been returned to the water in the hope they would grow bigger. He had hatched this winter 500 salmon ova, the fry from which he was preparing to turn into the moat to see what became of them. The fact was interesting in showing that land-locked salmon would grow, and he was informed by the South Kensington authorities that at least one other instance of the same thing had been known. He had begun seriously to doubt the wisdom of the indiscriminate protection of

wild birds. He was strongly in favour of it at first, but now he felt sure that it benefited only the hardiest and more common species, and tended to the diminution of the rarer and more delicate.

Mr. HUTCHINSON said he was inclined to agree with Sir Richard Harington's remarks if they were taken to relate to the Wild Birds' Protection Act, 1880, which might well be modified by taking some birds out of the provisions of the Act, as they tried to do when the Order was applied for. The Order would be useful, provided it was not allowed to remain a dead letter. So far as he knew, there had been no proceedings taken in Herefordshire, either under the Acts or the Order, although one of the Acts had been in force since 1880, and he knew that quite recently wild birds had been trapped in large numbers in certain districts of the county, and this was the most objectionable form of destroying them. The Act of 1880 provided a close time for all birds between March 2nd and July 31st, and during that time all persons destroying them were liable to a small penalty. A schedule to the Act contained a list of rare and useful birds for the destruction of which a penalty of £1 might be incurred. The Order that had been obtained for the county added a few birds to that schedule, and also prohibited the killing of other rare birds throughout the year, and it also prohibited the taking of certain eggs. There was no wish, he was sure, on the part of any member of the club or others who took an interest in obtaining the Order, to protect any bird except rare or harmless ones. In fact, application was made to the Secretary of State to exclude from the Act the house-sparrow, starling, magpie, blackbird, jay, and wood-pigeon, and so allow these birds to be killed at any time of the year, but the Secretary of State objected to the length of this list, and excluded all except the house-sparrow and the wood-pigeon. A copy of the Order appeared on pages 355 and 356 of the last volume of the *Transactions*, but he dared say members did not find it easy to understand the meaning of the Order without having the Act of Parliament before them, and he thought it would be useful if a short summary of the Act were prepared and printed on a loose page of the *Transactions*, and sent to each member as page 356*a*, so that it could be gummed in the volume following the order. If this met with the approval of the meeting he should be happy to prepare a *précis* of the Acts for this purpose.

Mr. MOORE formally seconded that this be done, and it was agreed to unanimously.

Mr. HUTCHINSON said that it had been proposed that plovers' eggs should be protected, but he did not think there was any fear that plovers would become rare in Herefordshire.

The RETIRING-PRESIDENT did not quite agree with that opinion, for when it was considered that 5s. to 6s. per dozen was paid in London for the eggs he was afraid the time might not be distant when plovers would be rare. As their principal food was the white slug, they were the most beneficial birds to Herefordshire farmers. He had found that wood-pigeons were becoming most destructive birds, even in regard to acorns.

Mr. PILLEY, as assistant secretary, read his report for 1905, which compared very favourably with previous years. The number of members on the books at the close of the year was 257, including 24 new members, which was the largest number yet recorded, and showed an increase of 18 over 1904. The attendances at the field meetings were above the average, and amounted to 264. The receipts for the past year established a record.

Mr. BEDDOE, as hon.treasurer, presented the accounts, showing there was in hand a balance of £58 4s. 5d.

The field meetings for the season were selected as under :— Pontrilas and neighbourhood, Tuesday, May 29th ; Birtsmorton, Worcestershire (President's day), Thursday, June 28th ; Llangorse Lake (Ladies' Day), Thursday, July 26th ; Wigmore, Tuesday, August 28th.

The RETIRING PRESIDENT said there had recently been established a small school and museum of forestry at Park End, Forest of Dean. If the club could decide on a supplemental meeting in October, he would arrange to give the members tea and show them the articles in the museum. He would also try to arrange for a special train service on the Severn and Wye Railway.

On the motion of Dr. HARRIS, it was decided to accept the offer.

The RETIRING-PRESIDENT said some time ago the Hon. Secretary consulted him with reference to the publication in the *Transactions* of a map of the Forest of Dean and some portions of the ancient forest. He had eventually got permission, but the Hon. Secretary said he now feared the expense would be too great, but if the members would allow him he would be happy to defray the cost of the publication himself.

The offer was cordially accepted.

Captain Kilby Steuart was elected a member, and the following gentlemen nominated for membership :—Messrs. J. A. R. Littledale, Wilton Dale, Ross-on-Wye ; and Rev. R. M. S. Onslow, Stoke Edith Rectory, Hereford.

The RETIRING-PRESIDENT did not quite agree with that opinion, for when it was considered that 5s. to 6s. per dozen was paid in London for the eggs he was afraid the time might not be distant when plovers would be rare. As their principal food was the white slug, they were the most beneficial birds to Herefordshire farmers. He had found that wood-pigeons were becoming most destructive birds, even in regard to acorns.

Mr. PILLEY, as assistant secretary, read his report for 1905, which compared very favourably with previous years. The number of members on the books at the close of the year was 257, including 24 new members, which was the largest number yet recorded, and showed an increase of 18 over 1904. The attendances at the field meetings were above the average, and amounted to 264. The receipts for the past year established a record.

Mr. BEDDOE, as hon.treasurer, presented the accounts, showing there was in hand a balance of £58 4s. 5d.

The field meetings for the season were selected as under :—Pontrilas and neighbourhood, Tuesday, May 29th ; Birtsmorton, Worcestershire (President's day), Thursday, June 28th ; Llangorse Lake (Ladies' Day), Thursday, July 26th ; Wigmore, Tuesday, August 28th.

The RETIRING PRESIDENT said there had recently been established a small school and museum of forestry at Park End, Forest of Dean. If the club could decide on a supplemental meeting in October, he would arrange to give the members tea and show them the articles in the museum. He would also try to arrange for a special train service on the Severn and Wye Railway.

On the motion of Dr. HARRIS, it was decided to accept the offer.

The RETIRING-PRESIDENT said some time ago the Hon. Secretary consulted him with reference to the publication in the *Transactions* of a map of the Forest of Dean and some portions of the ancient forest. He had eventually got permission, but the Hon. Secretary said he now feared the expense would be too great, but if the members would allow him he would be happy to defray the cost of the publication himself.

The offer was cordially accepted.

Captain Kilby Steuart was elected a member, and the following gentlemen nominated for membership :—Messrs. J. A. R. Littledale, Wilton Dale, Ross-on-Wye ; and Rev. R. M. S. Onslow, Stoke Edith Rectory, Hereford.

The RETIRING-PRESIDENT, in his valedictory remarks, said he could not let the occasion pass without at least saying one word about their friend, Mr. H. C. Moore, who had exhibited throughout unfailing courtesy, and had always given his time most readily to the interests of the society (applause). Proceeding to speak on the subject of forestry, Mr. Baylis mentioned a lecture by Sir Herbert Maxwell, who after alluding to the millions of pounds worth of timber imported into England, said nineteen millions of it could be grown in England. Mr. Baylis did not know whether his hearers had considered how much timber it took to produce £1,000. In France and Germany immense areas are covered by timber which for hundreds of years had been planted in a regular and systematic manner. There the area of timber was owned by the State or Commune, and from that fact they had continuity and regularity. In England tree growing was limited in area, and of the areas owned by the State only three or four were covered by timber. Of these the Dean Forest and the New Forest were by far the largest, and compared with the forests on the Continent they were almost insignificant quantities. So far as he knew none of the woodland of England was owned by any authority. It was largely vested in private individuals, and inasmuch as to produce a crop of mature oak they had to wait for at least 180 or 230 years, they could not induce private owners to plant crops the advantages of which they would not reap. Then there was a great deal of attention paid to sport, and so long as they had ground-game in the wooded areas of England they could not grow timber to advantage. A single rabbit or hare would destroy—he was going to say in three weeks—acres of planted woodland. Another point was that for tree planting they required deep soil, and it was not to be found in these thousands of acres people talked so glibly about. He, however, thought it was the duty of landowners to see that the woodlands on their estates were continuously and regularly managed. The Retiring-President alluded to the school of forestry which had been established in the Forest of Dean for working men and youths, and coming to the subject of whether better results were obtained by planting from seed than by transplanting, said trees planted from seed suffered a check in comparison with transplanted trees for eight or nine years, but after that they recovered themselves, and certainly surpassed the others in producing the best timber.

Mr. Baylis then vacated the chair in favour of the President-Elect (the Rev. R. H. Warner), to whom he extended a cordial welcome.

The new PRESIDENT proposed a vote of thanks to Mr. Baylis for his admirable address and for the services he had rendered during the time he had been a president and member of the club.

The motion was cordially seconded by Preb. LAMBERT, who referred to the hospitality shown by Mr. Baylis last year.

Mr. BAYLIS briefly acknowledged the compliment.

On pages 138 to 141 of the Transactions of the Club, 1893, is an article on "The Growth of Oaks—Seeds *versus* Transplantation," accompanied by an officially published table showing the measurements of oak trees in the Forest of Dean.

In his address as retiring president, on April 26th, Mr. PHILIP BAYLIS, Deputy Surveyor of H.M. Royal Forest of Dean, entirely renunciated his views expressed in that paper that transplanted trees grew better than the non-transplanted. He clearly explained how a further consideration and a lengthened experience in his official observations, had led him to the conclusion that the above view was erroneous, and that in fact the non-transplanted tree would in all probability prove the better tree in the end. He cited as examples (amongst other naturally grown non-transplanted trees in the Forest) that magnificent oak, known as the Golynos Oak. Mr. Baylis exhibited some photographs of the root systems of "transplanted" and "non-transplanted" oaks, and expressed the hope that some good photographs of these different roots, taken by Mr. Alfred Watkins, would appear in the next volume of the *Transactions*, to accompany his explanatory causes of their deviations.

Subjoined is a paper prepared for the Club on—

"SOME DOMESDAY PLACE-NAMES IN THE NEIGHBOURHOOD OF DEAN FOREST."

[BY JAMES G. WOOD, M.A., F.S.A.]

Sir Henry Ellis, in his Introduction to Domesday (*a*) wrote, "Many instances might be cited from the Survey where entries belonging to one county either for convenience, or the juxtaposition of the property of a particular landholder, or some other reason, have been confessedly placed in another. . . The Manors of Hanlie (Henley, near Upton-on-Severn) and Forhelmentone (Forthampton, near Tewkesbury), in Gloucestershire, with six

(*a*) Edition of 1816, folio xi.n.; edition of 1817, 4to, p. 20.n.

manors (*b*) in Worcestershire, are entered, fol. 180b, in Herefordshire. . . In Herefordshire, fol. 181, we have another instance of the arbitrary shifting of land from the jurisdiction of one county to that of another; in Niware sunt ii hidæ et dimidia quæ conveniebant et operabantur; et Rogerus de Pistes tempore Willelmi Comitis divertit illas ad Glowecestrescire."

I will deal later with the subject of the entries here cited.

The most instructive entry perhaps in illustration of this particular point is one on fol. 183, under Brooms' Ash Hundred, as follows:—"The Church of St. Mary of Cormeilles holds 2 hides in Chingestone (*c*) (*i.e.*, Kingstone S. of Madley); and for those lands pays geld-tax and performs the services in Gloucestershire; but for the purpose of legal proceedings they give attendance within the Hundred aforesaid; for they retain a settlement there for the purpose of suing and being sued."

Here we have a typical instance of lands situate in Herefordshire, but west of Brooms' Ash Hundred altogether, being assessed in Gloucestershire for one purpose, and treated as within Brooms' Ash Hundred in Herefordshire, for another.

It cannot indeed be too often repeated that, speaking generally, Domesday is to be regarded as not so much an estate survey as an assessment book. Its purpose was to ascertain what rents, taxes, and services the King was entitled to and who had to render them; the topographical arrangement was a secondary consideration.

It may be doubted indeed whether even Sir Henry had fully appreciated the extent to which this "shifting" had been made; he mentions it only as occurring between different counties, while we shall see that it in fact occurred as between different Hundreds in the same county. But there can be little doubt that, notwithstanding his observations on the point, later writers have not paid sufficient attention to the fact; and hence in many instances Domesday place-names have been falsely identified, or failed to be identified at all.

It is proposed in this paper to attempt in the light of these facts to consider some of the place-names, entered under Herefordshire and Gloucestershire, in Domesday, near, or in, Dean Forest.

(*b*) There is a slip here; the "six manors" mentioned in Domesday are made up of the two in Gloucester, and four in Worcester.

(*c*) By an extraordinary mistake Mr. R. W. Banks (Archæol. Cambr., ser. iv., vol. xiii., p. 20) confused this Kingstone with the Cingestun (now Sedbury) mentioned in a Saxon document describing the divisions and customs of Tidenham, Gloucestershire. The mistake is quite unintelligible; for the document mentions fisheries in Severn as well as in the Wye as belonging to "Cingestun"; The document is printed both in Kemble's Code and in Dr. Birch's Cartul. Saxon., and by Thorpe Dipl. Angl.

Much Marcle is entered in the Hereford Domesday under four Hundreds; Wimestruil, 179b, 185b; Plegeliet, 180; Bremese (or Brooms' Ash), 182b; and Radelau, 184b, 185b. All these were strictly Hundreds of Herefordshire. In the first of these entries we find "De hoc Manerio est una hida ad Turlestane quæ T.R.E. reddebat l. massas ferri et vi. salmones. Modo est hæc terra in foresta"; that is, "To this manor (of Marcle) belongs a hide of land at Turlestane which in the time of King Edward (the Confessor) used to render 50 blooms of iron and 6 salmon. This land is now in the Forest."

Duncombe (*d*) quoting this passage says of Turlestane "The modern name of this locality has not been ascertained."

Now a render or rent in kind was necessarily of the produce of the place. Marcle, as the geological and piscatorial members of the Club well know, does not produce, and never could have produced, a single bloom of iron, or a single salmon. We must clearly look for this "Turlestane" outside the limits of Marcle.

On February 10th, 1282, a survey of Dean Forest was made (*e*). In this the boundaries of the different Bailiwicks comprised in the Forest are set out. That of the "Bearse" begins at the Cone brook, skirts the woods of Alvington and Aylburton to Pillowell Brook; then to Horewell and Oakwood Brook and Spon Green; thence to "Thustanes Brook" at the Cross; thence to Stow, and by the fields of St. Briavels to Rodmore, and so back to the Cone Brook.

If my readers will examine this perambulation with the help of the 6-inch ordnance map, I think they will agree with me that the Cross mentioned is the ancient Cross in Clearwell village, close to the source of what is now known as the Newland Brook; the more ancient name of its spring being Clowerwall. If this is right we fix "Thustanes Brook" at this point.

We now proceed to the Bailiwick of Bicknor in the same Survey. The boundary here begins at the Bishop's Weir on the Wye, of which more presently. Then it traverses a highway leading from Bicknor to Stanton, and by a path to "Wybaltunesbroke," now converted into "Whippingham" Brook; thence by the fields of Stanton to the Greenway (*f*), and thence by the fields of Newland as far as

(*d*) Herefordshire, vol. iii., p. 2.

(*e*) This Survey was partially and incorrectly reprinted by the late Sir John Maclean in the Transactions of the Bristol and Gloucestershire Archæological Society, vol. xiv. I hope shortly to publish a full reprint of it with translation and annotations. Sir John says in his preface that the document is printed verbatim. He clearly never saw the original, and was supplied with an incomplete copy.

(*f*) The Greenway was, I think, the old trackway from Stanton by what is now Marian's Inclosure, by the site of Highmeadow House, and so to Newland Church and thence down the valley.

"Thustanes Brook"; and going up Thustanes Brook to the "King's Fish Pond" (which from other entries in the same survey I am able to identify with the mill pool at Millend Farm, near Scatterford); and thence to the Wolves Oak (on Winnals Hill, near Coleford), and so on.

Here again we meet with the same "Thustanes" Brook, as it passes down the Newland Valley on its way from Clearwell to join the Wye at Redbrook.

A perambulation of the Forest was made in May, 1300. This gives the outer boundaries of the Forest and not those of the separate Bailiwicks. The line is described from near Symonds Yat to "Stantonesgate" thence to Broadstone (between the Buckstone and the Kymin), and thence (as I understand it) by Duffields Lane (*g*) (which I believe to be the line of Offa's Dyke) to "the brook called Threbroke which goes down to the Wye"; and so down that brook and the Wye to Brockweir, &c.

The identity of this "Threbroke" with "Thustanes" Brook of the earlier Survey is obvious on examining the map.

Land on the line of this brook could well have been held by the service of rendering iron and salmon. On its watershed, near Highmeadow, lie the ancient iron ore workings of "the Scowles"; the timber around was ready to supply the charcoal necessary for the smelting; and in the Wye immediately at the mouth of the brook is Redbrook Weir, which by the name of Ithelesweir (*h*) was in 1330 granted with its fishery rights to the Abbey of Tintern by Sir John Joce, of Newland. Moreover, it was, as we have seen, within the ambit of the Forest.

We will not, however, assume, notwithstanding that all these features satisfy the conditions required, that we have as yet proved the identity of this Gloucestershire valley with the Turlestane of the Hereford Domesday, but will first deal with some other place-names in the neighbourhood.

Returning to the Hereford Domesday, we find (fol. 181) under the head of "Terra Regis" (or the King's land) in Plegeliet Hundred, "In Ruedene is one hide assessed to geld-tax." This is Ruardean (*i*) in Gloucestershire; on the border of Herefordshire it is true, but far removed from Plegeliet. This is immediately followed, but as in Brooms' Ash Hundred, by the entry as to Niware

(*g*) Duffield-Dyke-field. Compare Dixton and Ditton-Dyke-ton.

(*h*) Not to be mistaken for Coed-Ithel Weir below Llandogo.

(*i*) As to the derivation of this name, see my paper on the "Wardines" of Herefordshire (May, 1905). The Domesday scribe obviously forgot the contraction mark representing the second "r," which would have made it Ruerdene.

cited by Sir Henry Ellis in the above quotation. This entry means that " there are 2½ hides, the suit of Court and services for which used to be rendered in the county of Hereford ; but in the time of William FitzOsbern (1066-1070) it was turned over to Gloucestershire." This is New Weir, or rather the part adjacent to New Weir of the Vill of Huntsham, which was long debateable land as between the two counties. In the Dean Forest Survey already mentioned complaint was made that the men of Huntsham would not attend and do suit at the Forest Courts. On the other hand, earlier in the same century, they did suit of mill at the Mill on the Garron, as holding under William Marshall the younger as Lord of Goodrich, by whom the Mill with the services of the Huntsham tenants was granted to the Abbey of Gloucester (*j*).

On the same folio we read (still as under Brooms' Ash Hundred) that Earl Godwin formerly held a hide at Stanton ; but it was now waste and included in the Forest. This is Stanton-on-Wye.

On fol. 182 (again under Brooms' Ash) we find among the lands of the Canons of Hereford, " In Wiboldingtune are 3 hides which properly belong to the Bishopric. They are, and were, waste. There is a fishery there." This is the place which gave its name to the Wybaltunesbroke, already mentioned in the quotation from the Survey of 1282 (*k*), and the fishery is the Bishop's weir in the Wye, mentioned in the same quotation. The Bishop had evidently by that time got the better of the Canons (*l*).

On fol. 185b (again under Brooms' Ash) we have another mention of Ruardean (this time as Ruirdin, and between entries of Hope Mansell and Linton), held by William FitzBaderon, lord of Monmouth, and in the possession of his tenant Salomon ; and formerly held by one Hadeuwi. This last name remained long in the Forest. In 1250 Adam Hathewey was summoned before the justices in Eyre at Gloucester for trespassing, with the Earl of Norfolk's huntsman, in the Forest in pursuit of game. Ralph Hethewey was in charge of the Blaize Bailey at the time of the 1282 Survey, and afterwards was Verderer ; William Hathewey was a Forester in fee and one of the jurors on the Perambulation of 1300 ; and he, or a namesake, was charged with assisting John de Pateshull, the King's Receiver of Chepstow Castle in robbing the Castle of its stores in 1330.

(*j*) Cartulary of Gloucester, vol. i., p. 71.

(*k*) Now Whippingham Brook in the Mailscot Wood between Symonds Yat and Stanton.

(*l*) In the Taxation of Pope Nicholas (1291) the Bishop of Hereford is returned as receiving, among his temporalia, £2 a year " de quodam gurgite apud Bishopswere super Weye." It would seem that the weir was let to the Prior of Lanthony ; for in the Survey of 1282 it was complained that poachers in the Forest were able to escape by means of the Prior's boats kept at that weir and Hadnock Weir.

Again on fol. 185b Turstin FitzRolf is returned (under Brooms' Ash) as holding at Alwintune 6 hides, and rendering 20 blooms of iron and 8 sextars of honey (*m*), and having a Mill rented at 40d. Here again the Forest Survey of 1282 assists the identification of this Alwintune with the " Alwinebache " mentioned there as adjoining the Stanton-road in Bicknor Bailiwick between Slaughter and Hillersland, and on the outcrop of the iron ore.

Finally on fol. 179b it appears that to Clive and Wilton (entered under Brooms' Ash) " there belongs within the Forest of King William (*i.e.*, Dean Forest) as much land as in the time of King Edward rendered 6 sextars of honey and 6 ewes with their lambs."

We see therefore that in this north-west corner of Gloucestershire there was a series of places treated as if belonging to one or other of the Hundreds of Herefordshire, within the limits of which they locally never were ; and so there is, at least, no *a priori* improbability of the Newland Valley, immediately adjoining some of them, being similarly assessed as part of Marcle ; and the identification with it of Turlestane may perhaps now be accepted.

A very few similar instances from the Gloucestershire Domesday will suffice. The lands in Tidenham previously held by Bath Abbey are returned (fol. 164) as of Tidenham Hundred (*n*), and the land in Modiete (Madgetts in Tidenham Chase) previously held by Brictric are returned (fol. 164) as of Twiferde Hundred, as they would be locally ; but Roger de Lacy's lands in Tidenham and Madgetts are returned (167b) as of Bisley Hundred, which is away over Severn, on the top of the Cotswolds.

It may be well to conclude with a few words on the meaning of Turlestane, which may confirm the identification.

Just as in Domesday Turstin represents the Saxon Thurstan, so no doubt the more correct orthography would have been Thurlestane.

Thyrel-stan in Saxon meant a pierced or perforated stone ; and is not uncommonly met with in charters as a boundary mark ; thryel (or thirl) being derived from " thurh," *i.e.*, " through." So

(*m*) As to these honey-rents, see Mr. Seebohm's English Village Community (207 seq.), where he considers them to be confined to Gwent and Archenfield. The instances in the text are in neither. There is a special series of findings in the Survey of 1282 as to the rights to honey in Dean Forest.

(*n*) As this is a solitary mention of this Hundred, it is probably an error, for " Twiferde " mentioned in the text. But that would not affect the point in question. That it was an error is supported by the fact that the profits of the pleas, &c., in the Court and Hundred of Twyford are returned among the receipts of the manor of Tidenham as a member of the lordship of Striguil when in the hands of King on the death of Roger Earl of Norfolk in 1306. See Pope Roll, 4 Ed. ii., m. 34.

Thyrelstan and Thurstan would be synonymous. The form "Thustane" which we found in the Survey of 1282 is no doubt due to a common scribe's slip in not putting the contraction mark for the "r."

But why should that name have been used for the Newland Valley? I believe that from very early times a considerable business was done there in the manufacture of millstones. I well recollect very many years ago noticing a quantity of half-buried and neglected millstones along the river bank near the outfall of the stream at Redbrook, and I often wondered as to their origin. Undoubtedly they were fashioned of the stone to be found in the valley, and had been brought down to the river for shipment. That there was a considerable trade in millstones down the Wye is evidenced by the fact that the Lord of Striguil (as appears by a survey of 1687) was entitled to a toll at Chepstow of 4d. for every pair of millstones and 4d. for a load of grindstones and quernstones passing down the river.

There is, however, another solution which should be mentioned. We have seen that Turstin FitzRolf held land near Stanton. He also held lands in Marcle and elsewhere in Herefordshire and Gloucestershire, the greater part of which (apparently from complicity in Roger de Lacy's rebellion in the reign of Rufus) escheated and passed into the hands of Wynebald de Balun, Lord of Abergavenny, with Roger's lands in Marcle. It is possible that he or his ancestors had held land in the valley and gave the name to it. I, however, prefer the other explanation.

The name "Newland" indicates that the land had been reclaimed or brought under cultivation after Domesday.

The earliest mention which I have found of the Church is in the Plea Roll of the Eyre at Gloucester, 5 Hy. iii. (1221), where it is found that the Church of Newland (Ecclesia de Nova Terra) is in the gift of the King, and Robert Wakerley then held it by the gift of King John. So it dates from the reign of John at least. In 1286 Edward I. granted the advowson to William de Braose, Bishop of Llandaff, and his successors. This was confirmed in 1304 with a grant of the tithes of all the assarts (or newly tilled land) in the Forest, which accounts for the extraordinarily scattered area of the parish. A copy of an Award of Commissioners, appointed by the Bishops of Llandaff and Hereford respectively to settle disputes as to the boundaries of these assarts (May 5th, 1310), is in the Library of St. Michael's Priory, Belmont (Hill MSS. vol. vii., p. 129). The diocese of Hereford included the whole Forest area between the Wye and Severn until Henry VIII.'s reign.

NOTES ON RARE BIRDS IN THE ROSS DISTRICT, HEREFORDSHIRE, 1905.

[By William Blake, Ross-on-Wye.]

1905, September 21st. Two cormorants seen on the Wye, near Cubberley, Ross. One, shot by Mr. Griffin, jun., has since been preserved and is now in his possession.

On November 15th, a spotted crake occurred at Trerible Farm, Llangarren. Sent to me for identification; has been well set up, and is now my property. No record has been noted of the species in the county for about 30 years. It was killed by Mr. Harry Rudge, of Trerible House, who flushed it while rabbiting.

All the crakes usually leave us in October, but both this species and the corncrake have been with us as late as mid-winter, left behind from some unknown cause.

Hobby. About the middle of December, one of these rare hawks was killed in Coldbrough Wood, Yatton, by one of a Perrystone shooting party. Unfortunately it was not taken care of, but allowed to get like "high game," and then thrown away. There is no doubt as to its identity. The gamekeeper having since called inspected a preserved specimen in my possession.

1906. A flock of wild geese passed over the town during the first week in January. One was shot. Sorry it was sent away before I could see it. Most likely a gray-lag.—William Blake.

EARLIEST APPEARANCE OF BIRDS IN THE PRESENT YEAR.

At a meeting of the Club on 26th April, Mr. T. Hutchinson gave the following dates of appearance:—Sandmartin on April 5th, Martin on April 12th, Swallow on April 15th, Redstart on April 16th. Members of the Club are requested to send their records of the earliest noted appearance of these and other migrating birds in the course of their own observations.

The following interesting record in natural history has been received from Mr. J. E. H. Stooke:—On April 19th last, at Lower Brookes' Wood, near Pontrilas, I picked up a dormouse's nest, and, on opening it, found its inhabitant curled up asleep. It would seem that it must have been there for at least five months, *i.e.*, from November, or before then. The nest was of fine grass, about 2½ins. in diameter, and without any apparent exit. Near the same place was a dead badger, recently killed.—*24th April*, 1906. J. E. H. Stooke.

FORMS AND FORMING OF MOTE CASTLES IN HEREFORDSHIRE.

[By EDWARD A. DOWNMAN, Laindon, Essex].

All ancient entrenchments in England and Wales may be roughly divided into two great classes, the first class taking in the early hill forts large and small, and certain other enclosures of various dates; the second class being those strongholds which were the actual habitation of a lord, either acting as constable for his sovereign or as chieftain in his own right; it is for works of this second class that I have accepted the name Mote Castle, perhaps for want of a better.

While from a study, extending over many years, of earthworks in most of the counties of England I profess to be able to distinguish a Mote Castle from any other form of stronghold, I am as yet unable to determine for certain the earlier from the later; and though I hold almost overwhelming proof that all Mote Castles are the works of the Norman invaders, or of those influenced in the matter of castle building by the Normans, yet I am only prepared to state that such is my opinion, there being other antiquaries who hold a contrary view, namely, that some of these works are of Saxon or other make. Till we have before us plans drawn to a common scale, with full sections and details of position, commands, &c., (which is now, A.D., 1906, in advanced state of preparation) of all, or at least, the chief earthworks of England and Wales, any definite statement as to date is to be deplored. Probably the true history of our country is yet to be read in its earthworks.

As to the position of the Mote Castle, the builder apparently did not always have his choice, but had to form his stronghold, if not upon a given spot, yet within a limited area; but if he had his choice he seems to have chosen ground practically level, upon lowland with a subsoil of clay in some form, the result being such a grand and powerful work as Pleshey, in Essex, perhaps the finest specimen in the country, having been the castle of the constable of England; but as an example in Herefordshire, Kilpeck Castle will do. Another favourite position was the tongue of land between and above the junction of two streams, Ewyas Harold being so formed. A rare place to find a Mote Castle is the summit of a hill, especially a high one, Herefordshire possessing the extraordinary work of this kind upon the Malvern Hills, known as the Herefordshire Beacon, above Wynds Point. Sometimes a small hill was scarped and trenched, the result being such as we see in Clifford Castle, near Hay.

Masonry is found forming part of the defences of many Mote Castles, but the greater number have now no traces of artificial stone work, and probably never had, the earthworks forming the only defence, or, perhaps, once crowned with woodwork.

The forms of the Mote Castle are various.

1. There is the simple mound surrounded by a ditch. In some places, however, the ditch is wanting, and either never existed or has been filled up. Saint Weonards Tump upon the summit of a hill, and Rowlstone upon lower land, are Herefordshire specimens of this simple mound and ditch. A circular space was marked out, a ditch dug, the ballast from the ditch thrown inward and upward, and the outcome a raised level platform surrounded with a ditch, that at St. Weonards 16 to 22 feet in perpendicular height above the natural level; Rowlstone 8 to 11 feet; often as at St. Weonards, material must have been brought from elsewhere to heighten the mound, as now (1906), while the mound remains, the ditch is almost filled up; but at Grosmont, in Monmouthshire, close to the borders of Herefordshire, while the ditch is still very deep, the summit of the mound scarcely rises above the natural level, hence here the ballast from the ditch must have been removed to a distance.

2. In many places, to the simple mound and ditch was added a second work, known under various names, either as Court Yard, Bailey or Ward. Here let us call it a Court Yard. This, in its simplest form, consists of a space in the shape of a rough horseshoe, defended either with a ditch only, as at Dorstone, or a ditch and inside rampart, formed out of the ballast from the ditch, as at Castleton. But in Herefordshire the actual defences of this Court Yard are so various that it would take up too much space to enumerate the forms, many having in part a natural fall of land as the sole defence, as at Lower Pont Hendre, near Longtown. The actual size of these Mounds, or Mounds with Court Yards attached, varies greatly. The Mounds also are in some places oval instead of circular, and the Court Yard not in horseshoe form as at Newton Tump.

3. Besides the Mound and Court Yard, another enclosure is perhaps found, as at Huntington; or it may be several, as apparently once at Kilpeck, and at Longtown, where there are three enclosures besides the Mound. No doubt the size and number of enclosures varied according to the importance of the position, and the number of men under the command of the Governor or lord. As a rule the larger outer enclosure is rounded, but occasionally it is rectangular, as at Longtown, hence it has been the custom, till of late years, to ascribe the rectangular work to the Romans;

indeed all the large entrenchments protecting the towns under the command of a Mote Castle have been ascribed to a much earlier date than the Castle, but there is nothing in these works, whether rounded or rectangular, inconsistent with the Norman plan.

4. The Mounds themselves are not all thrown up on the same principle, and this fact may be of much greater importance than at first appears. (a) There is the Mound with the level summit, as at Mortimer's Castle, Much Marcle. (b) The conical Mound with practically no level space upon the top as at Lower Pont Hendre; one of the most pointed Mounds in the kingdom is that at Huntington. (c) The Mound having its contour defended with a rampart such as is found at Herefordshire Beacon on the Malverns. This latter may be the earliest form of Mote Castle, as most such, occupying the summit of a hill of considerable height, as at Dover and Folkestone in Kent, Edburton in Sussex, and Old Sarum in Wiltshire, have ramparted keeps; but Mouse Castle in its present form is an exception. This form is, perhaps, the decay from the earlier hill fort through the Mound towards the Moated Homestead, which is the latest and poorest attempt at an earthwork.

Before we proceed further, let it be noted that, as a rule, the Parish Church and Mote Castle hug each other closely, though sometimes the Castle has its own chapel, as at Goodrich. Also that, as a rule, the neighbourhood of a stream was chosen; often also a water mill exists near the Castle, as at Vowchurch and Staunton-on-Arrow; these three facts may help the student to distinguish between a burial mound and a Castle Mound. Tumuli are generally found in groups, upon high land, and probably never near a stream or church. Another curious matter in this connection is that tumuli are found in greater numbers in the chalk districts than elsewhere, hence their scarcity in Herefordshire. If the above facts were better known it would save the disfigurement of many Castle Mounds mistaken for tumuli as was St. Weonards Tump some years ago. But there is no reason why bodies may not have been interred a few feet below the summit of an existing Castle Mound.

5. Another form of Mote Castle is such as is seen at Cusop (near the church, stream and mill), which is a comparatively large platform doing duty for the Mound and Court Yard in one. These vary greatly in detail; Monmouth Castle, in a neighbouring county is a fine specimen.

6. Such works as Bronsil and Goodrich are Mote Castles declining towards the Moated Homestead, and wanting much in the way of defensive entrenchments (those apparent ramparts at Bronsil being partly banks to obtain a water level), lack interest as earthworks, but should be studied under architecture.

7. Works such as Castle Twts, at Lower Hergest, Kington, and Snodhill, attempts to form a Mote Castle out of a natural knoll are curious, the former an utter failure, the latter not very successful.

8. Such Mounds as Hengoed Turret Tump and Cwmma, both S.S.W. of Kington, with Cothill Tump at Turnastone, partake of the Mote Castle in object, but are so small that they merit little consideration. There are yet other forms of the Mote Castle, samples of which are not found in Herefordshire, and therefore are not detailed here; though the remnant of a work with two enclosures at Brinsop near to, and on three sides of the church, regarded by the Ordnance Survey authorities as Roman, have much greater resemblance to a Mote Castle, commonly found in Northamptonshire.

9. Minute enclosures such as at Burghill are, perhaps, the last form of Mote Castle, more properly treated as if a Moated Homestead pure and simple, the slight entrenchments consisting of wet moats or the banks to obtain such, and are of little interest. This earthwork was close to the church, and has been recently leveled by the proprietor.

As to the use of the Mound, it apparently acted as a raised foundation upon which to erect the stone castle or timber dwelling of the owner; at Llancillo is the trace of a small stone keep occupying the summit of the Mound without any further work visible, either of stone or earth. As an isolated Mound of this make, with its stone keep, or remnant of such is rare, this sample should be noted, though masonry at larger works is common. Occasionally we find a Mound whose summit is very large, as at Monmouth Castle, the diameter of which is about 300 feet, which would afford room for many buildings.

The ancient means of access to the summit of the Mound of the Mote Castle is, in most cases, now wanting, but such means of approach varied. (1) There was the causeway, remains of which may be seen at Kilpeck, Dorstone, etc. (2) The bridge of stone or brick, as at Goodrich. (3) The wall surrounding the Court Yard and continuing up the side of the Mound, to unite with the shell keep of the same, as at Snodhill and Richard's Castle; access to the summit in some places was apparently gained by this wall. But (4) probably at most Castles a drawbridge or moveable ladder was used, which has long since perished.

The Mote Castle ditch was often a wet moat. The builders of these works loved water as a defence, and where it was possible they so constructed the ditch surrounding the Mound and Court Yard so as to obtain a water level. Often a stream

was tapped, as at Eardisley, and the water was made to flow round the entrenchments. At some places the water was obtained at flood time and dammed in, or again a spring was found and used. Many ditches which were once wet are now dry. Some held water to a limited extent only; others, such as Ewyas Harold, were always dry. As a rule strongholds of earlier make than that of the Mote Castle used the dry ditch only, though earthworks of the Risbury type are found with wet moats, which fact probably denotes a late origin, with a strong suspicion of being one class of the Mote Castle series, but the evidence in favour of this theory is as yet rather complicated. Manuscript plans of all the earthworks in Herefordshire drawn to the standard scale of two feet to the mile, with sections and notes, are being placed in the British Museum (Depart. of MSS.), and rougher copies of the plans and some sections, probably on a smaller scale, are to appear in the Victoria Counties History of Herefordshire.

Woolhope Naturalists' Field Club.

FIRST FIELD MEETING, MAY 29TH, 1906.

WALTERSTONE, ROWLSTONE, AND EWIAS HAROLD.

Ideal climatic conditions favoured the First Field Meeting this season in connection with the Woolhope Naturalists' Field Club, which took place on Tuesday. The programme included visits to the churches, moated mounds, sites of castle and camp of Walterstone, Rowlstone, and Ewias Harold, and judging by the attendance and many expressions of gratification, the outing was a most popular one. The President, the Rev. R. Hyett Warner, was unable to be present, and his duties for the day were undertaken by the Rev. Preb. Lambert, one of the senior members of the Club. The following is a list of those gentlemen who took part in the proceedings :—

Mr. P. B. Barneby, Mr. W. Mortimer Baylis, Mr. H. Spencer Bickham, Rev. C. H. Binstead, Mr. H. Percy Bulmer, Mr. George Child, Mr. R. Clark, Mr. J. Truman Cook, Mr. Gilbert Davies, Mr. E. C. Douse, Mr. P. Leighton Earle, Rev. H. M. Evill, Rev. P. H. Fernandez, Mr. R. T. Griffiths, Rev. J. E. Grasett, Mr. F. S. Hovil, Rev. A. W. Horton, Judge R. W. Ingham, Rev. A. G. Jones, Mr. Herbert E. Jones, Rev. Preb. W. H. Lambert, Rev. Augustin Ley, Rev. H. B. D. Marshall, Mr. George Marshall, Rev. A. H. McLaughlin, Rev. W. E. T. Morgan, Capt. P. L. Morgan, Mr. C. S. Morrison, Dr. Scudamore Powell, Mr. John Riley, Mr. H. A. Wadworth, Mr. Alfred Watkins, Rev. Preb. Winnington-Ingram, and Mr. T. Hutchinson, Hon. Secretary. Visitors :—Rev. E. R. Firmstone, Mr. D. A. Derham Marshall, Rev. R. M. S. Onslow, Mr. F. Shuttleworth, and Mr. W. H. Woodcock.

The main portion of the party met at Hereford Station about 9 o'clock and journeyed by the 9-15 train to Pandy, being joined by other members and visitors at intermediate stations. At a quarter to ten the walk commenced, Mr. Herbert Jones, of Ewias Harold, going to the front as director for the day. Our first stopping-place was at the ancient mansion of Allt-yr-ynis, situated on the left bank of the Monnow, within half a mile of the station. The walk through the fields was preferred, by the side of the narrow water-way known as the Honddu, to the hard macadam of the roads, it was indeed delightful. The country was fresh after recent rains, and the air clear and invigorating.

Allt-yr-ynys is described as the principal farmhouse in the parish of Walterstone. It is an extremely interesting old world residence, having formerly been the property and seat of the historic Cecil family, from whom descended Lord Burleigh (the celebrated minister to Queen Elizabeth) and the Marquises of Salisbury and Exeter. The estate became the property of the Cecils by the marriage of Robert Sitsilt with an heiress about the year 1091. The ancient mansion, now occupied by Mr. and Mrs. John Gwillim, is charmingly situated near the junction of the rivers Monnow and Honddu. It still retains some traces of its former grandeur; the arms of Burleigh in painted glass were purchased and presented to the church by Mrs. Rosher, who formerly lived at Trewyn, and were placed in the small south window of the chancel. The whole of the party went over the house and surroundings, and were much interested.

Subsequently Mr. Jones gave us the benefit of the following notes :—" The name, according to a Welsh dictionary, ' compiled by the great pains of industry of Thomas Jones ' in 1771, would appear to be derived from the words Allt—the side of a hill, or a woody cliff. Yr or y—the and ynys—an island. But Duncumb in his History of Herefordshire says, Allt—a grove on the side of a hill, and ynys—a fertile tract of land below it. Thus Duncumb, while less correct as regards etymology, gives a better description of the situation of the place, for while the Rivers Honddu and Monnow, and a small rivulet meet here, they do not surround it, and the house is situated at the very foot of the hill leading to Walterstone Common. According to Duncumb (1812), Allterynnis Mansion is now adapted to the purposes of a farm, but the old hall and parlour still remain with little variation. A very minute survey of the house and grounds was made in 1647, by which it appears that the ' great haule ' was 30 feet long and 20 feet wide, having a communication at the upper end with the great parlour, ' a faier wainscott room,' usually employed as a dining-room. In the windows were the arms of Cecil and Delahay, in painted glass, and part of it still remains. Robinson, in ' Mansions and Manors of Herefordshire,' says that there were two duplicate coats of arms ; one of them has since been inserted in the south chancel window of Walterstone Church, where it still remains, and the other is at Trewyn. (The coat of arms in the church shows in the dexter chief and sinister base the same arms as are borne by the Cecil family at the present time, viz., Barry of Ten—Argent and Azure; over all—six escutcheons, 3, 2, and 1 sable—each charged with a lion rampant of the field.) There was in 1647 ' an old gate house at the first entrance into the green court, having two little chambers in the same, overhead, where the husbandman and labourers do

WALTERSTONE CHURCH.

STAINED GLASS, SUPPOSED CECIL ARMS.

Photo by A. Watkins.

use to lodge.' At the present time the great hall appears to have been partitioned off into smaller rooms, but there is a room with a fine ceiling which might be taken for the great parlour. Several of the rooms are oak panelled. The gate house has disappeared. The 'Archæological Survey of Herefordshire,' by Mr. James Davies and the Rev. J. O. Bevan, mentions the site of a chapel at Alterynys, and at the left-hand side of the front of the house in the green court is a roofless building, which was pointed out to me recently as the old chapel, but which from its appearance might have been anything. Duncumb, however, describes the site of St. Ailworth's Chapel as being situated near the camp on the hill above, 'a large stone having a cross upon it, and probably denoting the interment of a Roman Catholic, having been removed from hence, but a venerable yew tree still remains to corroborate the sacred purpose of the building.' But yew trees are unfortunately very common about here, altogether apart from religious edifices. The interest, however, attaching to this house is the fact that it is the ancestral home of the Cecils. Of this there appears to be no doubt, from what we gather in Dr. Nare's History of Lord Burghley and the pedigrees and letters in the Hatfield manuscripts, all endorsed by Lord Burghley and some written in his own hand. These show that he was a great student of his family genealogy, and seemed inclined towards a Celtic origin. One pedigree endorsed by him traces the family from 'Owyn temp. regis Harold' to himself, while in certain genealogical notes followed by a genealogical tree (both in the minister's handwriting), mention is made of Robertus de Sitsilt, who was with Robert Fitzhamon at the taking of Glamorgan, and who appeared to have had lands assigned him in Wales in requital of his services and assistance. This Robert was the father of James Sitsilt, who stands at the head of the family pedigree, and is there described as 'Dominus Halterennes in Ewyas, in Comitate Herefordensi ac etiam de Beauport.' (He is described as having joined the Empress Maud against King Stephen, and was slain at the siege of Wallingford Castle in 1139.) This pedigree from James Sitsilt is said by Nares to be duly signed and attested by Robert Cooke, Clarencieux King-at-Arms, and R. Glover, Somerset Herald. The nearest connection of Queen Elizabeth's Treasurer with Allt-yr-ynys is recorded in a pedigree originally brought down to 1508 (the year of the death of his great-grandfather), but afterwards continued in his own handwriting down to 1565. This document records the fact that William Cecil, Lord Burghley, was the grandson of David, a younger son of Richard of Halterennes, who died in 1508, and of whose will, dated April 12th, 1492, there is a copy amongst the Hatfield manuscripts. Francis Thin, Herald, who in the year 1585 drew up a catalogue of the Lord Treasurers of England, says that 'Lord Burghley was lineally descended from

Richard Sitsylt, father to David Cecill, who was the grandfather to the said Sir William Cecill, Lord Burghley . . . and at this day, William Sitsylt, or Cecill, Esquire, cousin german to the said Lord Burghley, removed by one degree only, is possessed of the said house of Halterennes in Ewyas land, as the heir male of the House of Sitsylts, and this William is descended of Philip Cecill, elder brother of the said David.' The names both of the people and the place show an extraordinary variety of spelling. I have found sixteen different modes of spelling Cecil, and ten varieties of Allt-yr-ynys. This led to an explanatory letter from Lord Exeter, in which he says, ' My Lord, my father's altering the writing of his name, maketh many that are not well affected to our house to doubt whether we rightly descended from the house of Wales because they write their names Sitselt, and our name is written Cecyll; my grandfather wrote it Syssell.' The fact of his descent appears to be the only connection that Lord Burghley had with Allt-yr-ynys, statements that one reads and hears concerning his residence there being probably founded on the coincidence of name and the time of death of the two Cecils, Lord Burghley and Cecil of Allt-yr-ynys, both being named William, and both died in the same year, 1598. With the death of William Sitsylt in 1598, the name became extinct here, at least so far as concerned the elder branch, but he left eight daughters, married, and numerous descendants, but wishing to continue the name of Cecill in that house, conveys the property to Sir Robert Cecil and his heirs, to the disherison of his own issue. The expense of his funeral was defrayed by Lord Burghley, as a letter from Paul Delahay, son-in law to William of Alterennes, says, ' and so in worshipful manner was the funeral celebrated according to your Lordship's commendations, for that to the credit of the house of Alterinis I gave out the charge to be yours, which amounted to £100 and mo. as by particulars shall be manifested.' Robinson (' Mansions and Manors of Herefordshire ') says that in 1652 the landowners in Walterstone were John Delahay (one of William Cecil's sons-in-law was Paul Delahay) and the Earl of Salisbury, son of Sir Robert Cecil, the estate passed into the hands of the Delahays, and was alienated to Guy's Hospital in about 1730 according to Duncumb, paying them a reserved rent of sixty pounds per annum, under a lease on three lives, subject by covenant to a perpetual renewal at fixed fines. Under these conditions the Governors of Guy's Hospital continue to hold Allterynnis; it passed through the hands of other lessees down to the Rev. John Rogers, from whom the late occupant was descended. The cause of the decay of the House of Halterinnis is described by Paul Delahay in a letter dated June 23rd, 1598, to the Lord Treasurer: ' The chief decay of Halterinnis was upon the killing of a man by Jo. Cecil, as the bearer will acquaint him.' " Prays for a picture of the Lord Treasurer to be placed

there." (Would this Jo. Cecil be Johannes, father of the recently deceased William ?) In the survey of 1647, according to Duncumb, Walterstone was described as a spacious parish with few inhabitants, ' noe preaching ministry only a poore curate haveing but £4 per annum standing wages, and no other profits but what he labours for in teaching a schoole in the same parish, and supplying sometimes other churches.' Traces of the Cecils are found in the district. In Abbey Dore churchyard there is a small upright stone to Benjamin Cicell and his wife, who died 1730. The Rev. Mr. Cecil is recorded as being Mayor of Grosmont in 1759; and there is an altar tomb in Grosmont churchyard to William Cecil, Esq., who died in 1804, aged 62. This has on the west side a shield bearing the Cecil arms and having a crest the same as that borne by the Salisbury branch of the family, viz., six arrows, three and three saltire wise, surmounted by a cap, but I cannot find a tomb at Grosmont which was described by Mr. Courtenay Scudamore in the *Western Mail*, March 13th, 1903, as being covered with the Cecil arms."

Amongst the variations of the word Cecil are Seysel, Seysol, Seisil, Cecell, Syssylte, Sitsilt, Sicell, Seycell, Cecill, Cyssell, Cecyll, Sicelt, Sicill, Seicill, Sitsylt, Cycil, Cyscells, and of Allt-yr-ynis, Alterinnes, Allterenys, Halterinis, Haulterennes, Halterennes, Alterinis, Alterinnis, Altyrinnis, and Allt-yr-ynys. The Monnow here forms the county boundary. South of Allt-yr-ynis, the Honddu flows into the Monnow upon its right bank, and west of the mansion the stream Nant Cravell (Grafel ?) flows into it upon its left bank.

GEOLOGY OF ROWLESTONE.

The following remarks on the geology of Rowlstone, Ewias Harold, and Pontrilas district from " Records of the Rocks " (by Rev. W. S. Symonds, F.G.S.), were forwarded by Mr. Moore, and were read by Mr. Hutchinson :—" I would now transport the reader to the picturesque districts of Pontrilas, Kentchurch, and Rowlstone, on the borders of Herefordshire and Monmouthshire, for the study of some of the Upper beds of the Lower Old Red Sandstone. Close to the railway station at Pontrilas is a quarry of sandstone which affords a fair section, and some years ago the plate of a Cephalaspis was still adhering to a stone in the tunnel. From these railway beds I and my friend, the Rev. William Thackwell, obtained ' Parka decipiens,' and remains of plants, with here and there portions of the plates of Scaphaspis or Pteraspis. Above these strata are the Cornstones of the High Common of Ewias Harold, and it is this hard Cornstone which arrested the devastation which has been so

rife in this district, and which occupies the plateaux of many hills in this part of Herefordshire and Monmouthshire. These Ewias Cornstones are not on the same zone as those on the upper flanks of the Black Mountains, though both yield fish remains, which, however, are far more sparse in the upper zone. I saw portions of the plates of Pteraspis and a fish spine last year in the Upper Cornstones when descending from the Black Mountains to Hay. Besides occurring in the railway beds at Pontrilas, 'Parka decipiens' (or the egg packets of Pterygotus) has been found on the Common of Ewias Harold; in the beds which cap the hill at Rowlstone; and also at Cusop, near Hay. This fossil marks one particular zone in the Old Red Sandstone, as it is found in the very basement strata that abut on the Passage rocks. The Castle of Ewias Harold stood on Cornstones, which form a concretionary limestone, such as, in former days, was burnt for lime in many parts of Herefordshire. In these beds fish remains occur, usually of a fragmentary character. A fine specimen of Cephalaspis Syellii was found some years ago on the Common; and in the quarry at the summit of the Common Dr. M'Callough obtained a new Pterygotus, Pterygotus taurinus (Salter). Proceeding from Ewias Harold up the opposite hill to Rowlestone, thick marly and sandy beds cap the summit of the hill, and were formerly quarried near the church. These Rowlestone strata are, in my opinion, the equivalents of the building stones of Cradley, which overlie the fishbearing strata on the Bromyard road, and also the equivalents of a similar series of deposits which, at Cusop, near the town of Hay, in Breconshire, overlie the Lower Cornstones, and underlie an Upper Cornstone series, which are associated with the Brownstones of the Black Mountains. The Rowlestone beds have yielded the fossil crustacean, the 'Stylonurus Symondsii' of 'Siluria,' which has not hitherto been found elsewhere; a Cephalaspis; and the remains of a giant Isopod, Præarcturus Gigas (Woodward), discovered by Dr. M'Callough of Abergavenny, and figured in the 'Transactions of the Woolhope Naturalists' Field Club' by Dr. Bull. The geologist who has traced the lower Old Red from Kilpeck, Whitfield and Pontrilas upwards through the hills of Rowlestone, Kentchurch, Grosmont, and the Graig, will comprehend the geology of the district and the succession of a series of strata, which are nowhere better developed than in this picturesque borderland; but walking up to a quarry, and finding a plate or two of fish, should not satisfy the physical geologist with respect to the horizon of the strata he is examining." Mr. Symonds treats of the antiquarian historic subjects of Kilpeck church, of Abbeydore, of Kentchurch Court, of the church and castle of Grosmont, of Skenfrith Castle, and Ewias Harold. Having made acquaintance with the upper rocks of the Lower Old Red Sandstone in the Pontrilas district, the geologist should proceed to Abergavenny,

the site of the Roman station, Gobannium of Antoninus, lying embosomed among the hills of the Scyrrid Fawr on the east, the Sugar Loaf on the north-west, and the Blorenge on the south.

From Allt-yr-ynis we proceeded along the roadway northwards for a mile and a half to Walterstone Church. En route were obtained splendid views of the outer range of Black Mountains in cultivation about one-third of the way up, the lovely Monnow Valley, whilst looking backwards the Scyrrid stood out in bold relief. The hawthorn of the hedges in full bloom added greatly to the beauty of the scenery. The church, dedicated to St. Mary, having seatings for 150 persons, is an ancient stone edifice, in the Early English style, consisting of chancel, nave, porch, and small tower containing two bells. It was restored in 1895. The Parish registers commence with the year 1761. It is a beautiful compact little church. In the porch are to be seen the remains of a Holy Water stoup, whilst in the churchyard is a preaching cross in a good state of preservation.

After an inspection of Walterstone Church, a walk of two hundred yards further north brought some members of the party to Pen-twyn, the residence of Mr. Arthur Griffiths, by whose permission the members inspected the moated mound at the back of his house. Duncumb, the historian, describes this mound as "raised in a conical form to the height of 30 feet, the circumference measures as many yards, and it is a deeply ditched or moated mound." There is a base court on the east side, and the moat is for the greater part filled with water. In volume 2 of an Archaeological Survey of Herefordshire, these mounds are described as a local modification of the ordinary Saxon burh. Defended by a wooden stockade, they provided local strongholds against the Celtic inroads. The custom of erecting them appears to have lasted into the 13th century. Windle says: "The moated mounds and mounds with base courts were formerly supposed to be the burhs of the Saxon period, but are now thought with greater probability to be of Norman construction."

From the roadway near the Carpenter's Arms, we made the ascent of 250 feet in half a mile over rough ground and fields to Walterstone Camp—a large defensive work with two or more ditches in places, on an elevation above the contour of 700 feet. The breeze was most refreshing, and the immediate view magnificent. Unfortunately the eye could not travel any great distance owing to the hazy condition of the atmosphere. Our conductor said he saw the Malverns distinctly on Sunday. The successive spurs of the Black Mountains, ending in the Cat's Back and the Hay Bluff, are to be seen to advantage from this commanding position. The camp is four-sided, with the corners rounded off, and is three or four acres

in extent. It is double-ditched, mostly clearly defined, and has two entrances. Windle, in his " Remains of the pre-historic age in Britain," says this shape used to be relied upon as a criterion for the origin of camps, the circular being considered British, the rectangular Roman, and the oval Danish. This is now known to be a fallacious test, for though many rectangular camps are of Roman origin, any hard and fast division like the above is misleading. It has been shown by excavation that three rectangular camps—South Lodge, Handley Down, and Martin Down—are all of the bronze period, and therefore belonging to the class commonly called British. There is only one way of dating an earthwork, and that is by trenching and excavating it, and examining the objects thus brought to light. The true Roman camp seems usually to have been rectangular, and to have possessed four entrances, which were not, as a rule, supplied with the elaborate outworks met with in important earlier fortresses.

Half a mile north of this camp is the reputed site of a Roman villa at Coed-y-grafel, where tesselated pavement has been found; but it was off the route, so that it was not seen on the present occasion. Leaving Walterstone Camp and bearing eastward, we got into the main road from Allt-yr-ynis to Rowlstone, passed the Common, and then bore north-eastwards for two miles or more to Rowlestone Church. On the right and left traces of old " Celtic lanes " were to be seen. Llancillo Church and the moated mound in the valley, one mile (as the crow flies) S.E. could not be included in the day's route. A long stay was made at

ROWLESTONE CHURCH.

Preb. LAMBERT read the following paper written by the Rev. M. G. Watkins :—

A mile and a half on the hills at the back of Pontrilas lies a small and little known Norman Church, very different from the stately buildings, Ludlow, Leominster, and Abbeydore, which have lately been described in these pages. Yet it is not without much interest of its own. Together with Walterstone, a neighbouring parish, Rowlestone probably marks the spot where two Scandinavian warriors, Walter and Rowl, or Rowley, were buried, and a stone erected over each. Northern settlers in Pembroke have similarly left their names in Ambleston, Haroldston, and the like. This nomenclature seems more probable than to refer the names of the two parishes to the Saxon tun or town. A similar name, Rolleston, appears in the heart of Notts, by the Trent, up which the Vikings certainly sailed their vessels.

The present vicar, Rev. S. A. Haines, was instituted in 1896.

Plate 13. To face page 264.

ROWLESTONE CHURCH. *Photo by Jakeman and Carver*

Plate 14. To face page 265.

Photo by A. Watkins

ROWLESTONE CHURCH. TYMPANUM.

The first glance would show that the tower, nave, and chancel of Rowlestone were built at the same time, about 1130 A.D., but a second look suggests that in all probability, from the greater size of the stones used in the chancel, it was built ten or a dozen years before the rest of the church. The S. porch is good of its kind, but is quite a new feature, dating from the restoration in 1865. Like Kilpeck, some seven miles away, neither church seems originally to have possessed a porch. In both cases, however, a porch may be welcomed as a great protection for the lovely carvings in the tympanum of each church. In the porch at Rowlestone the visitor is at once struck with the reverential character of the carving and its well-balanced æsthetic effect. In the tympanum of the door the Saviour is represented sitting in an aureole of pellet moulding and holding in His left hand the Book which He alone is worthy to open. The right hand is seemingly held upon high in the attitude of blessing, while four angels sweep round Him in adoration—*la dove il suo amor sempre soggiorna*—two looking up from below and two from above (Rev. v., 8-9). These angels wear dresses reaching to their ankles of rayed material which with long slender wings are very beautiful. The Saviour is clad in a close-fitting dress, like figures at Kilpeck and Shobdon. "These," says Fairholt, "Costume in England, p. 76," "may be considered as delineating the feature of the more ancient British dress, then preserved in the border county." This tympanum is eminently devotional, and well suited to the sanctity of the church, striking the note of worship, as it were, for all who enter, though it may not be as curious as those at Moccas and Kilpeck.

On each side of the Norman doorway is a circular jamb, and on the left side the capital is carved into two cocks (in allusion to St. Peter, to whom the church is dedicated), and on their left a human face with foliage proceeding each way from its mouth. This and all the wavy lines on the cocks, have a strong tendency, like so much later Norman work, to run off into ornamentation. Indeed here and there are touches which but for suppressed enthusiasm might easily have lapsed into the wealth of Keltic sculpture. On the right capital is another well-ornamented cock and four large bosses which may allude to the four wounds of the Son of Man wherewith He was wounded in the house of His friends. Two mouldings, one of starry appearance, encircle all. The porch and a considerable amount of new building on the south side of the nave are due to the restoration by Mr. Kennedy, a former vicar.

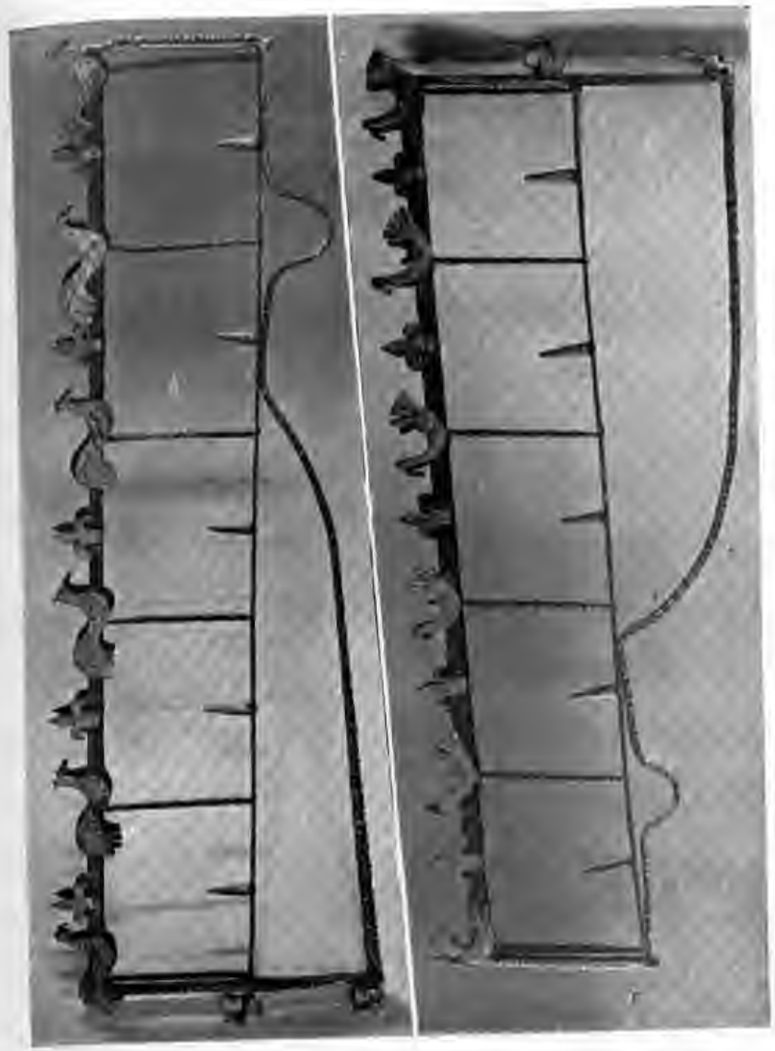
Besides its architecture Rowlestone is celebrated for its ironwork. The floriated hinges of the S. door are fine, but the door-handle is very noticeable. A beautifully hammered serpent twines round

each side of this ring. But the great feature in metal-work is to be found in the chancel. A couple of singular iron gates are let in with hinges into the N. and S. sides, each of which carries iron cocks and floriated crosses or fleur de lis ; first the cock, then a fleur de lis. These are about four inches in height. Six inches or so below them there are in each valve of the gate five iron cones (or prickets) to hold the candle or torch which then came through the top-bar next the cocks. This is certainly early work, and is among the oldest we possess, being probably of the 14th century. It is very effective and striking, and forms "the only example of the kind in England." (Mr. T. Blashill in "Woolhope Transactions," p. 249, 1890. The church is here described as well as the iron-work.)

The windows of the church were originally Norman and, as usual, small. In the end N. wall of the nave two of these windows are all that at present afford any light. Consequently the church is dark on a gloomy day. They are ten feet from the floor and are 8 inches wide, with a deep splay, and 31 inches in length. On the S. of the chancel is another similar window with a rectangular head, and one to match it on the north side. Both these windows are only 5 feet from the floor. There is a circular Norman porch-bowl of no peculiar merit, some 2ft. 6in. in diameter, and a tower at the W. end of the church with walls 3ft. in thickness, which might have been used for the purpose of defence. A little Norman window pierces the wall on the S. side, and on the exterior others may be noticed up the tower. On the W. of the tower is a triple modern window of which the less said the better. It is supposed there was no window originally at this place, and it would be a great advantage to the church could the window be removed. On the S. side of the nave there is a three-light perpendicular window, and another at the E. end. The pulpit is recent, of marble, and does not harmonise with its surroundings. One of plain oak near the reading desk would be another improvement to the internal arrangements of the building.

In the tower are three bells, but so thickly covered with dust that their inscriptions cannot be deciphered with any comfort. The "Woolhope Transactions" (p. 248, 1890), however, come to the rescue. One, believed by Mr. W. H. Jones to be a re-cast, the old inscription being retained, runs—"*Personet hec celis dulcissima vox Gabrielis.*" The second evidently "a post-reformation inscription," reads—"*Christus via veritas et vita*"; while the third is "God save the King—Richard, CW. 1685," or possibly 1658. There is a small iron chest in the tower which a few years ago could not be opened for some time, and several people assembled to see an entrance made into it and ascertain what it held. After the lid had been wrenched

Plate IX. To face page 266



ROWLESTONE CHURCH. TWO IRON BRACKETS IN THE CHANCEL.
Photo by Lakeman and Carver

Plate 16. To face page 267.

ROWLESTONE CHURCH. CHANCEL ARCH.

Photo by Jakeman and Carver

open with some difficulty, nothing but a quantity of hazel nuts was found inside it. These may have some occult meaning according to the folk-lore of the district, or, as is more likely, they had been dropped in by thoughtless children.

To return to the chancel, the altar of stone in a wooden frame, is probably the original altar of the church. At the back of it is a singular feature. A plain string-course runs from N. to S., in the midst of which, on either side of the holy table, projects a stone block about a foot long by 6 inches wide. Were these meant for Credence tables ? Or did they help to support a baldacchino ? They seem to have escaped the notice of most people who have studied the church.

The chancel arch still remains for consideration. It is curiously and beautifully carved, but without the extreme opulence of ornamentation which is found at Kilpeck. Two bands of lozenge-shaped mouldings run round the fine arch, the upper larger and bolder than the other. On the left are carved two figures, about eight inches high, dressed in gracefully falling garments supposed to represent St. Peter and his guardian angel (see Acts xii., 7) or some friend of the Apostle. A frieze largely composed of cocks and flowing ornaments, some of which has unfortunately been broken away, completes the left side of the arch. On the opposite side the Apostle and his friend or angel are represented in the same garments but as if crucified head downwards with again a cock carved close to them. This frieze and the cocks with their arabesque ornaments are again continued to the S. wall, and again a portion is broken away.

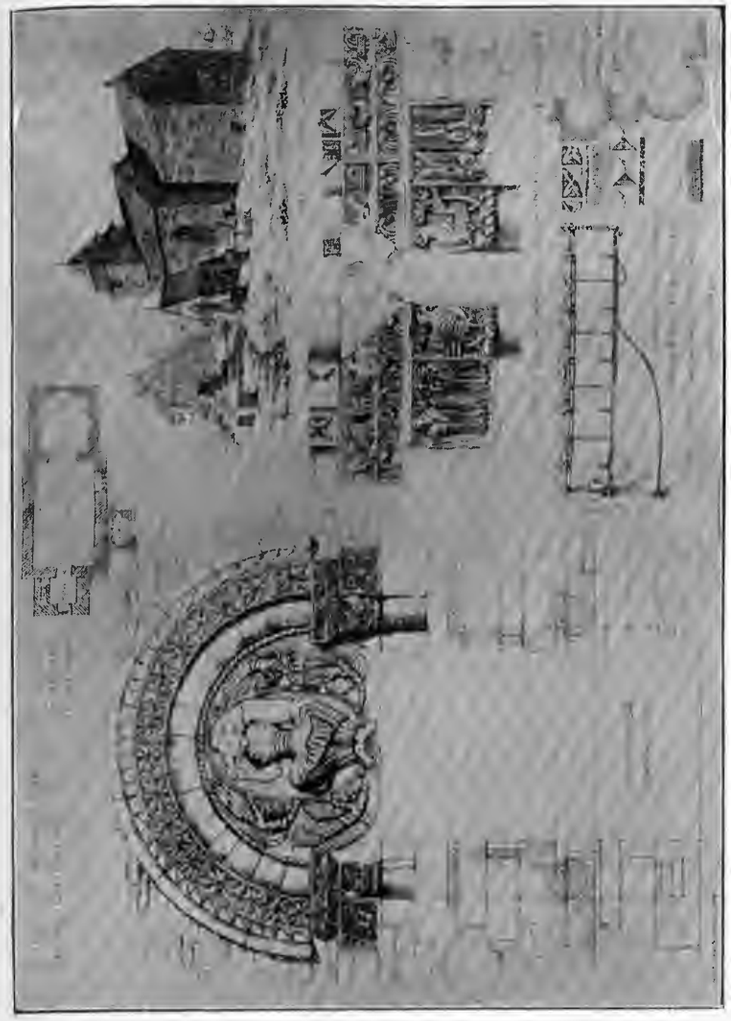
The character of this church with the faces and sculptured dress of the angels in the tympanum, so greatly resembling the figures carved at Kilpeck and the carvings of Moccas Church, is very suggestive to students of architecture. At Llancillo Church, 2½ miles away in the valley of the Monnow, in the early Norman architecture, rude and massive, and very dark owing to the small windows peculiar to it, may be seen Norman architecture at the commencement of the style. At Rowlestone, as has been described, and at Moccas are examples at the middle of the style when ornament was beginning to assert itself against massiveness. Passing on to Kilpeck, Norman architecture is seen at its finest, ornamentation having here its full sway before it passed into the plainness of the Transition which heralded the birth of the graceful Early English style. It is quite possible from a consideration of these general characteristics to suppose that a school of carvers passed on from the one church to the other, and finally displayed their greatest wealth of ornament at Kilpeck.

A very fine Cross must once have existed in Rowlestone churchyard. Like most of these remains in Herefordshire Churchyards, the Cross itself was probably destroyed in Post Reformation times. Till the last year it consisted of four large steps when one whose name is written on all the churches round by her benefactions crowned the original base (3ft. square and more than 2ft. high) afresh with a beautiful Cross, and inscribed it to the memory of one well known and deplored by many, George William Atlay, priest and son of the late revered Bishop of the Diocese, who died a martyr's death in Central Africa, August 26th, 1895. Within the church is a touching brass plate recording that it " is erected by one who knew and loved both father and son."

Two hundred yards north-east of Rowlstone Church is another moated mound. Subsequently the party proceeded another mile and a half N.E., mostly by footpath, to Ewias Harold, and the site of its Castle, Priory and church, the history of which has been so well written by the vicar, the Rev. A. T. Bannister. Mr. Bannister, without the aid of notes, gave the members some valuable historical information, which was much appreciated. The ancient castle, now demolished, was formerly the head of the lordship of Ewyas Harold. Il is supposed to have been built by King Harold, and from him the place derives its name. Here was also a Priory, or cell, of Black monks. The church is dedicated to SS. Michael and All Angels, and the chief feature is the tower, an excellent specimen of Early English work. A walk across the Common took some of the party to Abbeydore Church.

Hereford was reached at 7.40 p.m., the day having proved a most enjoyable and profitable one.

Plate 17. To face page 268



ROWLESTONE CHURCH. *Photographed by Jakeman and Carver*

From a sketch.

THE KELTIC LANES OF SOUTH HEREFORDSHIRE.

By The Rev. M. G. Watkins.

An interesting study for dwellers in the rural districts of Herefordshire, consists in tracking and mentally reconstructing its old roads. Many of these go back to the earliest historic population of the island, the Kelts. Before them the origin of these lanes is lost in remote antiquity. They are generally to be found winding along the sides of hills, with perhaps a preference for dipping into the valleys below. As for cutting a path as straight as may be over moor and moss, and running with few deviations over the tops of lofty hills, as may be seen in the case of the great Roman roads in Lancashire and the North, this was furthest from the mind of their makers. For these roads were not all at once surveyed, and then cut out; they grew from the force of circumstances. The primitive men who first trod them possessed few or no tools—perhaps did not know the metal, iron—and being in all probability but small dissociated tribes, only too glad to be left alone, did any more powerful neighbours live near them, saw no object in levelling rocks and engineering a straight road at the cost of much labour. With regard to a conquering people like the Romans, another policy suited them. It was enough for the aborigines if they and the beasts of burden (chiefly mules and small sized horses or ponies) could pass along the loops of road which festooned as it were, the hills. The straighter the road, on the other hand, the less time was wasted by the Romans in pushing on conquest or suppressing rebellion. To the Kelts, natives of the country in general, time meant nothing. A little of this feeling still clings about the country. A Mr. Loveden, of Moreton-on-Lugg, in 1799, contributed some notes on the agriculture of the county of Hereford to be published in Arthur Young's "Annals," and amusingly writes—"the labourers here partake in the Welch languid manner of work."*

Seven or eight of these Keltic lanes may be found near Kentchurch. One formed until quite recent years the direct road to Hereford, and has been used in the memory of man. Another runs down to a ford in the river, and maintains a right of way, passing up Garway Hill. In Monmouthshire, in the adjoining parish of Llangua, two very good examples may be seen. One is still used by pedestrians, and runs from the Great House, the site of the old Benedictine Monastery, to the lower road by the Church. It is known as Tabernpwylch Lane, from an old tavern which formerly

* Annals of Agriculture, Vol. 35, p. 103.

stood at the lower end by the river. This lane is in every respect a typical example of such roadways. It is deep, yews bend over it, and ferns cling to the sides. Throughout the winter a stream runs down it; its floor being formed of solid native rock. In some respects a finer example, in that it is both deeper and narrower, runs between Pentwyn Farm and Great Marlborough, in Llangua. Tabernpwylch Lane raises curious thoughts of those who used it in past centuries. First came savage races bearing rude stone weapons, in the course of numberless generations giving way to neolithic man, and then to bronze and iron using peoples. The Romans do not seem to have entered this district. A bronze coin of theirs was found last year at Llancillo, but no traces of them exist on the right side of the Monnow. Englishmen of Mercia must have passed up and down the lane; also Saxon churls and villeins. Then came the Benedictine monks. Before 1183 A.D., Llangua Manor and Church were given to the Normandian Abbey of Lire, and a cell dependent upon it was raised at the head of the lane. It is easy to fancy the monks in their black habits passing up and down the lane, perhaps visiting their brethren at Llanthony, and returning in the summer eve as the westering sun cast their lengthening shadows before them. Every now and then a mediæval knight might come down it in armour, with a goodly band of followers, and the country folk made it the ordinary road for centuries. After the dissolution and destruction of the Monastery, the lane must have seen something of the Civil War. Charles I. is known to have been in the district. Hawking parties would use it as a short cut. Then it settled down into the placid monotony of the 18th century and the first half of the 19th. Since then—strange contrast to its roughness and the character of the animals and vehicles which used it for centuries—the Great Western express trains daily rush past, in front of its exit upon the Monnow.

The Roman writers have left such fragmentary notices of Britain that I have not been able to find more allusions to the Keltic or indigenous lanes, than Cæsar's "secreti calles," which suggest lanes overhung with brushwood; and another allusion—"Omnibus viis notis semitisque."* These "semitæ viæ" might well represent the primitive lanes, running like a thread through the hills among forest and coppice-growth, branching off in some places, in others opening on moorland, and only to be discovered on the further side by people well acquainted with the country. It may easily be understood how useful hidden lanes of this kind were to poachers and outlaws in such a district as was Archenfield (in which Kentchurch is situated), and which was not probably cleared and opened up until the end of the 17th century.

*Cæsar de Bello Gall: "loci impediti atque silvestres," Bk. V. 19.

The growth of these lanes seems to have been much as follows:—First the most convenient tracks over a district were marked with large stones, put down some twenty feet from each other, as the coastguardsmen on the cliffs of South Devon still mark out the paths over the Commons facing the sea. The "trackways," however, to be seen on Dartmoor at the present day, appear to have been boundaries rather than paths. In the course of centuries, it may have been, these stones gradually sank into the earth, and the path which resulted also cut its way lower. A little labour was then seemingly bestowed upon it—rough stones thrown out on each side and the like—to make it serve, not man only, but ponies as well, and, thanks to the constant moisture which prevailed in these ditch-like roads, vegetation began to grow along the sides. The exchange of commodities and convenience of carrying corn and firewood on rude pack-saddles upon these beasts caused the lanes to assume the width which they now present, and which they have certainly borne for ages; say, about half the width of modern roads. In Devonshire curious lanes are occasionally to be seen deeply cut into the ground and overhung by bushes, but only half the width of the Herefordshire Keltic lanes, in fact just wide enough for a man to pass through. These are known as "Church lanes," and probably do not date further back than Saxon or Mediæval times. To return to Herefordshire lanes, modern needs have dealt with them in three ways. New roads are often made on one side of them, and the old lanes are then left as deep ditches half choked with rubbish and vegetation, but easily tracked by the curious. One old lane thus treated at Rowlstone forms at a corner a convenient horse pond. Or, secondly, modern roadmakers have incorporated part of the lanes when it suited their needs, and at certain places left the old tracks of the lane to tell of the operation. There is a beautiful road in Surrey, running from Cold Harbour to Dorking, which has been thus treated. The old lane itself has been widened here and there into the modern road, but evident traces of the primæval lane still remain at several places on the left side. Thirdly, the lane was wholly abandoned, and traffic carried over a new road often in an entirely different route to the old lane.

One interesting feature in these old lanes, in itself vouching for their antiquity, is that on either side fringes of aboriginal greenery run along them. Yews, and especially hollies, alders, butchers'-broom, all the most ancient brushwood of the native flora may thus be seen, presenting a strong contrast to neighbouring fences which are modern and singularly free from these indigenous plants. Every here and there, too, from the depth of solid rock or pebbles seen on the side of the lane, some notion may be formed of the extreme antiquity of these lanes, where the slow tide of human life has cut

its way in the course of ages, much as the rivers of the country have also deepened their channels during the same long centuries.

Kingsley, whose eyes few features of a district escaped, attributes the formation of some of these lanes to human labour rather than the slow course of time, thinking that the ground was so hollowed for the purpose of concealment from enemies; and he states that he has seen many ancient roads of this kind, long disused, around the spurs of Dartmoor. He contrasts them somewhat fancifully, in a moral point of view, with Roman roads constructed on the scientific lines prescribed by Vitruvius. "It marks strongly the difference between the two races," he says, "the difference between the Roman paved road with its established common way for all passengers, its regular stations and milestones; and the Keltic trackway, winding irresolutely along in innumerable ruts, parting to meet again, as if each savage (for they were little better), had taken his own fresh path when he found the next line of ruts too heavy for his cattle."* And then he terms the Kelt "a sneaking animal." The Kelt may have been a fickle character, but he was not cowardly, as the Romans themselves had to confess in old days when Brennus and his Gauls vanquished them at the River Allia, and then sacked Rome. Aristotle, too, tells how the Kelts would dare even the waves.

In any case, the old lanes, undoubtedly among the most ancient monuments of Herefordshire, will well repay careful inspection. They transport us to a distant antiquity. They are beset with interests on all sides. Their long slow growth may be paralleled with the geological formation of the mountains above them. They wind along in juxtaposition with modern improvements, as if to bring out the whole contrast between them, and to challenge investigation. These remarks are a small contribution towards their more particular study.

* Prose Idylls, p. 171, 168—170. (Ed. 1873).

Woolhope Naturalists' Field Club.

SECOND FIELD MEETING, JUNE 28TH, 1906.

BIRTSMORTON COURT AND TEWKESBURY ABBEY.

BY "A VISITOR."

The joys of looking over that fine old-world mansion, Morton Court, Birtsmorton, and the magnificent structure of Tewkesbury Abbey, which comprised the chief points of interest in connection with the Woolhope Naturalists' Field Club second field meeting of the season, held on Thursday, June 28th, were marred by a perfect deluge of rain that greatly inconvenienced the 25 members and visitors who participated in the drive of upwards of 30 miles from Great Malvern and back. The climatic conditions were a great disappointment, but the pleasure associated with the visits will be cherished for many a long day to come. The party was made up as follows:—Members: The President (the Rev. R. Hyett Warner), Mr. J. E. Ballard, Mr. C. P. Bird, Mr. R. Clarke, Rev. H. M. Evill, Rev. P. H. Fernandez, Sir Edward Hopton, Rev. Preb. M. Hopton, Rev. A. W. Horton, Mr. F. S. Hovil, Rev. Preb. W. H. Lambert, Mr. C. J. Lilwall, Rev. J. H. McLaughlin, Rev. M. A. S. Onslow, Dr. Scudamore Powell, Mr. H. C. Moore (hon. secretary), and Mr. J. Pilley. Visitors: Rev. W. Marshall, Mr. J. Ballard, Mr. E. M. Hopton, Mr. A. W. Blake, Mr. C. Cuthbert, Major Ravenshaw, Mr. W. Davis, and Mr. W. H. Woodcock.

Hereford was left by the 9-42 express train, and Malvern reached by 10-17. The party immediately took seats in a large brake, unfortunately uncovered, and drove to Morton Court, a distance of nine miles. Naturally the beauty of the intervening country, wrapped in its hazy atmosphere, did not particularly appeal to the company. But the Court constituted a treat in store, and meanwhile interesting conversations helped to counteract the depressing surroundings. On arrival we were met with good cheer by its present occupant, Mr. J. Padfield, whose daughter acted as "guide, philosopher, and friend." The structure, though diminished in size and beauty as compared with days gone by, is still large and handsome. It is a spacious and venerable-looking building, with numerous gables and ornamental chimneys, some ancient mullioned windows, a lofty weedy wall with bridge and mouldering stone gateway, all completely encircled with a very broad moat, forming a

picture not the less pleasant to look upon from its contrast with the surrounding bareness. Within there is much to strengthen fancy and retrospective thought. There are gloomy stairs with their dark walls, their long worn steps, and their railwork of massive oak; apartments with their antique panelings, grotesque carvings and oaken doorways.

Birtsmorton has been made celebrated by the publication of Mr. Symonds' historical novel, "Malvern Chase," which is said to rival in interest some of the favourite productions of Sir Walter Scott. We cannot do better than give Mr. Symonds' paper on the Court and Church published in the 1881 Club *Transactions*. Here it is: "There are few places in the county of Worcester more interesting than Birtsmorton Court and Church. Both were erected centuries ago among the great woodlands of Malvern Chase, and around them have gathered historic associations, legends, and superstitions, which it is well should be rescued from utter oblivion. The original founders were Saxons, and were Birts or Brutes, for Birtsmorton was known in the days of Edward the Confessor, and is mentioned in Domesday. In Norman times one John, Baron of Monmouth, appears to have been Lord of Birtsmorton, and those who have studied the architecture and basement believe they can trace relics of the foundation of a Norman keep. There was a Brute or de Brute here in the days of Edward I. In his reign, too, the Birts or Brutes intermarried with the family of Ruyhalles, who took their name from Rhyalle, the hamlet in the parish of Upton-on-Severn. In the days of Henry IV. we are confronted with the two great historic names of Owen Glendower and Sir John Oldcastle. Tradition says that one of the great Welsh chieftain's daughters married John Scudamore, of Kentchurch, in the county of Hereford. When on a visit to the late Colonel Scudamore some years ago, I directed his attention to the fact that the armorial bearings of his ancient family ornamented one of the panels in the old room at Birtsmorton Court, when he showed me a very old painting on panel, which he told me tradition had assigned as the portrait of Owen Glendower. Colonel Scudamore was acquainted with the tradition that Glendower was in the habit of disguising himself in a shepherd's dress, and going backwards and forwards to his daughter's and other friends' houses, among which were Birtsmorton Court and the Old Grange at Dymock, Another tradition is that he is buried at Monnington in Herefordshire. The *Transactions* of the Woolhope Club for 1869 contain a notice of 'The Ancient Forest of Deerfold' and 'The Lollards in Herefordshire,' by Dr. Bull, who shows how this great forest afforded a refuge to some of the earliest and most noted followers of Wycliffe, and amongst these we find the name of Walter Brut, 'a layman and learned,' and who

was probably one of the family from Birtsmorton. For ages tradition has fixed upon Birtsmorton Court as one of the hiding places of Sir John Oldcastle, and I have mentioned elsewhere how the venerable Mrs. Webb, of Ledbury, now in her 103rd year, well remembers that she was frightened as a child when she was shown the hiding place of Sir John Oldcastle, the secret chamber in the paneled room. The Brutes seem to have intermarried with the family of the Oldcastles, as in 1420 we find a Richard Oldcastle concerned in the presentation of the living with John de Brute. About this time we find that the Brutes of Morton held the manor of John o' Gaunt, 'time-honoured Lancaster,' on the presentation of a rose. The Tudor rose, too, the heraldic emblem of the Dukes of Lancaster, appears on the old seats in the Church. It is not easy to make out when the ancient Cornish family of Nanfan came to reside at Birtsmorton. There was a great Cornish esquire, John Nanfan, whose last will is dated 1446, and whose effigy, as a man in armour, appears upon the south side of the old mediæval altar tomb in Birtsmorton Church; but he was buried in Tewkesbury Abbey, and gave 40 marks for masses for the good of his soul. He was esquire 'of the body with King Henry VI.' The brass tablet of this tomb is gone, and it is not possible now to say to whom it was erected; but as we find there the effigy of Richard Nanfan, who became Captain of Calais, presented to the living in 1501, and was 'squire to Henry VII.,' it is probable that the tomb was built to the memory of Sir John Nanfan, to whom Cardinal Wolsley was chaplain when he was but a 'boy batchelor,' and whose ancestors figure as effigies. It seems probable, too, that although other Nanfans held the manor this was the first who really lived at Birtsmorton Court. The 'Oumphrey Arundel,' 'Lord John Arundel,' and 'Dame Elizabeth Lygon, an ancestress of the Beauchamps of Madresfield, were, I suppose, relations and connections of the Nanfan family; but that the tomb was not erected until the time of Henry VII. is certain from the effigies of Richard Nanfan, who was his esquire. I like to think that this tomb was erected through the gratitude of the great Cardinal Wolsey to the memory of his early friend and patron John Nanfan, who presented Master Thomas Pechy to the living A.D. 1510. With respect to the armorial quarterings upon the panels, it is the opinion of those versed in heraldry that some of the devices are as old as the Wars of the Roses, that these were added to by the Nanfans in the days of Henry VII., and that in the time of Queen Anne the Earl of Bellomont made one or two additions. In the time of Charles I. 'the Bloody Meadow duel' was fought between Sir Giles Nanfan and the lover of his sister Bridget. The lover was buried in the Berrow Churchyard, and Bridget left the 'Bloody Meadow' by will to the poor of Berrow, and devoted a sum to the payment of a minister to

deliver a sermon against the sin of duelling. I may here mention that many years ago I went with Sir William Guise to examine the parish registers respecting the name and date of the burial of Bridget's lover. We found the entry and made a copy, which I regret to say I have mislaid. Some time ago Sir William went with me to examine the register a second time, but we were informed that the register 'was lost,' and Mr. Harkness, the former incumbent, does not remember ever to have seen it. The book certainly disappeared between the incumbency of the Rev. James Hughes and that of Mr. Harkness. Inquiries should be made everywhere respecting this abstraction. Bridges Nanfan, the last male heir of the direct line, died in 1704, and his only daughter, Catherine, married Richard Coote, Earl of Bellomont, who died in 1700. This lady distinguished herself by marrying four husbands ; the last she married at the age of 72. Neither of the Earls of Bellomont distinguished himself in any way whatever ; but the English statesman, William Huskinson, was born at Birtsmorton Court, and his father was churchwarden in 1797. In the church there is a fine monument to Rear-Admiral Caldwall, the second husband to Catherine Nanfan.' "

Such is Mr. Symonds' sketch, but there is much to add. Special interest attaches to what is now used as a drawing-room. Large and spacious, it is wainscoted over every inch with beautifully wrought oak, and in the centre is a splendid sculptured chimney-piece, surmounted with the emblazoned shields of the Nanfans and their alliances, the Harleys and the Cornewalls. Round the room are panels bearing the arms, close to the ceiling, of Thomas Harley, Baskerville of Eardisley, Thomas Cornewall, the Knights, Sir Henry Poole, Sir James Croft, Sir John Scudamore, Sir Thomas Throgmorton, Lord Copley, John Blount of Eve, William Rudhall of Rudhall, John Wyett, Bromwich of Bromesberrow, and Roger Minors, while in the corridor are the arms of Richard Southall, Thomas Cornewall, Baron of Burford, and Robert Audley. Miss Padfield informed us that the magistrates used to assemble in this room in connection with Malvern Chase, and each sat under his coat of arms. The procedure was somewhat similar to that which was formerly the case at the Speech House, Forest of Dean. The room was full of quaint and interesting things. We saw the old hiding place, which led to a subterranean passage underneath the moat, an elaborate mirror carved out of a solid piece of bog oak, a wonderful ceiling made out of a special kind of cement, the art of making being now unknown, some curious horse shoes, made to leave the imprint of a cow and a child in order to avoid the horse's track being betrayed (Miss Padfield said they were quite unique, there being nothing like them in the British Museum), old pewter, a Noah's Ark carved in oak of 1598 date, a 15th century staircase,

a room used by Cardinal Wolsey as a study when tutor to Sir John Nanfan, etc.

In reference to the Bloody Meadow duel, above referred to, Mr. Padfield read us a copy of the will of Mrs. Susannah Cox Nanfan, widow. He said as churchwarden he annually paid the residue of the interest of £40 ; 10s. to the clergyman and 30s. to 30 parishioners to hear the discourse, which was on the crime of duelling, to signify this good lady's "great deliverance from the violent and wicked design of an unnatural enemy." It is also on record that the duel ended in the death of the lover and the mortal injury of his antagonist. Horrified at the extent of the catastrophe of which she had been the innocent cause, the lady hid herself away in the old manor house and lived unmarried till her death. The question is, did she remain single, or was she a widow ? It is interesting to note that some years ago the Duke and Duchess of Teck, Princess Mary (now Princess of Wales), Princess George and Alexander of Teck, accompanied by Sir Sydney Greville, paid a visit to the house, and were highly pleased with all they saw, the Duchess declaring that it was one of the most interesting old mansions she had ever seen. A signed photograph now on the walls of the drawing-room commemorate the visit. Among the antiquities of the church close by was a circular alms chest, made out of the trunk of a tree.

On leaving Morton Court, we drove on to Tewkesbury Abbey, a distance of seven miles. The verger, who is thoroughly familiar with the ancient building, was most obliging and interesting. The Rev. Hemming Robeson, Vicar of Tewkesbury, prepared an able paper on Tewkesbury Abbey some years ago, which, after dealing with the early history and erection of a Monastery by Oddo and Doddo, sons of a Saxon nobleman, of the kingdom of Mercia, on a spot where it was said one Theocus, a hermit, had his dwelling, goes on to give an historical account of the notable personages and families who were successively Lords of Tewkesbury and patrons of the Abbey, and pointed out which portions of the structure belonged to the various periods of its history. The Fitz-Hamon Chapel carries us back to the time following the Norman Conquest in 1066, when enormous estates were made over to warlike nobles, and when habitual lawlessness and frequent crime had little to compensate them except the munificence by which buildings like the Abbey were raised and endowed. The tiles of the floor bear the arms of Fitz-Hamon, impaling those of the Abbey, and on his tomb being opened in 1795, bones were found which might reverently be supposed to be those of the founder himself. The new window in the 13th century Chapel (choir vestry) represents Fitz-Hamon and

his wife Sybil, in the character of church founders, holding between them a model of a cruciform church, but it was left to the first Earl of Gloucester to complete the work of his father-in-law. The building progressed step by step. A roof of oak, the central tower with its interlaced arcading, a lofty wooden spire above, gradually all were completed, and then, after 20 years' work, with great pomp, the noble church, in its most remarkable features, was dedicated to God, November 20th, 1123. It is interesting to note that when, 750 years afterwards, an eminent architect surveyed the work of this Norman period, there were ample proofs of the sound condition of the main fabric, and that those early builders built well and dreamed not of a "perishable home." In 1178, a destructive fire destroyed the monastic buildings, and left its mark. Amongst the several patrons and historical personages who have taken an active part in the building and support of the Abbey, are the De Clares, De Spencers, and Beauchamps. The history of the chapels, tombs, and graves of illustrious personages is also especially interesting. The architecture and history of the Abbey have been lovingly pictured, and the sacrilegious desecration by the pursuing victorious Yorkists has been feelingly pourtrayed in "Good Words" by the Dean of Gloucester, and there are numerous local handbooks, of which the one which gives the most minute details is "Tewkesbury Abbey and its Associations," by the Rev. J. A. Blunt. Mr. Thomas Blashill read a paper on the Abbey, on August 14th, 1877, to the members of the Royal Archæological Institute. One of the latest and most reliable works on the Abbey has been written by Mr. H. J. L. J. Masse, M.A., but unfortunately space forbids any reference to the exhaustive information which it contains. Upwards of one hour was spent at the Abbey, and then we drove back to Malvern by another route, through Upton on Severn, a distance of 15 miles.

BIRTSMORTON COURT.

By Rev. R. Hyett-Warner

(*President of the Woolhope Naturalists' Field Club*).

A quarter of a century ago our Club visited this ancient manor-house, once a forest fortress in Malvern Chase. On that occasion, in the chamber in which we are now assembled, the company had the privilege of listening to a paper from the late Rev. W. S. Symonds, Rector of Pendock, who, in his well-known novel "Malvern Chase," has thrown over the plain historic facts connected with Birtsmorton the witchery of poetry and romance. The Worcester Naturalists' Club have made several expeditions to Birtsmorton, and recorded valuable matter respecting its local traditions in their *Transactions*. An experienced antiquary, Mr. Fletcher Moss, of Didsbury, has also recently given some attention to this sequestered survival of an ancient world, and has embodied his impressions with illustrations in an interesting work published at the beginning of the present year, entitled "Pilgrimages to Old Homes," mentioned in the programme for to-day.

The subject having been ably and luminously treated by these writers, any remarks of my own upon the present occasion might appear superfluous. I venture, however, to plead by way of apology for these few notes the honour you have conferred upon me in electing me your president for the present year. This honour carries with it, by immemorial custom, the privilege of choosing one of the places for the year's meetings; and we are accordingly met together to renew our acquaintance with a very interesting and historic site prior to another visit to the ancient Abbey of Tewkesbury. Being thus responsible for the day's gathering, though not for the unfortunate weather, I was anxious to keep up the presidential character and to justify my selection of Birtsmorton. I claim no special knowledge of the subject, and can offer nothing original, but venture to hope that these few observations may not be altogether devoid of interest.

Without more preamble, let me observe that the name Morton, spelt in Domesday Moretune, and in old writings sometimes written Moreton, indicates a Saxon "ton" or home situated on the edge of a moor or meer or marsh, and with various prefixes or affixes frequently occurs in the list of English place-names. With regard to the prefix "Birt," the author of "Malvern Chase" and other writers adopt the tradition that it is derived from the Saxon family

of Birt, who, originally settled at Deerhurst, near Tewkesbury, were driven thence by the Danes, perhaps in the same year in which they sailed up the Wye, and found a refuge amid the moors and marshes constituting the well-known Chase, which even now is one of the finest stretches of country in England. Here they established their new home of Birtsmorton, and here in later times for greater security, in that lonely region, they built for themselves a Norman keep, "small but strong," says Mr. Symonds, and "surrounded by massive stone walls and a deep trench or moat. A little stream fed this moat, and ran through a large upper fish pool, which answered two purposes, it fed the moat with water and the occupiers of the keep with fish on fast days."

The author of "Pilgrimages to Old Homes," already referred to, is of opinion that this Norman Keep was built on an island, "for even now," he says, "the water in the narrowed moat laps the walls of the other parts." As we stand on the ancient causeway crossing the moat and giving us access to the house, we can in a measure verify this opinion for ourselves, and recognise the wisdom of the Birts in thus choosing a site which gave them a natural and permanent defence for their home.

It needs no professional skill to distinguish between the massive basement of the old keep washed by the moat and the lighter structure of the manor court built thereupon in a later generation, when the castellated buildings of Norman times were slowly but surely changing into dwellings more in keeping with civilisation, and more in harmony with an age of comparative order and peace. It goes without saying that Birtsmorton has gone through many changes. The room in which we are assembled was originally of far loftier dimensions, and was wainscoted from floor to ceiling; several of the upper apartments have in later times been secured by the introduction of flooring across the middle of this and adjacent rooms. The wainscoting is adorned with the shields of magistrates who sat periodically in the court-leet for dealing with disputes and other matters arising within the jurisdiction of Malvern Chase. As you look around upon the walls you may discern the shields, with names carved beneath, of the Blounts of Eye, the Throcknortons, the Baskervilles of Eardisley, the arms of Sir John Scudamore representing the ancient family of De Lacy, the arms of Rudhall, Minors, and Bromwych and other historic and local magnates, some of whom have living descendants still known in the West.

As we picture to ourselves these worthies of the olden time seated beneath their respective shields, like prebendaries in their cathedral stalls, we may imagine the stern justice which would be

meted out against the wretched poacher caught red-handed with his snares, or against the borderer or churl who dared to transgress the forest laws.

On the wall opposite to the entrance is the panel containing the three shields of Cornewall, Nanfan, and Harley, all connected by marriage with the Brutes of Birtsmorton. The central shield is that of the Nanfans, conspicuous in the history of Birtsmorton, and though now lost in the obscurity of the past, once a family of distinction and wealth. Sir Richard Nanfan was Sheriff of Worcester, and Steward of the Manor of Tewkesbury in the reign of Edward IV. He followed a soldier's life and became Governor of Calais, the last possession of the English in France, the loss of which nearly broke the hard heart of Mary Tudor. It was while Sir Richard was at Calais that Thomas Wolsey, the future Cardinal, became his chaplain, and by his industry and ability made himself indispensable in the administration of the English community. When Sir Richard retired from active service he settled down at his manor of Birtsmorton, probably a welcome change from the anxious and laborious life of a military governor in a hostile country. His chaplain accompanied him thither, and in the little room at the head of the staircase you may sit down in the very chamber, now adorned with old books and weapons, once occupied by one whose career has employed at once the pens of the historian and dramatist. Through the intervention of the ex-Governor, Wolsey was introduced to Henry VII., when the future Cardinal entered upon that career of ambition which in his old age lost all its glamour in view of eternity, and which extorted from the statesman dying beneath the roof of Leicester Abbey, the sad confession, "Had I but served my God as faithfully as I have served my king, He would not have forsaken me in my grey hairs."

Sir Giles Nanfan, grandson of Sir Richard, and his son of the same name, appear among the characters of another work from the pen of Mr. Symonds, representing the better type of the loyalist gentry who followed the standard of Charles I. True to nature, if not to history, is the picture drawn by the novelist, of young Giles Nanfan, at the return of peace, hanging up his sword, above the Nanfan coat-of-arms, in the great hall of Birtsmorton Court. Equally true to womanly nature and the spelling of the time, is the abstract from Aunt Tabitha's diary, in which she speaks of the last Nanfan baby, "Richard Plantagenet Forester Nanfan," whom she declares "is a boy in a duzzen. God bless hitt."

Actual history discerns a John Nanfan, in command of a company of Sir J. Jacob's Regiment of Foot, and follows him to New York, where, through the intervention of Richard

of Birt, who, originally settled at Deerhurst, near Tewkesbury, were driven thence by the Danes, perhaps in the same year in which they sailed up the Wye, and found a refuge amid the moors and marshes constituting the well-known Chase, which even now is one of the finest stretches of country in England. Here they established their new home of Birtsmorton, and here in later times for greater security, in that lonely region, they built for themselves a Norman keep, "small but strong," says Mr. Symonds, and "surrounded by massive stone walls and a deep trench or moat. A little stream fed this moat, and ran through a large upper fish pool, which answered two purposes, it fed the moat with water and the occupiers of the keep with fish on fast days."

The author of "Pilgrimages to Old Homes," already referred to, is of opinion that this Norman Keep was built on an island, "for even now," he says, "the water in the narrowed moat laps the walls of the other parts." As we stand on the ancient causeway crossing the moat and giving us access to the house, we can in a measure verify this opinion for ourselves, and recognise the wisdom of the Birts in thus choosing a site which gave them a natural and permanent defence for their home.

It needs no professional skill to distinguish between the massive basement of the old keep washed by the moat and the lighter structure of the manor court built thereupon in a later generation, when the castellated buildings of Norman times were slowly but surely changing into dwellings more in keeping with civilisation, and more in harmony with an age of comparative order and peace. It goes without saying that Birtsmorton has gone through many changes. The room in which we are assembled was originally of far loftier dimensions, and was wainscoted from floor to ceiling; several of the upper apartments have in later times been secured by the introduction of flooring across the middle of this and adjacent rooms. The wainscoting is adorned with the shields of magistrates who sat periodically in the court-leet for dealing with disputes and other matters arising within the jurisdiction of Malvern Chase. As you look around upon the walls you may discern the shields, with names carved beneath, of the Blounts of Eye, the Throcknortons, the Baskervilles of Eardisley, the arms of Sir John Scudamore representing the ancient family of De Lacy, the arms of Rudhall, Minors, and Bromwych and other historic and local magnates, some of whom have living descendants still known in the West.

As we picture to ourselves these worthies of the olden time seated beneath their respective shields, like prebendaries in their cathedral stalls, we may imagine the stern justice which would be

meted out against the wretched poacher caught red-handed with his snares, or against the borderer or churl who dared to transgress the forest laws.

On the wall opposite to the entrance is the panel containing the three shields of Cornewall, Nanfan, and Harley, all connected by marriage with the Brutes of Birtsmorton. The central shield is that of the Nanfans, conspicuous in the history of Birtsmorton, and though now lost in the obscurity of the past, once a family of distinction and wealth. Sir Richard Nanfan was Sheriff of Worcester, and Steward of the Manor of Tewkesbury in the reign of Edward IV. He followed a soldier's life and became Governor of Calais, the last possession of the English in France, the loss of which nearly broke the hard heart of Mary Tudor. It was while Sir Richard was at Calais that Thomas Wolsey, the future Cardinal, became his chaplain, and by his industry and ability made himself indispensable in the administration of the English community. When Sir Richard retired from active service he settled down at his manor of Birtsmorton, probably a welcome change from the anxious and laborious life of a military governor in a hostile country. His chaplain accompanied him thither, and in the little room at the head of the staircase you may sit down in the very chamber, now adorned with old books and weapons, once occupied by one whose career has employed at once the pens of the historian and dramatist. Through the intervention of the ex-Governor, Wolsey was introduced to Henry VII., when the future Cardinal entered upon that career of ambition which in his old age lost all its glamour in view of eternity, and which extorted from the statesman dying beneath the roof of Leicester Abbey, the sad confession, "Had I but served my God as faithfully as I have served my king, He would not have forsaken me in my grey hairs."

Sir Giles Nanfan, grandson of Sir Richard, and his son of the same name, appear among the characters of another work from the pen of Mr. Symonds, representing the better type of the loyalist gentry who followed the standard of Charles I. True to nature, if not to history, is the picture drawn by the novelist, of young Giles Nanfan, at the return of peace, hanging up his sword, above the Nanfan coat-of-arms, in the great hall of Birtsmorton Court. Equally true to womanly nature and the spelling of the time, is the abstract from Aunt Tabitha's diary, in which she speaks of the last Nanfan baby, "Richard Plantagenet Forester Nanfan," whom she declares "is a boy in a duzzen. God bless hitt."

Actual history discerns a John Nanfan, in command of a company of Sir J. Jacob's Regiment of Foot, and follows him to New York, where, through the intervention of Richard

Coote, Earl of Bellamont, the Governor, who had married Catherine, daughter of Bridges Nanfan, he became Lieutenant-Governor. Many earnest good men alike, from the ranks of the Cavaliers and Roundheads, sought a home in the American colonies, secure from the political animosities of the time, representing a noble element in that American society, which was slowly but surely growing into the future Republic.

You will discern another shield on yonder wall, beneath which is inscribed the name of a family connected with the Oldcastles and other noted houses, and honoured by at least one name distinguished in the world of science and literature. Richard Hakluyt was the founder of scientific and mathematical navigation, published many collections of English travels, and was the friend and adviser in nautical matters of Frobisher, Drake and Raleigh, and other heroes of the "spacious times of Queen Elizabeth." But although their shield hangs in the hall of Birtsmorton in Worcestershire, we claim the Hakluyts as hailing from Yatton, near Leominster, in Herefordshire.

In speaking of Birtsmorton, it would be unnatural to pass over in silence Walter de Brute, the most eminent member of the Birt family, and an eminent Lollard leader at the latter end of the fourteenth century. In contemporary documents he calls himself a "Briton," and is described in official proceedings as "a layman, learned of the diocese of Hereford." His zeal against the existing order had been greatly stirred by the indulgences granted by Pope Urban VI. to Henry Spencer, Bishop of Norwich, to fight against the rival Pope Clement VII., when Christendom looked upon the spectacle of rival successors of St. Peter engaged in mutual war and excommunication. The action, too, of the Bishop of Hereford against his friend William Swynderby had sharpened his own sword against the corrupt system which made such proceedings possible.

The reader of "Malvern Chase" will remember that the supposed author, Master Hildebrand de Brute, of Birtsmorton, attends a Lollard service in the crypt of Gloucester Cathedral, when "it seemed as if some spirit was leading us to praise God and give honour to Him from whom all good proceeds, even amidst the gloom of sorrow and the terrors of death." The actual author of the story skilfully contrasts this simple worship with the mystery play exhibited in Tewkesbury Abbey we are this day to visit, leaving upon the reader's mind the inevitable impression that this way of instructing the people could no longer satisfy the spiritual yearnings of souls nourished on the teaching of Wycliffe's Bible. Brute being a learned man, and as some now call him "a mystical layman," and certainly a strong opponent of the current theology, incurred

of course the wrath of the hierarchy. He was of sufficient importance for Richard II. to write to some of the principal Hereford magistrates, requiring them to support the Bishop against "one Walter Brute and other such children of iniquity.' Boniface IX., one of the three competing Popes, in a bull addressed to this same King Richard, urging his "sweet son" to proceed with vigour against the heretics of his kingdom, is kind enough to mention that "he could not call the Lollards men at all, but rather the damnable shadows or ghosts of men." In this degenerate twentieth century one might be forgiven for wondering how much of a man was left in this Boniface IX,, seeing that he was but the third part of a Pope, and metaphorically speaking entitled to only one of the three hats which popular tradition places upon the head of his Holiness! What effect his amiable bull had upon the fate of Walter Brute, of Birtsmorton, is not known, but there is a very improbable tradition that he was burnt at Bodenham.

Time forbids me to linger upon these personal memories of Birtsmorton. The bugle will soon summon us on our way to the noble Abbey of Tewkesbury, one of those poems in stone with whose history the humbler manor-houses had many interesting links. But before we bid farewell to this spot our attention is invited to a curious relic of evil days in the two horse-shoes found years ago in the moat which once defended these walls. They tell eloquently of the devices to which stern necessity compelled our fathers to resort when in peril of their lives. The blacksmith has so dealt with one of them that it leaves the impress, not of a horse's hoof, but the print of the foot of a little child: while the other would lead you to suppose it left the mark of a cow's foot. What stories might not imagination weave out of those bits of rusty iron! of the little maiden lost amidst the forest glades, anxiously sought by distracted parents, or the cow straying far away on the Chase, when lo! it was brave Oldcastle with a thousand marks set upon his head fleeing to the Welsh mountains, or Owen Glendower escaping from the cross-bow men of Henry IV. No wonder we have legends of enchanted forests and mysterious mountains when our forefathers baffled their enemies with these uncanny shoes.

One other tradition connected with this place will be familiar to every reader of "Malvern Chase." It was believed in those good old times that when the shadow of the neighbouring peak of the Malverns, known as the Ragged Stone, fell upon Birtsmorton Court some dire calamity was impending upon the inmates. The weird shadow, we are told, fell upon the house when Sir John Oldcastle was hid in the secret chamber, and when Thomas Wolsey was visiting his friend and patron, Sir Richard Nanfan. In the latter case

the calamity was long deferred, for Wolsey was one of Sir Richard's executors, and survived him many years. In the *Transactions* of the Worcester Club, already referred to, these stories are handled in an eminently modern spirit. The learned author of the paper recording their visit tells a gruesome story of Druid priests who had assembled to worship the mistletoe and to offer human sacrifices, and how as they marched through the forest to the summit of the Ragged Stone its shadow fell upon them, and not one was ever seen alive again! It is to be hoped that the victims designed for the fire in the wicker frame managed to escape, in which case our grief for the loss of these bloodthirsty priests need not be overwhelming! It would certainly not appear to require a very deep knowledge of mathematics to perceive that at a certain angle of elevation the sun, the hill and the house being in one vertical plane, the shadow of the rock would necessarily fall upon any intercepting object within its range, such as the manor-house.

This tradition and the somewhat beautiful idea that when sweet angelic music was heard at the beginning of the New Year it signified angel voices calling one of the inmates to another world before the end of the year, takes one back to the prehistoric past, when natural phenomena found their expression in myths hardly more incredible than some of the superstitions still lingering in the folk-lore of our own county.

Before taking our leave of this interesting place, another circumstance should be noted which even more than the progress of science marks the changes which these walls have seen. The tenant of this house, who so courteously permits our party to roam at will through his dwelling, and his daughter, who so intelligently explains the various points and objects of interest, belong to an earnest and zealous community of Nonconformists. Thanks to the progress of religion and civilization, he has no need of the secret chamber in which tradition hides Sir John Oldcastle for a few perilous moments; nor to live in constant fear of his life, as the Lollards of Malvern Chase, but can cultivate his fields and offer his worship, no man making him afraid. To him and his family the thanks of this Club are surely due for their courtesy and help this day.

Birtsmorton Court and the adjacent Church, with the ancient tomb from which even the name has vanished, have too often been visited and described to admit of anything new or original being written about them. My humble purpose will have been accomplished if we can persuade ourselves to rise above the mere antiquarian view of things, and to look back upon the days apparently altogether evil in which this house was built, and to console ourselves

for the darkness of the past with the light of the future. "Could we unfold the book of history," writes an eloquent historian, "and lay its facts before our eyes in their connected reality; were the fleeting events of time to display their most concealed mechanism before us, as do the eternal forms of Nature, how often should we not be comforted by perceiving in the first as in the last, that the fresh germ is hidden in the decay we deplore, and that new life is proceeding from death."

Woolhope Naturalists' Field Club.

THIRD FIELD MEETING (LADIES' DAY), JULY 26th, 1906.

LLANGORSE LAKE.

The member who suggested Llangorse Lake, one of the largest sheets of water in Wales, and the Allt, Breconshire, for the third field meeting (ladies' day) in connection with the Woolhope Naturalists' Field Club, is deserving of the best thanks of all associated, together with their many friends, for a more ideal outing and more suitable climatic conditions could hardly be conceived. The institution of ladies' day has always been appreciated by the gentler sex, and the rule is to draw up a programme which will meet with their entire approbation and not bore them too much with matters scientific.

A large party left Hereford by the 9.22 Midland train on Thursday morning, and ere Talyllyn Junction was reached it was considerably augmented. Upon leaving the train the Rev. W. E. T. Morgan took the visitors in charge and led them along the north side of the lake to Llangorse Church. Here a short history of the discovery of an ancient stone, now in the vestry, was given by the former Vicar, the Rev.William Bowen, a gentleman who has long passed the allotted span of life. We stood around him just outside the church. He said it gave him very great pleasure to say something with regard to this interesting and valuable old stone. It was all the more interesting because they could not discover anything with regard to its origin, or how it possibly came there. In the year 1881 he lived at the Vicarage, and on May 18th the clerk at that time came to him and complained of a difficulty with regard to a grave. He said he had got down so far, and could go no further owing to an immense stone, about two feet below the surface of the ground. He was afraid that the inscription on the stone had been damaged by the use of the pick-axe, so that they could not tell the name of the person who lay there. He was about to build at the time, and thought it would be useful as a foundation stone. In May, 1884, he was informed by one David Jenkins that there were some letters upon the stone. He examined it, and immediately took care to have it removed. It was placed in the churchyard opposite the door of the vestry, and

in that position it was examined by a great many people. The late Lord Glanusk took great interest in it, and asked him to get a rubbing. This he did, and he sent it to Prof. Rhys, of Jesus College Oxford. He had considerable correspondence with Prof. Rhys, who said that the date was too early for him to discover any record. Neither the portion of the inscription that remained, nor the letters, helped him. Various opinions were expressed with regard to the inscription, and meanwhile artists took photographs of the old stone. Lord Glanusk and Prof. Rhys continued to give him every assistance. The late Lord Bishop of St. David's, Dr. W. Basil Jones, said such a valuable stone ought not to remain outside, and that it should be removed into the church as soon as possible. He obeyed orders, and the stone was placed in the vestry, where they saw it that day. Prof. Rhys concluded that the stone went back to the year A.D.1000. The Rev. gentleman was thanked for his remarks, all being deeply interested.

Retracing our steps by a ten minutes' walk across the fields, we made for the boat landing stage, and crossed the lake, refreshed by the breeze, a distance of about three-qarters of a mile from this point, to a spot immediately beneath Llangasty Talyllyn Church (St. Gastyn's) upon the south bank. Here there was a short halt for refreshments. The Rector (the Rev. R. Meredith Jenkins) and members of his family welcomed the visitors, who, at once impressed with the neatness of the churchyard surroundings, were prepared for the manifest attention bestowed upon the interior of this pretty church. In the chancel, inspirations to praise and thanksgiving are urged in decorated illuminated texts. Upon the tower the white ensign (St. George's Cross with the Union Jack in the dexter quarter) favoured by the breeze spread out fully throughout the day. After an inspection of Llangasty Talyllyn Church, (517 feet), in charge of the Rev. Meredith Jenkins, we set off for a walk of two miles to the summit (1,287ft.) of the Allt, and en route passed by Tymawr (The Great House), now a farm, but formerly probably an old manor house. Although its appearance may betoken a monastery, there is no evidence of its connection with any monastic house. It is not mentioned in Jones' "Brecknockshire" under that name. Mr. R. J. Raikes of Treberfydd has no doubt that it is the same as Talyllyn House therein mentioned, and the name Tymawr (Great House) given perhaps in more modern days. Mr. P. C. Crespigny bought the manor and other property including Tymawr in 1795, but it was not until later, and perhaps shortly before Mr. C. F. C. Crespigny sold it in 1836 that the name Tymawr estate appears, as may be gathered from the reference to the "Tymawr Estate" on page 116 of Mr. John Lloyd's Memoranda of Breconshire (1903) pp. 109 to 117. A portion of the roof was in such a dilapidated condition that its removal,

together with a certain portion of masonry, was essential, and this work was in progress as we looked around. In taking away one of the chimney stacks no less than twelve flues were revealed. The cellars were also very old. From the church to the top of the Allt was about two miles, and the views to be enjoyed all along, and especially from the summit, are magnificent. The Beacons and the Black Mountains stand out in bold relief on either side, with beautiful intervening valleys. The summit of the Allt, south-west of the stone wall, is common land for a width of about 60 yards.

Descending from the Allt, through the bracken, until we came to a zig-zag footpath, our way led by an interesting old farm, known as the Neuadd. In the front wall of the house, formerly "the hall of justice," was a representation in a kind of cement of the scales of justice, and Adam and Eve under an apple tree. It was a most curious piece of work, and needless to say attracted a great deal of attention. Subsequently the whole party were most hospitably entertained by Mrs. Raikes in the picturesque ornamental grounds of Treberfydd. Mrs. Raikes was a charming hostess, and was ably assisted by her daughters. Another two-mile walk brought the party back to the station, and the return journey was made to Hereford at six o'clock, the day having been one of the most enjoyable in the annals of the club.

Amongst those present were :—Members : The President (Rev. R. Hyett Warner), Mr. H. J. Apperley, Rev. C. B. Caldicott, Mr. J. U. Caldicott, Mr. T. Hutchinson, Mr. H. C. Moore, Lieut-Colonel J. E. R. Campbell, Mr. R. Clarke, Mr. J. E. P. Davies, Mr. Luther Davis, Mr. P. Leighton Earle, Mr. E. A. Gowring, Rev. J. E. Grasett, Mr. R. T. Griffiths, Mr. J. J. Jackson, Rev. Augustin Ley, Mr. F. Littledale, Count Bodenham-Lubienski, Rev. W. E. T. Morgan, Mr. Theodore Neild, Mr. H. Southall, Rev. C. H. Stoker, Captain Kilbee Stuart, Rev. Preb. Trevor Williamson, Mr. A. Watkins, Rev. H. B. D. Marshall, Mr. E. F. Cockroft, Rev. Claud Lighton, Mr. G. H. Brierley, Rev. F. S. Stooke Vaughan, Mr. E. T. Woodward, and Mr. J. B. Pilley. Visitors : Mrs Hyett Warner, Miss Marshall, Mrs. Apperley, Mrs.Caldicott, Miss Caldicott, Mrs. Campbell, Miss Campbell, Misses Campbell (2), Mrs. Davies (Kington), Miss Davis (Abergavenny), Mrs. Leighton Earle, Mrs. Griffiths, Mrs. Chave, Mrs. Haywood, Miss Chave, Misses Armitage (3), Mrs. Littledale, Mr. Lubienski Bodenham, Miss H. Nield, Miss Stoker, Miss Cross Thayte, Mrs. Kilbee Stuart, Mrs. A. Watkins, Miss Courtenay, Misses Derham-Marshall (3), Rev. R. Derham-Marshall, Miss Cockroft, Miss Bird, Mrs. Hutchinson, Miss Durrant, Mrs. Leader (Austria), Mdlle. Soudey (Rouen), Mr. and Mrs. Woodcock, and others.

ADDITIONAL NOTES.

[By Editor.]

THE ISLAND IN LLANGORSE LAKE.

With reference to the reputed Crannog (Cran, Celtic, a tree) or lake dwelling formed of piles of trees, bonded with twigs, and thatched with reeds, we have not heard of any futher discoveries since those chronicled in Transactions of the Woolhope Club, 1870, in the descriptive illustrated paper by Henry Dumbleton, on pages 101 *et seq*, and the supplementary notes on the bones of wild animals found on the island, in Transactions, 1871, page 44.

In pre-historic times nearly all the shallow lakes in Switzerland and adjoining countries were peopled by lake-dwelling communities living in villages constructed on platforms supported by piles. Lake dwellings are mentioned by Hippocrates and by Herodotus, both of whom wrote in the 5th century before Christ. In Ireland there are several crannogs. A few are also found in Scotland, but fewer still in England and Wales. In England the excavations still in progress at Glastonbury have afforded us the best example of these lake-dwellings.

Some apparently raised beaches on the southern side point to the evidence of a slightly higher level of the lake in former days ; at the same time the remains of trees now under water on the eastern side, and elsewhere, as recorded by Mr. H. Dumbleton, indicate a lower level at some other period. In Ordnance Map, Breconshire xxxiv. N.E., the surface level of the lake on November 15th, 1887, is given as 501.9 feet.

Upon the western bank of the Usk, a mile and a half south-west of the lake, there is an elevation of 367 feet. Near Glasbury, upon the Wye, there is an elevation of 274 feet. Here the Wye and the Usk are nearest to each other in their course, the Usk being on an elevation of about 100 feet above the Wye at the distance, as the crow flies, of about eight miles.

At the southern end of the rectangular bend of Llangorse Lake the Afon Llynfi is an affluent. A small brook named Cui, which flows through the village of Llangorse, is also a small feeder of the lake upon its northern bank. The effluent upon its north-western bank is also named Afon Llynfi, which, proceeding northwards, is crossed by the railway three miles north-east of Talyllyn Junction ;

the stream thence runs west of the railway. After passing Talgarth it receives upon its left bank a tributary from the western district called Dulais ; on its right bank it receives the Enig from the eastern lands. Near Three Cocks Junction the Llynfi is crossed by the Central Wales Railway, and after a total course of about nine miles from Llangorse Lake enters the Wye near Glasbury.

This line of watershed on the east to the Wye, and on the west to the Usk, forms an interesting feature in the physiography of this country. The Wye is deflected at right angles to its former course and is separated from the Usk by the several parallel ranges of the elevations culminating in the Black Mountains at 2,306 feet in Herefordshire, 2,624 feet in Breconshire at Pen-y-gader-fawr, and 2,660 feet at Waun-fach, one mile and a half further north. The above configuration is best grasped by a study of the " A.L." Relief-Model Map No. 18, of the " Severn Basin and the West Midlands," as supplied by Arnold and Sons, educational publishers, Leeds. The model is on the horizontal scale of four miles to one inch, and on the vertical scale of 1,200 feet to one inch. The size of the model is 31½ inches by 29 inches, and the net price is 27s. 6d. It is in use in one or more of our elementary public schools.

BIRD LIFE ON THE LAKE.

For an excellent detailed history of Bird-life on Llangorse Lake, see the paper by E. Cambridge Phillips in Transactions, 1901, pages 239 to 243.

A few years ago Mr. Cuthbert Raikes of Treberfydd shot an Oyster Catcher, a very rare bird to be found so far distant from the sea.

The following birds have been killed by one sportsman visiting the lake in the winter months of the year :—Wild fowl, shot on Llangorse Lake by R. A. Swayne during various visits from 1870 to present time, the last visit being in November, 1905.

Llangorse Lake is evidently a favourite resort of various species of migrating wild fowl on their journey from the north to the south on the approach of severe cold weather, but when the beginning of winter is abnormally mild they seem to put off their migration and remain in the north, as I remember that on one visit in November when the weather was unusually mild, I found no wild fowl there, but only about half a dozen tufted ducks and a few common wild ducks. I had, however, capital sport fishing, catching 38 pike in

two days on the rod and line only, my nephew and I having two rods out. On my various visits I have secured one or more specimens of the following varieties with my own gun :—Black-necked swan, a bird about the size of a common wild goose, I believe a native of Holland ; common wild duck, velvet duck, golden eye, scaup duck, long-tailed duck, tufted duck, wigeon, shoveller duck, pochard, common teal, large-eared grebe, dusky grebe, full snipe, jacksnipe, bald coot, moorhen, water rail, green plover, goosander (shot by my brother), spotted crake (shot by a friend whom I recommended to go to Llangorse on his first visit), knot (shot by a stranger in another boat and shown to me at my request as he did not know what it was). Besides these birds I have seen but have not killed the following :—Common wild goose, cormorant, heron, sooty tern, curlew, common sandpiper, dabchick, and grey lag. I have seen a flock of pochards numbering many hundreds, and have seen flocks of common widgeon floating about on a calm Sunday morning (when they are quite tame, knowing Sunday as well as we do), numbering from 90 to 100 in a flock frequently.

BOTANICAL NOTES.

By William P. J. Le Brocq.

The shores of Llangorse Lake yield a large number of plants, many of which are of especial interest,owing to their occurrence here, and here only, in the county. In the following list mention is made of such only as are not commonly met with in the district :—Thalictrum flavum (var. sphaerocarpum), on the island, east and south sides of lake ; Ranunculus circinatus, abundant ; Ranunculus Lingua, very fine and in great plenty on west side ; Ranunculus sceleratus, scarce, north and south sides ; Trollius europaeus, east and west ; Nymphaea alba and Nuphar lutea, the white and yellow water lilies, on the west side ; Nasturtium palustre, scarce ; Stellaria aquatica, ditches on north-west side ; Lythrum Salicaria, on the island, east and west sides ; Sium angustifolium, plentiful on west side ; Oenanthe fistulosa, plentiful on west side ; Bidens cernua and Bidens tripartita, north and south ends ; Menyanthes trifoliata, north and south ends ; Solanum Dulcamara, ditches between station and landing stage ; Veronica Anagallis, north and west ; Lycopus europaeus, frequent ; Scutellaria galericulata, east and west sides ; Lysimachia vulgaris, island and east side ; very fine ; Littorella lacustris, south-west side ; Rumex maritimus, rare, an occasional plant north and south ; Typha angustifolia, plentiful on west side ; Typha latifolia, very scarce, north of lake near station ; Spargan-

ium ramosum and Sparganium simplex, in small quanity on west side ; Apogeton distachyon, a South African plant, was well established near the boat houses on the east side in 1897, but has, I fear, disappeared ; Butomus umbellatus, lastly, perhaps the most beautiful of all the lake's guests, is to be found in the Llynfi effluent, and also on the north-west side of the lake near Glan-y-Llyn.

On the Allt Mr. R. J. Raikes of Treberfydd has found the Oak fern, the Beech fern, Cystoptris fragilis, and many varieties of Lastrœa.

THE ALLT.

The view from the summit of the Allt is grand, impressive, and instructive. For an excellent descriptive account of the same reference should be made to a paper by John Lloyd under the heading, " The Landscape from the Allt," in Transactions of the Woolhope Club, 1870, pages 90 to 100, from which the following notes are taken, and further remarks added :—

On either side of the great ranges of mountains before us rivers numerous rise. He mentions no less than 35, without including some tributaries of the Wye.

For nearly 40 miles the Wye and its tributaries form the boundary of Breconshire, and in the centre of the county is the Usk.

Mountains.—Mynydd Troed, three miles north-east, rises to 1,997 feet. The most elevated point of the range of the Black Mountains of Talgarth and Ewyas is called Y Gader, which has two heads. Pen-y-Gader-Fawr, 2,624 feet, and one mile north of it Waun fach, 2,660 feet.

These two heights can be seen from Hereford looking south-west from the bridge on the Wye at Hereford, and lie 20 miles distant as the crow flies. South of Mynydd Troed, and east of the lake, Mynydd Llangorse rises to 1,665 feet.

In former days, when these mountains were used as barriers, it was necessary to protect the gorge of the Usk at Buckland, and of the Wye at Hay, and the practicable passes of Pen-y-cenffordd and Bwlch.

The castles of Hay, Clifford, and Brynllis, defended the approach of the Wye valley, and Blaenllyfni Castle, close beneath us, protected the pass at Bwlch, and with its dependent castles of Tretower and Pencelly, the Valley of the Usk. Dinas Castle protected the great pass at Pen-y-cenfford.

The great battle near Brecon, in which the Welsh under Bleddin ap Maenach were defeated, placed the whole of Breconshire in the power of the conqueror, Bernard Newmarch. The King assigned to him the conquered lands, and he subdivided them among his knights and followers. Bernard Newmarch built his chief castle at Brecon, and founded the present town.

Blaenllyfni Castle served to protect the pass of Bwlch and the Vale of Usk.

To the right of Blaenllyfni Castle and over the pass of Bwlch we look down upon the Valley of Cwmdu, and of the Usk as far as Abergavenny, the Sugar Loaf, and Blorenge Mountains hemming in the valley on either side.

Farther to the right is Buckland hill, or Mynydd Buckland, overhanging the Usk. On one side Buckland Hill shuts out the morning sun. On the other the towering giant Tar-y-foel shelters the river from noonday heat. Thus is formed the Gorge of the Usk.

Beyond Tar-y-foel rises the massive Llangynider Mountain, interesting only for the mineral wealth it contains.

At Penrhiwcalch and other points we catch glimpses of the limestone rock which fringes the South Wales coal basin.

Still to the right opens the picturesque valley of the Cavanell, called Glyncollwm, or the valley of hazel bushes, up which the Brecon and Merthyr Railway creeps.

Beneath our feet is the grotesque beehive like tower of the quaint little church of Llansaintfraed (Saint Fraid, pronounced Fride, is Saint Bride, or Bridget).

The Scethrog fishery is the best in the Usk. (Scethrog lies one mile to our north-west in the direction of Brecon, five miles further distant.)

Near the fifth milestone, on the main road from Brecon, is a curious stone commemorating the death of the son of the Roman General Victorinus, A.D. 265-7, and a little stream runs hard by in a dingle called Cwm-y-gelanedd, or the dell of slaughter.

Whether we run our eye up the Cynrig Valley to where it rises at the foot of the beacons, or along that grand range of mountains above Pencelly, embracing the Cwmbanw heights, or the Bryn, Brynteg, Bwlch-ar-fan, and that magnificent offshoot of the range, Cefncyff, our gaze will rest with wonder on the twin peaks of the Brecon Vans. (The greatest height is 2,907 feet.)

Notice the Slwch and Crug hills with their plainly-marked British Camp, the wooded brow of Dinas, and Brecon itself nestling in the valley beneath.

Looking westward, the summit of the Cantref Bychan, or Carmarthenshire Beacon, is seen. Here the Usk rises.

To the north are the Epynt range of mountains, and in the distance that of Drygarn and the Ellenith Mountains, extending to Plinlimmon. A little to the right and looking across the fertile vale of Talgarth, the wooded slopes of Pontyval and Trephilip and over the gorge of the Wye at Llangoed we see the Begwms of Radnorshire, and in the far distance the Radnor Forest.

SOME OBSERVATIONS ON THE PROTECTIVE HABITS OF BIRDS.

[From a Correspondent.]

It is very interesting to study the various means taken, and the different standards of intelligence displayed, by wild animals and birds in the preservation of their young, and therefore of their species, in the struggle for existence ; and as the young of birds have to lie for periods varying according to their size in the egg stage—a stage in which they are not only incapable of helping themselves in any way, but form a favourite article of food eagerly sought for by many enemies—I suppose that birds are for this reason gifted with a higher order of intelligence than other creatures, man alone excepted. The means adopted by birds to protect their eggs from plunder are so many and various that it would require volumes of space to describe them all, but a few may be touched upon here.

Perhaps the most curious, as well as the best protected, are the eggs of those birds which bury their nests in the earth. Of these the Shieldrake, Puffin, Kingfisher and Sand Martin are best known, the first two making use of rabbit holes, the Kingfisher of what appears to be the hole of a water-rat, and the Sand Martin skilfully cutting out its own subterranean chamber with its tiny apology for a beak. The Shieldrake, or, as it is called in Somerset, the Barrow Duck, is usually found about the sandbanks of tidal estuaries, where they lay their eggs and hatch their young deep in the rabbit holes which may be near at hand. The female lays her eggs at a depth of several feet from the surface, and, while sitting, is jealously protected by her husband, who literally "dances attendance" on the top of the sandhill above the nest, keeping a sharp look-out for

intruders. As soon as the young are hatched and have absorbed the yolk of their mother egg, the old duck leads them all down to the sea, where they soon find their living on the various marine creatures they find there. If they are intercepted on their way down to the water they can easily be caught and reared ; but if once they reach the water the case is altered, for they are such expert divers that they disappear like magic, and do not seem to come up again, as they only protrude their little bills from the surface for a breath of air and then go down again.

I was once an amused witness of the diving powers of young Shieldrake. We were boating up the river Mawddach, above Barmouth, two of the party bringing their guns with them. On rounding a rocky point, we came upon a family of Shieldrake, consisting of a duck and her brood of "flappers," or young ducks, not strong on the wing, as they tumbled helter-skelter into the water under a broadside from the sportsmen. One of them was killed, but to the astonishment of the gunners, all the rest disappeared except the old duck, who flew away unharmed. The excitement of the two sportsmen was intense, as they believed that they had wounded the whole lot and that their dead bodies would soon come to the surface ; after, however, waiting some time quivering with excitement, some small objects about the size of the top of your finger were observed about 15 yards off. "There they are, shoot !" said one, but before they could shoulder their guns the objects had all disappeared, except a cork floating by, which received a salute from a gallant R.A., who was apparently not accustomed to fire at so small a mark. The result of the fusilade was that all the young shieldrakes (except the one killed at the first discharge) escaped. Now these young birds had to make their way from the rocks about 20 yards on our left, past the boat, to get out into the open river about 70 yards to our right, before they could consider themselves safe, and were of course obliged to take breath several times on their way ; yet they managed so cleverly that, although the gunners kept a sharp look-out and the water was clear and calm they got safely away, so the diving powers of young Shieldrake must be marvellous.

Returning to our birds' nests, the larger birds of prey appear to have no anxiety about the safety of their eggs if only they can make them inaccessible to man. They therefore build their nests on precipitous rocks or on very high trees, without any attempt at concealment. The Corvidæ also make no attempt at concealment, but trust to the difficulty of ascending high trees. In this, fortunately, they do not always display their usual cunning, as the climbing propensities of the young male of the genus Homo are generally equal to the occasion.

The Corvidæ, all of them the most daring of thieves, do not seem to have the honour proverbially ascribed to the predatory fraternity, as they evidently do not trust one another. The Magpie, for instance, fortifies his nest against attack from above by a very strong network of thorns, leaving a small hole for his own ingress and egress so firmly interwoven that it is most difficult to pull asunder. The enemy against whom the Magpie guards so carefully is the Carrion Crow, a most inveterate thief and poacher, who would rob his own species without the smallest compunction.

The Jackdaws associate together in large communities for common defence, and lay their eggs in hollow trees, in holes in rocks, under the leads in Church towers, so that any Carrion Crow which attempted to rob their eggs would be driven off immediately, if not killed.

The Woodpecker tribe lay their eggs in the hollow trunks of trees, and cut out neat little holes for themselves through the hard exterior of the tree, to reach the hollow centre, and as the hole is not large enough to admit of the insertion of the hand or for the body of a thieving crow or magpie, the eggs are safer than those of almost any other bird.

The Nuthatch, a bird nearly allied to the Woodpecker in habits, though not in its food, also bores a hole into a tree for its nest, but generally chooses a soft wood tree. It is very interesting to watch this pretty little fellow making free with your filberts; he picks off a nut and flits up into an elm or some large tree which will provide him with a convenient crevice in its bark, and having fixed the nut firmly in the crevice, hammers away industriously at it, producing a quick tapping sound, until he succeeds in boring a small hole in the nut about the size of a pea, through which he gradually extracts the kernel in little bits, then tosses you down the empty shell and goes to fetch another.

The Wryneck, a bird which seems to be a sort of connecting link between a Woodpecker and a Tree Creeper, also lays its eggs in hollow trees, but chooses very soft wood trees, such as willows, for the purpose. The young of this bird practise a curious deception when disturbed; they elevate the mottled brown feathers of the head, twist their necks round, and make sudden darts with their beak at your hand, at the same time hissing loudly, so that they exactly resemble a brood of young vipers and are often called locally the *Snakebird*, in consequence of this trick of deception. I went once, when a boy, after some weeks' interval, to visit a Wryneck's nest, in which I had left five eggs, and was so taken in by the young bird's imitation of the motion of a viper that I jumped back from

the tree in alarm, and it was some time before I could make up my mind for a closer inspection.

But of all the strange places of concealment of a nest, I think the position of a Water Ouzel's nest, which I once found in the Black Mountains, was most peculiar. Prowling up a deep gully down which a brawling stream leaped from stair to stair of rock, I saw a Water Ouzel dart out through the curtain of water formed by the brook as it tumbled over a smooth ledge about six feet high, and on examination of the rock and waterfall I found the nest attached to the rock just underneath the spot where the water tumbled over, so that it was perfectly concealed by the curtain of water, but was quite dry inside, as the water arched over it enough to leave room for it without touching it, but the bird had to pass through the waterfall every time she went to or from the nest, which contained five eggs.

The Bald Coot and the Moorhen lay their eggs in nests constructed of reeds and floating on the water, and appear to trust to the water and the concealment of the thick reeds growing around to protect their eggs from man and quadrupeds, and to their untiring watchfulness and courage, to defend them from the ubiquitous Carrion Crow and Magpie. They always appear to stay about pretty near to their nest, and the male bird is ever ready (like that model husband the Gander) to protect his wife and family. He is also very jealous of any other male of the same species coming too close to his own domain, and when this happens the two birds will fight with the fury and pertinacity of a couple of game cocks, tearing at each other with their long well-armed toes and making a rare splutter in the water.

The Grebe also, especially the Great Crested Grebe, which breeds largely in Llangorse Lake, makes his nest floating on the water exactly like that of the Bald Coot but larger; but as their eggs are white and therefore more conspicuous, and as the parent bird wishes to make longer excursions from home to catch fish, they cover their eggs carefully every time they leave them with aquatic weed, which, although pulled out of the water and therefore of course quite wet, seems to answer the purpose of maintaining the warmth of the eggs as well as concealing them. The old bird, if disturbed when sitting, slips noiselessly under water and dives through the reeds, which appear to be moved by the movements of a large pike, until they are a safe distance off, when they come to the surface and watch you reproachfully till you paddle away.

A curious fact was told me about these floating nests by a man who spent most of his time on Llangorse Lake and appeared to

make his living out of it, that they are the habitat of the species of leech used by surgeons in their practice, and that he often collected them and sold them to the druggists.

The common Wild Duck, which breeds freely all over the British Isles and is easily domesticated, is very careful to cover up her eggs whenever she leaves the nest. She does this with a double purpose, both for concealment and warmth, as she does not find her food in the immediate neighbourhood of her nest, but often has to fly a considerable distance for it and to remain a long time away. She therefore covers her eggs carefully with a soft cushion of down pulled from her own body and places on the top of that, dried leaves, bits of stick, or anything lying about near, so that her nest is often so carefully concealed that it is difficult to find, even if you know to a few yards where it is. It is this habit which makes the Eider Duck so valuable to the inhabitants of the North, where she breeds, as they gather up these cushions of down from the ducks' nests and sell them for the manufacture of Eider-down quilts. This habit of the Wild Duck, when domesticated, often causes the poor bird to come short of her breakfast, as when the henwife calls her poultry to their morning meal, the careful Wild Duck begins covering her eggs, so that by the time she has done it to her satisfaction and flies off to feed, she finds her corn is all gobbled up by the greedy fowls ; the wise bird, however, soon corrects this, and after losing her breakfast a few times, takes care to cover her eggs up before the henwife comes to feed them, and is found waiting with the others when she arrives.

Plovers and the various kinds of wading birds (not, of course, including the heron) lay their eggs on ground as nearly as possible assimilating in colour to their eggs, so they only scratch out a little depression and deposit them in it.

The Oyster Catcher and some others lay their eggs amongst beds of pebbles mixed with sand, so that it is very difficult to see them, so closely do they resemble the surrounding pebbles. Peewhits also choose ploughed fields or rough sedgy meadows where the ground as nearly as possible resembles their eggs in colour. They are very brave in the protection of their nests and young, and will attack and drive away crows, magpies, or jays, and will fly screaming round the head of an approaching person, endeavouring to distract their attention from the ground towards themselves.

There is one clever trick practised more or less by all birds in the protection of their nests and young, and that is feigning lameness or disablement. If a novice happens to walk suddenly into the middle of a covey of very young grouse or partridges, he will

probably be surprised to see the old hen bird fluttering about apparently wounded, and if he tries to catch her he will find that she always manages to keep just out of his reach, but flutters on till she has drawn him away to some distance, when she regains the use of her wings and flies quickly away. One day, on the Black Mountains, near Llanthony (only it was a large hawk who was deceived, not I), I walked into a covey of very young grouse, and the old hen acted in this manner, when suddenly a hawk which I had not seen descended like a "bolt from the blue," making a stoop at her, evidently taking her for a crippled bird, and it was amusing to see how alert she immediately became, taking flight and darting round a shoulder of the mountain like lightning, and the hawk had to go discomfited. On examining the ground I saw some of the young grouse squatting flat and looking like dead leaves among the heather. On one occasion I saw a hen partridge over-act her part. Walking in a clover field, accompanied by my retrieving spaniel, I came upon a covey of young partridges, who could only fly a few yards. The old hen fluttered along in front of the dog, who of course rushed after her and actually caught her in his mouth, but being a well-trained animal, dropped her with the loss of a few feathers only, when my warning shout told him that he was doing wrong, so that she flew off unharmed. I have seen many sorts of birds, even larks and buntings, practise this trick of feigned lameness when suddenly disturbed at their nest, and I have even been threatened with attack both by the Ring Ouzel and the Missel Thrush, no doubt to divert my attention from their young to themselves.

Woolhope Naturalists' Field Club.

FOURTH FIELD MEETING, AUGUST 28th, 1906.

WIGMORE AND NEIGHBOURHOOD.

The fourth or last field day of the season of the Woolhope Naturalists' Field Club was favoured by splendid weather, and was voted by all a most enjoyable one. The rendezvous was Wigmore and neighbourhood. Leaving Hereford by the 9.20 a.m. train for Leominster, the party found brakes awaiting them at the latter place, and after a picturesque drive through interesting and historical country, the members alighted at Wigmore Church, where the Vicar (the Rev. W. Bamford) gave a short description of the building.

Mr. BAMFORD pointed out that as far as he knew of the place it was noted in the Anglo-Saxon Chronicle. In the year 921 it was said King Edward the Elder came there and ordered it to be built. It stands on the very pinnacle of the hill, from which a good view of the surrounding country is obtainable. It is much in need of restoration, and it is to be hoped funds will be forthcoming for this purpose.

Under the guidance of Mr. R. H. George, whose "History of the Herefordshire Borderland" has proved so valuable, a move was subsequently made for Wigmore Castle. This building was the subject of an article which the Rev. Preb. Davies read at a meeting of the Woolhope Club many years ago, and his observations are so rich in historic material that we take the liberty of quoting at length.

"One of the grand and vaulting stories of historic and heroic Herefordshire is that of Wigmore and her lords. From my boyhood I remember how at a country theatre on the border I used to listen attracted and entranced to 'Mortimer of Wigmore: A Legend of Herefordshire,' performed nightly by a company of strollers, from no visible manuscript, but a hasty transcript, which was, I suppose, somewhere in existence lying 'perdu.' I recollect that the young Prince, who whilom made the wonderful escape from durance at Hereford, was nightly precipitated from the heights of Wigmore Castle, by the powerful Baron of Wigmore, but my recollection of history is insufficient to serve me in point of date or particulars. I conclude that the battle of Evesham must have come after and settled

Plate 18. To face page 301.

WIGMORE VILLAGE AND CHURCH.

Photo by A. Watkins.

matters satisfactorily for the powerful family which occupies so distinguished a place in the annals of English history, and ultimately obtained the crown in the person of Edward IV. One thing I cannot doubt, that this theatrical reminiscence—which must have been kept alive in many memories besides mine—may even yet cling to many, and that we are all the more fascinated to hunt up kindred stories of old memorial and to revive fondly the vestiges of the past—the footsteps of the Marches whether across the border in Radnorshire where the name of Mortimer was powerful and predominant, or in their central home and source-place of power, wherein we are this morning met. I purpose to gather from the help afforded by such authorities as 'The Castles of Herefordshire,' by Mr. C. J. Robinson, a former president; a learned 'Paper' of Mr. G. T. Clark, of Dowlais, the eminent exponent of English Castle building; and such notes as have been stored up in the 'Quarterly Reviews' article on Herefordshire in 1879 and its complement, 'Mr. Murray's Handbook to Herefordshire, Worcestershire, and Gloucestershire,' for an (I hope) intelligible account of Wigmore Castle's early history and superstructures, a passing sketch of the chief Mortimers of history with whom we are concerned, and such other general remarks as are perhaps not out of keeping with the 'genius loci.'

"The Castle and chief stronghold of the Wigmores stands in the north-west corner of the border shire of Hereford, eight miles on the English side of Offa's Dyke, one of a chain of strongholds of which Clun, Hopton, and Brampton Brian lay to the due north, Lingen and Lyonshall to the south, while in its rear were posted Croft and Richards Castle, assuring the garrison speedy communication with Ludlow and Shrewsbury. The church formerly attached to the abbey, founded for monks of the Order of St. Austin, is a Romanesque building with Decorated additions standing on the pinnacle of a hill close to a precipice whose chasms are filled by great trees. It exhibits some herring-bone masonry with curious stall woodwork inside. The castle above the town stands on a very commanding eminence above the church and beyond it, between which and it runs what was once a 'wet ditch.' To the west it is commanded by a still higher hill, but north and north-east the outer walls crown precipitous and breezy heights, and overlook as from an eyrie the broad rich meadow lands of Adforton, Letton, Brampton, and Leintwardine, making it an almost impregnable stronghold by the help of art and nature. High over all to the north and north-east was the square Norman keep with its projecting buttress towers, below which, connected with it by a strong battlemented wall, were the apartments of the castle in a quadrangle, and at the foot of the hill a second and perhaps later wall. In the lower part is the great gateway surrounded with a lofty curtain protected

by square and round bastions. Outside the castle and separated by a gorge appears to have been a protective barbican as well as strong enbankments sloping towards the moor beneath. The entrance gateway of the 14th century is still tolerably perfect, and was reached by a drawbridge. That such an outlook should have been early secured is easy to understand, yet from the account in Domesday it seems to have been waste land in Saxon times, and only built upon by Earl William Fitzosborn on waste land called Moreston, which belonged to Gunnert in King Edward's time. It is inferable that between 1072 and 1085 Edric Silvaticus forsook allegiance to King William; that William Fitzosborn, Earl of Hereford, being then dead, Ralph Mortimer, son of Roger Mortimer, the conqueror's kinsman who fought at Hastings, was deputed to reduce Edric, and having succeeded in doing so was rewarded with many of the estates of Edric, and that he became Lord of Wigmore in 1074 in virtue of being the King's principal lieutenant in Herefordshire. Mr. G. T. Clark judges that when the principal fortress was founded is unknown, though there certainly was a mound here before the time of Edward the Elder, who is recorded to have repaired Wigmore. He holds that a Norman lord at the end of the 11th or the beginning of the 12th century first superseded, as elsewhere, the timber walls or palisades of the English keep by a polygonal keep and the curtain walls of the inner yard. Much of the extant masonry, with the exception of the Norman shell keep and wall, is of the Decorated date, mostly built originally on the Norman outlines. In the early 14th century the whole was probably restored in a complete and solid fashion.

"So far as it goes, the veteran historian of the Civil Wars (the late Rev. John Webb, of Tretire) and his son, the Rev. Thomas William Webb, contributed no small weight to the veritable data of Wigmore's early tradition. It is well known that, in some way or other, one volume of Blount of Orleton's MSS. History of Herefordshire (that which begins with letter L) has alone survived. The first volume, according to the testimony of Blount's grandson, was lent to a Herefordshire gentleman, and should be retrievable, but is not. However, the elder Mr. Webb had the good fortune in the course of his long life to get access to a transcript of the first volume, in apparently a child's handwriting, and full of inaccuracy in names and dates, but still of use and interest in default of better authority. Of this through the kindness of the Rev. T. W. Webb, of Hardwick, I have been allowed a careful research, and naturally looked to see what Blount, a scholar of profounder research than any of his contemporaries in North Herefordshire, had to say about Wigmore and its lords. His words, under the head of 'Wigmore Town and Castle,' are as follows, and may be interesting :—

Plate 19. *To face page 303.*

WIGMORE CASTLE.

" ' Wigmore Town and Castle. This town is of great antiquity, for we find it was repaired in the time of Edward the Elder before the Conquest by the name of Wiggen yn Mere, and was then reputed a city, and after fortified with a strong castle by William, Earl of Hereford. The name seems to be Saxon, in which language ' Wigge ' or ' Wiggend ' seems to signify Warrior ; ' ga ' or ' to go,' and ' mere' a pool or great water ; for it is supposed that rich ground below the town now called Wigmore was held heretofore to be undrainable. It is held one of the ancientest honours in England, and has 21 townships or manors that owe suit to the Honour Court, and all the land wherein these manors lie is called Wigmore Land, which has two high constables and gives name to the whole hundred. The Abbey was founded by Hugh Mortimer in the time of King Stephen, and had very great possessions granted to it from time to time by that noble family. These Mortimers had great privileges, and even some regalia granted by our Kings to the honour of Wigmore as well as life and death as of other immunities.'

" The ruins of Wigmore Castle are extensive. The keep is in the ordinary Norman style, massive and square, with slightly projecting buttress tower at each corner. The entrance gateway is on the south of the castle, and the most perfect part of the castle yet extant. In the right tower access was gained by a newel staircase to the porter's room, from which the portcullis was worked. The rugged, precipitous nature of the ground to the west and north was in itself a protection, but the process of dismantling which the fortress suffered in 1643 has destroyed most of its ancient features. According to a letter of Lady B. Harley, there was talk of sending soldiers into Wigmore in that year, but as Col. Massey could not spare men or ammunition it was thought most prudent to dismantle it. Certain it was that a baffled attempt was made after the siege to plant a garrison at Wigmore, slighted in a military sense by Sir Robert Harley at the breaking out of the war, and now to recall out of the dim past some of the many chiefs who erstwhile made these courts re-echo with the tramp of war. The first English Mortimer, Ralph, died seized of above 130 manors, of which 69 lay in Herefordshire and Salop. He was succeeded at Wigmore by his eldest son, Hugh, who opposed the accession of Henry II. and fortified Wigmore, Bridgnorth, and Cleobury Castles against the King. Brought to terms by Henry II., Hugh had to surrender Wigmore Castle to the King, and died there in 1185 in penitence as a Canon of the Abbey, having much confirmed and augmented his father's grants thereto. It is to him that the weight of authority attributes the Norman work traceable around the outer ward of Wigmore. He is also credited with having built several castles in South Wales. Roger, his son, seems to have found full employment in keeping down the Welsh,

and, dying in 1215, was succeeded by his son Hugh. Hugh, the fourth lord, adhered to King John. In his time Llewelyn attended a conference at Wigmore. He held for the King the castles of Stratton Dale and Holgate in Salop, and, dying from wounds received in a tournament, 1287, was succeeded by his brother Ralph, the fifth Earl. He flourished in the first part of Henry III.'s reign, and was very turbulent on the Marches. In Melenydd, which seems to have represented pretty much Radnorshire and Breconshire, he built the castles of Keventlas and Knocklas (Covenllys and Knucklas), and strengthened his social strength by marrying the daughter of Llewelyn, and widow of Reginald de Braose—dark Gladys. He died 1246. Roger, sixth lord, his son, took a fluctuating lead in Welsh affairs, in which Llewelyn took four of his castles, Melenydd, Keventlas, Radnor, and another. He adhered to Henry, fought at Northampton, and had to flee from Lewes. He aided, as all know, Prince Edward's flight from Hereford, bringing him, in concert with the Lord of Croft, with fleet steeds to Dinmore, and thence by relays to Wigmore. He had a command at Evesham, and for his services received the Earldom of Oxford, opposing on that account the restoration proposed by the Dictum of Kenilworth. It was he who at that castle held the famous tournament, in honour of which the great Gate House there gained its name of Mortimer Tower. Chronicles distinguish the military pageant as the Round Table of 100 knights and as many ladies. This Roger has been supposed to be a great rebuilder of Wigmore Castle, though the work now seems of slightly later date. He died 1282-3, and was buried at Wigmore. His eldest surviving son, Edmund, succeeded, and is famous for his attack on the Welsh at Builth and transmission of Llewelyn's head to the King. As he was ' suspect ' on the score of his Welsh lineage, he was very busy in quelling the outbreaks after the event, and in putting down one of these at Builth he got the death wound of which he died soon after at Wigmore.

" Roger, 8th lord, styled Lord Mortimer of Wigmore, and created Earl of March in 1328, served both in Scotland and Ireland, was governor of Builth Castle, took Cardiff from Hugh Le Despenser, and had a grant of Clun. He joined Thomas of Lancaster's party against Edward II., had a narrow escape for his life while in prison, and in gratitude built St. Peter's Chapel in the outer ward of Ludlow Castle. In 1382, after the battle of Boroughbridge, he fled to France, and the King seizing Wigmore, caused an inventory of its contents to be made by a keeper, John de Charleston. This comprehends springholds, the artillery of the age, cross bows, English and Oriental armour and weapons, a chess board and a board for tables and draughts, five peacocks in courtyard, and grain and cattle in quantity. On the Earl's return, followed his guilty ascendancy with the

WIGMORE GRANGE, GATEWAY.

Photo by A. Watkins

Plate 20. To face page 305.

she-wolf of France, his acquisition of endless manors in England, Wales, and Ireland, his seizure in Nottingham Castle, his attainder and hanging in 1330. Edmund, his dispossessed son, died within a few months, a minor. But Roger, the 10th lord, succeeded him, and had living of the Castle of Wigmore before he came of age. He procured the reversal of the attainder and restoration of the Earldom of March in 1352. Serving Edward III. in France, he recovered much Welsh property, and added to it Ludlow and other estates, through his mother, the heiress of Grenville, and finally died in 1360, commander of the English forces in Burgundy. Edmund, 11th lord, and 3rd Earl of March, succeeded; whose abilities were turned by Edward, while under age, to account in negotiating a peace with France, and later as Lieutenant of Ireland. Marrying Philippa, the heiress of Lionel Duke of Clarence, he maintained the ancient honours and influence of his name. He died at Cork in 1381.

"His eldest son became 4th Earl of March. He was by Richard II. made Lieutenant of Ireland, and by descent from the Duke of Clarence declared heir to the Crown. His service was exclusively in Ireland, where he was slain. He was followed by his son Edmund, the 5th and last Earl of March, who, during Henry IV.'s reign, was regarded with a jealous eye by that monarch, and kept under surveillance. Henry V., however, employed him in Normandy, and in the next reign he became Lieutenant of Ireland. He died in 1425, aged 24, and with him the main line of Mortimer ended.

"Among his castles in the Marches were returned at his death, Builth, Clifford Dinas (by Talgarth), Dolveren, Denbigh, Kenvelas, Ludlow, Montgomery, Norton, Narbeth, Raidery, Radnor, Usk, and Wigmore. Richard, Duke of York, as his sister's son, transmitted the vast estates of the Mortimers to his son, Edward IV., when all became merged in the Crown.

"From the honour of Wigmore Edward raised most of the forces wherewith to defeat Owen Tudor, at no great distance from the Castle and nearer still to Mortimer's Cross. The Castle remained in the Crown till granted away by Elizabeth. In 1610 it was purchased by Thomas Harley. In 1643 it was dismantled by the Parliamentarians. It descended amidst divers vicissitudes to Lady Langsdale. Mr. R. W. D. Harley, Brampton Brian, succeeded to the property."

The party afterwards divided. The one portion was conducted by the Rev. W. Bamford to Wigmore Grange, a fine 15th century timber building, now used as a barn, but connected with the Augustinian Abbey, which formerly occupied the site. It is about two

miles north of the Castle. Mr. G. H. Green, who was in Dublin judging at the Horse Show there, courteously gave the visitors permission to inspect the Grange.

Others of the party, led by Mr. R. H. George, went through Barnett Wood to the old 14th century Chapel Farm of Deerfold.*

Most of the visitors availed themselves of the kind invitation of the Vicar and the Misses Bamford to return to the Vicarage to partake of tea, which on such an afternoon proved most acceptable, but those who enjoyed walking went by way of Dickendale, etc., to the bridge over the Lugg at Aymestrey, a distance of about 5½ miles, where the party united.

There was just time to peep at the church, with its many beautiful features, prominent among which are the magnificent screens, which were restored some years ago by Mr. R. Clarke. The members then took seats in the brakes for Leominster, which was reached in time for dinner at the Royal Oak Hotel, the party returning to Hereford by the 6.50 p.m. train.

Among those present were the President (the Rev. R. Hyett Warner), Mr.W. H. Banks, Mr. H. C. Beddoe, Mr. C. P. Bird, Mr. G. M. Brierley, Mr. J. U. Caldicott, Rev. C. B. Caldicott, Canon W. Capes, Mr. W. E. H. Clarke, Mr. Luther Davies, Mr. Gilbert Davies, Colonel E. C. Douse, Mr. Edward J. Du Buisson, Mr. R. H. George, Rev. H. E. Grindley, Mr. E. J. Hatton, Mr. J. Tuder Hereford, Major-General Sir Edward Hopton, Mr. F. S. Hovill, Mr. A. G. Hudson, his Honour Judge R. W. Ingham, Mr. J. J. Jackson, Rev. Preb. W. H. Lambert, Mr. F. Littledale, Mr. W. G. Lloyd, Rev. H. B. D. Marshall, Mr. Theodore Neild, Rev. M. R. S. Onslow, Dr. Scudamore Powell, Mr. A. P. Small, Rev. F. S. Stooke Vaughan, Captain R. Kilbee Stuart, Mr. H. A.Wadworth, Mr. Alfred Watkins, Rev. Preb. H. T. Williamson, Mr. T. H. Winterbourn, Mr. T. Hutchinson and Mr. H. Cecil Moore (hon. secretaries), Mr. James P. Pilley (assistant secretary). Visitors: Mr. H. Bell (China), Mr. Lewis Bishop, Mr. Havard, Mr. Donald Mathews (Redditch), and Rev. Father A. Rogers.

* For an account of the Chapel Farm, see Paper by late Dr. Bull in *Transactions* for 1881, p. 37.

Plate 21. To face page 306.

CHAPEL FARM, DEERFOLD.

Photo by A. Watkins.

THE BRITISH ASSOCIATION.
REPORT TO THE WOOLHOPE CLUB.

The Rev. J. O. Bevan, Chillendon Rectory, Dover, who acted as delegate on behalf of the Woolhope Naturalists' Field Club, Hereford, gives the following report of the proceedings at the British Association :—

CHILLENDON RECTORY, DOVER,
August 10th, 1906.

To the Secretary of the Woolhope Naturalists' Field Club.

Dear Sir,—I beg to forward certain literature relating to the session of the British Association for the Advancement of Science, recently held at York.

At this meeting nearly 2,000 Members and Associates were present. It was generally considered to have been a most successful gathering. This may be accounted for by the unique position occupied by York as the birthplace of the Association 75 years ago, as well as by its natural position and its interesting historical memories.

There was a good attendance of men of eminence in every department of science, and the number and value of the papers presented may be considered to be above the average. The sections were well attended, and the discussions were carried on with vigour.

Section L—devoted to education, a comparatively new division —fully justified its existence, and useful work was done by this section in regard to subjects relating to correlation of studies and training of teachers.

In other sections, such diverse matters were dealt with as radio-activity, constitution of the atom, measurement of a geodetic arc, requisite amount of sleep, food values, exploration in Tibet, the site of Ephesus, the capital of the Hyksos, coast erosion, problem of the unemployed, etc., etc.

The delegates of corresponding societies met twice under the presidency of Sir Edward Brabrook. On the first occasion attention was directed to the scientific and economic advantages of carrying out meteorological observations. Suggestions were made for linking up rain-gauge and other meteorological centres which already exist, and for increasing their number in important regions, where,

owing to sparsity of population and other causes, systematic records have been neglected. It was pointed out that stations not far removed in distance from other stations, may yet possess very different characteristics from a meteorological point of view.

In our second session, the desirability was brought forward of carrying out a systematic photo-survey of England, so as to form a collection valuable from different points of view—archæological, ethnological, and anthropological. Under the auspices of the British Association, a collection of geological photographs has already been formed, and it is allowed that this could be imitated with advantage. It is true that archæological maps and indices—like that of Herefordshire—already exist, and that in many counties much has been done to obtain and preserve a record of interesting natural and archæological features; but it is felt that the British Association should be called upon to stimulate the workers, as well as to furnish a centre, whence information and uniform direction could be obtained.

The magnitude of the work was touched upon, and a committee was appointed to take into consideration the *modus operandi*. Of that committee your delegate was appointed a member, and I should therefore be glad to be furnished with a brief record of the work already accomplished for Herefordshire, so as to lay it before my colleagues. There may be a member of the club who has taken an active part in the matter, and who might be put into communication with me, or reference may be made to reports bearing on the subject. If I am not mistaken, such buildings in Herefordshire as columbaria have been exhaustively dealt with, and I venture to submit to our club that it would do well to take into consideration the desirability of adopting, say, our archæological index and map as a basis of operations, and of "Grangerising" it in order to illustrate, as far as possible, *every object named* by way of drawing, woodcut, or photograph. To this end a large quantity of material must already exist. Our record ends with 1600, and objects which came into existence at a later date could be dealt with separately. When completed, the work could be deposited in a public library, and it would furnish an important and interesting memorial, the value of which would increase from year to year.

Pray do me the favour to communicate this report to your committee and the members of the club generally, and believe me to be, dear sir, faithfully yours,

J. O. Bevan, M.A., F.S.A., F.G.S.,
Delegate.

Woolhope Naturalists' Field Club.

VISIT TO THE FOREST OF DEAN.

[By C. O. Hanson, Instructor, School of Forestry, Forest of Dean.]

On Thursday, October 18th, a small body of the Woolhope Field Club made an interesting expedition through part of the Forest of Dean. Unfortunately the heavy rain which fell in the early morning prevented a larger assembly of members. Those who came were rewarded, as the weather cleared and no rain fell during the walk.

Leaving Mitcheldean-road station at 10-45, guided by Mr. J. Morris and Mr. Smith, Crown keepers, and by two Crown woodmen, the party entered the Forest of Dean at its most northern boundary, and walked through Lining Wood and across Wigpool Common to Pingry Tump, which is at an elevation of 914 feet above sea level. Here we were met by Mr. Philip Baylis, Deputy Surveyor of Dean Forest, who accompanied us during the day, and acted as a most efficient guide. From Pingry Tump a fine and extensive view was obtained. To the east the Severn valley with the horseshoe bend of the Severn lay below us, while on the south-west, Ruardean Hill, Buckstone Hill, and the Kymin lay in the middle distance. Owing to the clouds the distant view was not distinct, but a dim outline of the Cotswolds on the east, and the Black Mountains on the west, could be distinguished. On a fine day the view from this point is magnificent.

Leaving Pingry Tump, we proceeded southwards along the edge of Mitcheldean Meend enclosure, and through Harry Hill Wood, both containing crops of oak some 60 years of age, till we struck the main road from Mitcheldean to Coleford, close to Holy Trinity Church. This Church was built in 1817, and is not of any great interest except as being the first church built in the Forest.

We then walked along the road in a south-westerly direction towards Serridge Lodge, passing through oak woods of two ages, 60 and 90 years. Mr. Baylis explained that these 90-year-old pure oak woods, owing to overthinning, are very open, and not likely to produce the same class of fine timber which the Forest of Dean was

famous for in the last century. The previous crop had been grown mixed with beech, which exerts a favourable influence on the oak; the beech forms a dense cover over the soil, and keeps it cool and moist, and the heavy fall of leaves acts as a fertilizer to the oak, keeping the roots cool and moist during the summer, and warm in winter. In addition the beech growing up among the oak causes the latter to shoot ahead and to grow to a good height, while at the same time the heavy shade of the beech kills off the side branches of the oak, with the result that tall, clean stems of oak timber are obtained. Should, however, the beech outgrow the oak the latter would die, as the oak cannot stand the shade thrown by the beech. To avoid all chance of this it is best to start with a pure crop of oak, and when some 30 or 40 years old, or even older, to underplant with beech. This is now being done in the younger woods in Dean Forest, which are now some 60 years old; although rather late for the operation the present crop will be greatly improved, and by the time they are ripe for the axe, at 150 years of age, they should produce fine timber.

Near Serridge Lodge a plantation of Spanish chestnut was seen. The chestnuts had been sown here five years ago, the turf being lifted in rows about 4 feet apart, and a few chestnuts thrown under the turf at intervals of about one foot; the turf was then firmed down. The result has been very satisfactory, as some of the trees are now 10 feet in height.

We now passed on to the new road from Mirey Stock to Lydney, a road some nine miles in length, which is the only one running through the Forest from north to south, and which will prove a great boon to the district. This was made by the Crown on Mr. Baylis's recommendation, and was only opened for traffic a year ago. It passes close by the Cannop ponds, through lovely scenery, and it is for this district a remarkably level road, there being only one hill, and that a low one, in all its length.

Turning off the road, we next visited the site of the Cannop Coal Company's colliery. This is a new colliery just started with the intention of extracting the lower seams of coal which lie, at this point, at a depth of from 170 to 200 yards below the surface. We were most interested to see the way in which a shaft is sunk. Mr. Joynes, the manager, kindly showed us round, and we were privileged to see the men actually at work. Although the shaft was only commenced on the previous Monday and is 16 feet in diameter, a depth of some 30 feet had already been excavated. The sides of the shaft were shored up with timber, kept in place by iron bands, which will shortly be replaced with brickwork. A few yards off we saw a vein of coal only some four feet below the

Plate 22. To face page 311.

OAK TREE WITHIN A TREE.

The cross section shows heartwood in the centre surrounded by sapwood in the usual way. And here comes the curiosity; for around this sapwood is a second layer of heartwood, again surrounded by sapwood, with bark outside all. The inner tree, as shown in the long piece, is entirely separate from the outer tree. People have travelled hundreds of miles to see this curiosity—the only one known.

surface of the ground; this had been exposed while making a railway siding.

Leaving the colliery, we proceeded down the new road, through oak woods which were looking very pretty with an undergrowth of bracken now a rich brown colour, to Whitemead Park, the residence of Mr. Baylis. Here our walk of some 15 miles, through woods the whole way, came to an end, and although the whole expedition had been of great interest, some of the party were glad we had no more walking to do. The day's pleasure, however, was not yet over. Mr. Baylis very kindly gave us an excellent tea, and showed us a very fine set of photographs of Tintern Abbey.

After a welcome rest we next visited the Forestry Museum, which has recently been arranged in connection with the School of Forestry for woodmen. Here some hundreds of interesting specimens of timbers, etc., are collected, and are well worth a detailed inspection. Amongst others we saw the following of special interest:—

1. A complete oak tree which was felled in Dean Forest some years ago which has the appearance of one tree inside another. On a cross section we find heartwood in the centre surrounded by sap wood in the usual way. Here, however, comes the curiosity, for around this sapwood we find a second layer of heartwood again surrounded by sapwood, with bark outside all. The inner heart and sapwood is entirely separated from the outer heart and sapwood throughout the length of the tree with the exception of the extreme butt end. Another peculiarity is that the inner part of the tree appears to have been dead before the outer part was formed, although this would seem to be impossible, as all wood is formed by the activity of the cambium, the layer of living cells between bark and sapwood. Had, therefore, the inner part been dead, including its bark and cambium, it would have been a botanical impossibility for new wood to have been formed on the outside. It is, in fact, very difficult to find any reasonable explanation. Suggestions have been made that this is an exaggerated case of ring-shake, while others suggest it was caused by lightning. No such explanations, appear, however, to account for the fact that we have heart wood *outside* sap wood, although they might account for the separation of the inner core. That the tree is actually one and not two is proved by the fact that the butt end is normal. An additional curiosity which is also difficult of explanation is that the inner part contains a hole caused by decay, of which there are no signs on the outer part. This decayed part is clearly seen in the centre of the photograph.

2. Specimens showing the difference in the root system of transplanted and untransplanted oaks. The fibrous roots are far

more numerous on the transplanted trees. Measurements taken at regular intervals since the year 1809 in the Forest of Dean show that transplanted trees have grown quicker in girth than trees left untransplanted. The tap root of an oak thus appears to be of little importance after the first few years and this is almost always removed when transplanted. At the same time experience seems to show that ultimately the finest oaks producing the best class of timber are those which have grown where the seed originally fell, and which have never been transplanted.

3. Specimens showing that an injury to the bark and surface of the sapwood are still visible a considerable number of years afterwards. Towards the end of the 18th century a return was made of the timber then standing in the forest, and the trees were marked with a blazing hammer which formed a wound some 6 inches by 4 inches. On the specimens seen we find a scar, on the outside of the bark, of one of these trees which was cut down 80 or 90 years after the wound was made. On the inside of the timber of another specimen which has been split open, we find the Crown and the word "Dean" still plainly visible on the originally outer surface of the sapwood; while on the latter formed wood we find the same marks in relief, showing how the newly formed wood fitted itself into the cuts. These marks can be distinctly seen in the photograph, the original marks being on the right side of the photograph. The two lower pieces of timber are one specimen split and opened out. This specimen also has the scar on the bark.

4. Specimens showing the result of good and bad pruning. Where branches had been cut off at some distance from the trunk, decay had set in, and had penetrated into the trunk, spoiling the timber for a considerable distance towards the ground. Where, however, the branch had been cut off on a level with the trunk, the wound had been perfectly closed over, and no decay had set in.

The Forest of Dean contains some 18,500 acres of woodland, and the Crown has the right to enclose and keep enclosed 11,000 acres of land within the Forest for the purpose of growing timber. At the beginning of the 19th century the 11,000 acres were enclosed and planted up, but between the years 1841 and 1861 a very large portion of the 11,000 acres were thrown open to grazing, and large numbers of sheep, which are uncommonable animals in a forest, and which do great damage to the woods by eating off all young seedlings and in other ways, were depastured upon the Forest. In 1893 or thereabouts the enclosed area for growing timber in the Forest was only 3,000 to 4,000 acres, and the present policy is to re-enclose, in the central parts of the Forest, up to the limit of 11,000 acres. Some

Plate 23. To face page 312.

Fig. I. *Fig. II.*

TRANSPLANTED AND UNTRANSPLANTED OAKS.

Fig. I. shows the roots of an oak that has never been transplanted, and Fig. II. the roots of an oak that has been transplanted. Transplanted trees, it will be seen, form numerous fibre roots, and the trees themselves, it has been proved, grow quicker than when not transplanted.

3,500 acres have been enclosed in the last ten years, and the work of re-enclosing will proceed until the limit is reached.

Of the present crop 10,883 acres consist of oaks planted in enclosures, and are now from 90 to 100 years old, 3,000 acres contain 35 to 60-year-old wood, 149 acres contain 120-year-old oaks, and only 80 acres are covered with mature timber from 180 to 200 years of age. There is, therefore very little mature timber ripe for the axe at present. Almost the whole of these woods are in a very open state, containing trees which, although of great beauty, are not very satisfactory from a forester's point of view ; they are to a great extent short in length, with branches a considerable way down the stem.

Now, for value, a forester wishes to obtain tall, straight stems, free from branches. The practice throughout the life of the present crop, up to within the last 12 years, has been to thin the woods repeatedly whenever they were getting at all dense. This was a mistake, though a common practice in English woods. When an oak wood is planted, it soon becomes, if left alone, a dense thicket, and in this stage a struggle for existence is set up in which each tree is striving to outgrow its neighbour, with the result that the trees are drawn up and quickly grow in height. At the same time the lower branches are killed by the heavy shade. Certain trees fall behind in the struggle and die, or get so suppressed, that they take no further part in the struggle. At this time, which is usually when the wood is from 16 to 20 years of age, the forester should step in and make a thinning and should cut out all dead, dying, and suppressed trees, at the same time taking care not to interfere with the dominating trees, which should still be allowed to compete with each other for light and air. In 10 years time more trees will have given up the struggle, and will have gone under, and may be removed in a second thinning. This process can be continued periodically until the woods have reached an age of 50 or 60 years, always taking care not to open out the cover of the dominating trees. By this time the wood will have completed its principal growth in height, and will consist of tall, straight stems free from branches to a considerable height, but the individual trees will be of small girth. From this time onwards the thinnings should be heavier, and the trees should be gradually isolated. Their crowns will then extend, and the stem will increase in girth with the result that, by the time the oaks are ripe at from 150 to 200 years of age, they will consist of tall straight timber, will be of good girth, free from branches, and of great value. Throughout the thinnings all inferior species, such as birch, should be cut out wherever they are topping the oak. As before mentioned, as soon as the oaks are from 40 to 50 years old,

there will be light enough to introduce an underwood of beech which will still further benefit the oaks. The golden rule for thinning is "Begin early, thin often, thin moderately."

The present crop in the Forest of Dean has been thinned on a different principle, the main object having been to isolate the trees throughout life. There was thus no natural struggle between the trees, and they ceased to grow in height. They are of good girth, but this does not make up for the poor length of clean timber.

Mr. Baylis is now endeavouring to remedy this state of affairs, and all thinnings in the younger woods have been stopped for the present, and they are, moreover, being underplanted with beach. The older crops, from 90 to 100 years of age, cannot now be improved, and they will therefore be gradually cut, and will be replaced by a new and more vigorous crop. This work has been begun and the effect can be seen in Beechenhurst and Blakeney Hill woods.

In order to train young working men in the science and art of Forestry, a School of Forestry has recently been opened by the Commissioners of Woods and Forests in Dean Forest. Working lads are admitted and remain in the Forest for two years, during which time they go through a complete course of Forestry, both theoretical and practical. They work as Crown labourers during this period, and receive a small wage for the work they do, in addition to obtaining their education entirely free.

My thanks are due to Mr. Baylis for much information contained in this paper, and to Mr. Roper, of the Crown office, for the photographs of the specimens referred to.

Woolhope Naturalists' Field Club.

ANNUAL MEETING, DECEMBER 13th, 1906.

The annual meeting for the election of president and officers for the ensuing year, and the transaction of other business, was held in the Woolhope Club-room, Free Library, Hereford, on Thursday afternoon. The retiring President (the Rev. R. Hyett Warner) presided, and there were also present Sir James Rankin, Bart., Captains T. L. Morgan and Kilbee Stuart, Revs. Prebendary Lambert, H. B. D. Marshall, H. E. Grindley, and A. H. McLaughlin; Messrs. H. C. Beddoe, J. Carless, G. Marshall, R. Clarke, W. E. H. Clarke, A. B. Farn, P. Leighton Earle, H. Easton, F. James, H. C. Moore, J. B. Pilley, and J. Cockroft.

The PRESIDENT said the first business to transact was the election of president for the ensuing year.

Mr. MOORE said he wished to propose a gentleman well known to them all, in fact he had been a member for many years, and was president 37 years ago—in the year 1869 (hear, hear). If they looked at the Transactions they would find that he made a most interesting presidential address in that year. He had great pleasure in proposing the nomination of Sir James Rankin (applause).

Mr. CARLESS seconded and said he was the only individual present on the occasion of Sir James Rankin's election to the presidency. From his words on that occasion rose the initiation of the institution in which they were now sitting. He threw out a suggestion with reference to the provision of a proper museum and free library, and this resulted in his great benefaction to the city (hear, hear). It was one of the most useful institutions the city possessed (hear, hear).

The RETIRING PRESIDENT said he must add his own word of satisfaction at the nomination of Sir James. He welcomed the advent of Sir James to the presidential chair, and he thought the members might congratulate themselves (hear, hear, and applause).

Sir JAMES RANKIN said he thanked them for the honour they had done him in electing him again to the position of president of their society. He could say with perfect truth that in the year 1869 he had a great deal of pleasure in being president (applause), and he thought he was fairly intimate in those days with the work of the

society. Those were times when he was fresh from the University, where he had taken his degree in natural science, and taken the greatest delight in studying those matters. He would like to express his great regret that he had been for so many years precluded from attending the meetings of the Club, owing to the reason he had to be somewhere else. He had the most lively recollections of the many pleasant and instructive days he had in former times spent with them. A great many friends had since passed away, particularly Dr. Bull, to whom the Club owed so much. Mr. Moore had taken his place, and he was a most excellent secretary (applause). So far as his powers would allow him, he should have great pleasure in doing all he could to keep up the glories of the Club, and he looked forward to have a happy year among those who were interested in natural science and natural history (applause).

The other officers were elected as follows :—

Vice-presidents, Rev. R. H. Warner, Rev. Preb. Williamson, Mr. R. Swayne (Tarrington), Mr. Herbert Jones (Pontrilas); Central Committee, Mr. C. P. Bird, Mr. J. Carless, Preb. Lambert, and Mr. Alfred Watkins; Editorial Committee, Rev. A. Ley, Mr. H. C. Moore, and the Rev. M. G. Watkins; Hon. Treasurer, Mr. H. C. Moore; hon. auditor, Mr. James Davies; hon. secretaries, Mr. Thomas Hutchinson and Mr. H. C. Moore.

Mr. MOORE stated that progress was being made with the re-publication of Transactions from the year 1852 to 1865 inclusive. It would probably number over 300 pages. He had not had time to complete the volume for the present year, but he hoped to do so by an early date.

Mr. MOORE next read the list of additions to the library during 1906 by presentation, remarking that the books formed a most valuable collection. The list was as follows :—

America—Bulletin of the Geological Institution of the University of Upsala.

Antiquaries, Society of, of London—Proceedings of the. 20 volumes, 2nd series. Vol. 1 to 20. 1859 to 1905.

Birmingham Archæological Society—Transactions, Excursions, and Report, 1905. Vol. XXXI.

British Association for the Advancement of Science. Report. South Africa. 1905.

British Rainfall, by Hugh Robert Mills. 1905.

British Mycological Society. Transactions for 1905.

British Naturalists' Society. 4th Series. Vol. I., Part 2. 1905.

Caradoc and Severn Valley Field Club. Transactions. Vol. IV. No. 1. 1905.

Do., do., do. Record of Bare Facts. No. 15. 1905.

Cardiff Naturalists' Society. Transactions. Vol. XXXVIII. 1905.

Clifton Antiquarian Club—Proceedings of. Part XVI. Vol. VI., Part 1. 1904—1905.

Cotteswold Naturalists' Field Club—Proceedings of. Vol. XV. Part III. September, 1906.

Essex Field Club—Transactions of. 41 Parts. Being parts of Vols. III. and IV., also odd parts of Transactions during 1883, 1884, 1885, and 1886, thus making the set of Essex Naturalist complete up to date.

Essex Naturalist. Vol. XIV. Part V. April, 1906.

Do. Vol. XIV. Part VI. July, 1906.

Fauna and Flora—Devonian and Carboniferous—by John J. Bigsby.

Fauna and Flora—Silurian—by John J. Bigsby.

Geologists' Association—Proceedings of. Vol. XIX. Parts 6, 7, 8, 9, 10. 1906.

Geological Society. Quarterly Report. Vol. LXII. Part 1, No. 245. Part 2, No. 246. Part 3, No. 247, and Part 4, No. 248, 1906.

Geological Society. Geological Literature added to Library during the year ending December 31st, 1905.

Malvern College Natural History Society. 3rd Annual Number. Year Book. 1905-1906.

Marlborough College Natural History Society—Report of the. No. 54 for 1905.

North Staffordshire Field Club. Annual Report and Transactions. Vol. XL. 1905-1906.

Worcestershire Naturalists' Club—Transactions of the. Vol. III., Part IV. 1905.

Year Book of Learned Societies for the year 1906 (Charles Griffiths and Co., Exeter-street, Strand).

Yorkshire Naturalists' Union. Transactions. Part 33. Second edition of North Yorkshire. Studies of its Botany, Geology, Climate, and Physical Geography.

A letter was read from the Photographic Convention of the United Kingdom, inviting members of the Woolhope Club to become members, upon a subscription of 5s each, of the convention to be held in Hereford, July 15th to 20th, 1907, with privileges of admission

to the official receptions, conversaziones, exhibition of photographs and apparatus, with reduced rates for excursions proposed to Ludlow, Weobley, Pembridge, Ledbury, Goodrich, etc. It stated that Mr. Wilfred T. Carless, Hafod Road, was the hon. local secretary, to whom application should be made

Mr. MOORE said they wanted members of the photographic societies to take photographs of geological interest.

With reference to the subject of the mammals of Herefordshire, Mr. MOORE stated the article for the Victoria County Histories (Hereford) would be written by Mr. B. Lindsay, 79, Mill-street, Osney, Oxford. Various particulars were wanted, and with a view to getting the information the club had issued the following paper :—

MAMMALS OF HEREFORDSHIRE.

Replies to be sent to Mr. T. Hutchinson, 101, East-street, Hereford. N.B.—Kindly number answers to correspond with questions.

1. The Fox.—Is he "genuine home-grown," or have you imported foxes from other parts of England ? If so, from where ? Best localities for foxes ? Any notes regarding variation in colour, etc., or what information of interest ?

2. Wild Cat.—If surviving, in what locality ? If not, what traditions or record regarding date of extinction ?

The often quoted Compensation law of Howel the Good marks the recent introduction of the (at the date) still valuable domestic pussy. Do you know of any special reference to wild cats at that period, or in any interesting historical connection ?

3. Pine-Martin (popularly called Martin-Cat).—Same.

4. Polecat (sometimes called Ferret),—Same. Query ? Locally known as " fitchet " or " fitchuk ?"

5. Badger.—Same. Any record of tamed badgers ?

6. Otter.—Localities ? Any record of tamed otters employed in fishing ? Any record of an Otter Club ?

7. Weasel.—Any considerable number ? What localities ? Any information of interest ? Please quote any record in the county, with locality and date, of the weasel attacking man.

8. Stoats.—Localities ? Variations in marking, etc. ? Any evidence of stoats turning partially white in winter ?

9. Wolf, Wild Boar, Beaver.—Any traditions or known record, regarding latest survival ? Or bones and teeth in deposits of historic note ?

10. Deer.—Any traditions of surviving wild deer ? Any park deer reasonably supposed to be descended from wild deer ? Any antlers or bones found in deposits of historic date ? (State which kind of deer in each case.)

11. Bats.—What species, in what localities ? Information required about bats in addition to previous observations in the " Transactions " of Woolhope Club.

12. Mole.—There is a plague of moles in some parts of England at the present. Is your district similarly afflicted ? If so give localities. Also state probable cause, whether the extinction of other creatures or the presence of unploughed ground, etc. Any record of variations in colour ? Any record of trapping for the sale of the fur ?

13. Hedgehog.—Numerous in any special locality ? Trapped, or bred, or tamed, for sale ? How regarded by the country folk—as useful or harmful.

14. Shrew Mouse (common).—Numerous in any special localities ? By what creatures observed to be caught ? Variations ? Do you find stones embedded in ash trees ? The relics of animal superstition. A shrew mouse was buried alive in the tree and some medical incantations performed.

15. Water Shrew and Pigmy Shrew (the two rarer kinds).—Any records, respectively ? By what creatures observed to be caught ?

16. Squirrel.—Localities ? Any variations ? Any records of trapping or taming within recent years ? Nests ?

17. Dormouse.—What record ? This is not probably nearly so uncommon as is often supposed.

18. Black Rat.—Any really reliable statements as to its occurrence and numbers ? Any local records or traditions regarding the relative variation in comparative numbers,of this and the common rat ? Any recent changes ? Any immigrations, old or recent ?

19. Water Vole (popularly called water rat).—Name best localities.

20. Common Field Vole (similarly often called field rat).—Best localities ? Variations in colour ?

21. Bank Vole.—What records ?

22. House Mouse.—Any special notes? Any occurrence of "Singing mice," or of variations in colour.

23. Harvest Mouse.—What localities? Nests.

24. Long-tailed Field Mouse (*Mus sylvaticus*).—What localities?

25. Hares.—What information? Any change in distribution within recent historic times? Any re-stocking of the ground with Scotch or Irish hares?

26. Rabbits.— Are these more or less numerous than formerly? Best localities? Any variations? Any record of rabbits spreading and displacing hares?

Mr. MOORE said Mr. Walter Pilley had now reclassified all the British birds in the Museum in proper order. Mr. Pilley had also gone further, and had re-classified the mammals.

Mr. JAMES asked Mr. Pilley of which Herefordshire mammals the Museum was deficient.

Mr. PILLEY said the shrew mouse (common), water shrew, and pigmy shrew, dormouse, water vole (popularly called water rat), and harvest mouse.

Mr. John Lambe wrote suggesting a general index to the whole of "The Transactions."

Sir JAMES RANKIN said he thought this was necessary, and if the members would allow him he would find a man who would compile such an index free of expense (applause).

Woolhope Naturalists' Field Club.

HISTORY OF THE COUNTIES OF ENGLAND.

CHARACTERISTICS OF THE COUNTY OF HEREFORD.

Herefordshire will occupy a prominent position in what has been aptly described as the greatest guide to England ever published, viz., "The Victoria History of the Counties of England." All thoughtful people, apart from the scientific and learned, readily concur with Bishop Stubbs when he says, "There is not an acre, I may say in England—certainly there is not a parish or a manor—that has not its place in English history; and there is not, I think, an intelligent person in England who is not in one way or another a sharer in such interests of tradition if he would or could realise it."

Those well qualified to deal with such a stupendous task have been and are being approached, and with reference to Herefordshire a very happy choice has been made. It is safe to say they will work most amicably with Mr. William Page, F.S.A., the editor in chief, and the assistant editor, Mr. C. R. Peers, M.A., F.S.A., and that the many characteristics of the county will be faithfully chronicled. Generally, geology and botany, archæology and genealogy, architectural and manorial history, British, Roman, and Anglo-Saxon remains, political and ecclesiastical history, sport and natural history, etc., of each county are to be fully treated by an army of experts, and no Herefordshire library will be complete without a volume having reference to the county, to say nothing of adjoining counties.

It is to be a great national work, and Messrs Archibald Constable and Co., the publishers, are rapidly adding to the already goodly regiment of stately volumes. The standard is a very high one, the utilisation of the result of trained observation and accurate deductions having been brought to bear on a scale that has never before been attempted. Some counties have already been supplied with one or more volumes, and it must be at least two years since the magnificent work of the first volume of the neighbouring county of Worcester was produced.

The following contributors are arranged for Herefordshire :—

Palæontology—Mr. R. Lydeker.

Molluscs—Mr. B. B. Woodward.

Insects—Rev. Canon Fowler.

Crustacea—Rev. T. R. R. Stebbing.

Geology (15,000 words)—Mr. L. Richardson, F.G.S., 10, Oxford-Parade, Cheltenham.

Botany (*Phanetogama and allies*)—Rev. Augustin Ley, Sellack, near Ross.

Botany (*Musci and Hepaticæ*)—Rev. C. H. Binstead, Breinton, Hereford.

Botany (*Fungi*)— Mr. Carleton Rea, 34, Foregate street, Worcester.

Arachnida—Rev. O. Pickard-Cambridge, Bloxworth Rectory, Wareham.

Fishes—Mr. J. F. Symonds, Broomy Hill, Hereford.

Reptiles and Batrachians (1,000 words)—Dr. Gerald Leighton, 51, East Trinity-road, Edinburgh.

Birds (16,000 words)— Mr. E. Cambridge Phillips, Church House, Talgarth, Brecon.

Forestry (13,000 words)—Mr. Stephen Robinson, Lynhales, Kington, Herefordshire.

Mammals (7,000 words) —Contributor wanted.

Agriculture (12,000 words)—It is hoped that Mr. C. W. Radcliffe Cooke will undertake this subject.

Early Man—Mr. George Clinch.

Roman—Mr. F. J. Haverfield, M.A., LL.D.

Domesday—

Text—

Introduction—Mr. J. H. Round, M.A., LL.D.

Earthworks—Rev. E. A. Downman and Mr. J. Chalkley Gould, F.S.A.

Political History—Mr. E. J. Carlyle.

SPORT.

Hunting (*all branches*)—Mr. W. King-King, Graftonbury, Herefordshire.

Horse Racing.

Shooting.

Angling.

Cricket—The editor writes to Mr. Moore saying that he has arranged for a contributor.

Football.

Any other subject of special local interest.

The subject of spiders and other arachnids is to be contributed by the Rev. O. Pickard-Cambridge, of Bloxworth Rectory, Wareham. This contributor has sent a small printed pamphlet of " Notes on Collecting and Preserving Spiders and other Arachnids." Spiders and other arachnids (as scorpions and other allies and acarids) have eight legs, and in advance of them two somewhat leg-like palpi, those of the male ending (in spiders) with a knob more or less broken up into spinous processes. No situation is too barren or too fertile, too wet or too dry, so stony or so overgrown with vegetation, as not to furnish many peculiar species. Search should be made among moss, dead leaves, or débris of all kinds, in either dry or damp places, in holes in banks and river sides, under loose or decaying bark of trees, in crevices in the earth, in timber or in rocks, among the lower stems of grass or other rank herbage, especially on the borders of swamps and ponds, on tree trunks, among lichens, on bushes and blooms of flowers. Some can only be found in hot sunshine, some only at dusk or in the night.

The above remarks are extracted from the notes. He has sent Mr. Moore, the honorary secretary of the Woolhope Naturalists' Field Club, several small bottles containing spirits of wine for the use of any collectors who may apply to him and collect for Herefordshire specimens. No special knowledge of spiders is required by any collector. He writes :—" Do not be afraid of bottling duplicates. What I want to know is what the county of Hereford contains. All the common spiders are as desirable as rarities. Whilst wild and uncultivated districts are good localities, an ordinary garden and shrubbery will yield a great many species. Only a few days ago a collector gave his two children a tube of spirits for search in his outhouse and garden. The result of one or two hours' work was—21 examples, containing 15 species of seven different families. Several were by no means common."

For the better condition of the specimens, of course the less fingering the better. A small empty phial may be used for catching the spider, to be afterwards transferred into the bottle of spirits. Spiders may also be caught in a pill box, and when brought home may be chloroformed and put into the spirit bottle. A label in pencil (not in ink), denoting the locality and parish, should be placed also in the phial. More phials of spirits will be sent if required. The bottles must be tightly packed in corrugated or other paper (not cotton wool),and packed in a strong tin box so as not to be broken by the Post Office stamping, etc. This present season of the year is about the best for a large proportion of species."

Woolhope Naturalists' Field Club.

Annual Spring Meeting, Thursday, April 4th, 1907.

The annual spring meeting of the members of the Woolhope Naturalists' Field Club was held at the Free Library, Hereford, on Thursday afternoon, when there were present the President (Rev. R. Hyett Warner), the President elect (Sir James Rankin), Mr. H. C. Beddoe, Mr. J. Hutchinson, Rev. Preb. M. Hopton, Rev. A. W. Horton, Mr. C. P. Bird, Mr. R. Clarke, Rev. Preb. W. H. Lambert, Rev. H. M. Evill, Mr. G. Marshall, Rev. A. Ley, Rev. H. E. Grindley, Rev. H. T. Williamson, Mr. H. E. Jones, Mr. F. R. James, Rev. H. B. D. Marshall, Mr. F. S. Hovil, Rev. A. H. McLaughlin, Rev. C. H. Stoker, Mr. P. L. Earle, Colonel E. C. Douse, Rev. E. Gedge, Mr. J. E. H. Stooker, Mr. Lewis Bishop, Messrs. T. Hutchinson and H. C. Moore, (Hon. Secs.), and Mr. J. B. Pilley, (Assistant Secretary).

The Rev. C. H. Stoker said in reference to the mound seen at Burghill, and mentioned in the minutes, it ought to be stated that it was not an ancient one. Bones of cattle and a modern coin had been found, and it was evidently a place where diseased cattle had been buried.

Mr. H. C. Moore exhibited a Map presented to the Club by Mr. Philip Baylis, illustrating the boundaries of the Forest of Dean, which would appear in the Transactions. The thanks of the Club were given to Mr. Baylis for his valuable presentation.

Mr. Beddoe (treasurer) presented a statement of accounts, showing a balance on the right side.

Mr. Pilley (assistant secretary) presented a report, which showed the number of members on the books to be 249, as against 253. Eleven new members were elected, which was smaller than usual. The attendance on field days was very satisfactory, the average being 46.

The places and dates of field meetings for the year 1907 were fixed as follows:—Tuesday, May 28th, Newnham-on-Severn; Thursday, June 27th, Kington (for Bradnor Hill and Stanner Rock); Thursday, July 18th (ladies' day), Brecon; Thursday, August 29th (president's day), Hampton Court, if possible.

THE RETIRING PRESIDENT then gave his address (somewhat abridged) as follows :—

Gentlemen,—By immemorial custom, your president before subsiding into private life at the end of his year of office is supposed to impart to the club the benefit of his departing wisdom—a custom, however, which I am bound to say, presses with peculiar severity upon an occupant of the chair to whom Nature has been parsimonious in this respect. As I scan the roll of distinguished predecessors in this presidential chair, and see before me authorities in their several branches of natural science, and archæological learning, I own to a feeling of trepidation in addressing you to-day, and for the few minutes at my disposal must claim your kind indulgence. Looking back, then, to the meetings of the year, which to me at least have been fraught with pleasure, I would recall to your remembrance the war which our indefatigable secretary proclaimed against a race described by the Roman poet as "invisa Minervæ Laxos in foribus suspendit aranea casses." In laying upon the table of the house sundry bottles in which we were to embalm the bodies of the spiders in spirits, our secretary had my entire sympathy. I know that Blackwall, and Cambridge, and Ray Lankester, and other learned scientists have studied the nature, structure, and habits of these uncanny creatures with unwearied industry, and Dr. Dallinger in his lectures glows with enthusiasm over their interesting little ways, and I am not unmindful of the valuable paper with which Mr. Vize enriched our Transactions some years ago. But it is all lost on your president. Of course the story of Bruce and his spider was well rubbed into me, but through long decades I have never forgotten the poetry of childhood in which the poet holds up the spider to the reprobation of its fellow creatures :—

Web-spinner was a miser old,
  And he came of low degree,
His body was long and his legs were thin,
  And he kept bad company.
Up in a garret dark he lived,
  And many have averred
That dismal cries from out his house
  Were very often heard.

Nor can the disciples of Darwin* trace any improvement in the spider. By a horrid kind of telephone it still knows when some unfortunate bluebottle is entangled in its treacherous web; and with the fearful mandibles Mr. Vize so forcibly describes, it still seizes upon its prisoner and sucks him to death. I wish the list of its enormities ended here—compared with which the crimes

* It is consoling to learn from the great naturalist that the South American spider meets with condign punishment from the wasp, which runs him through and through.—*Voyage of the Beagle.*

of a mediæval baron in his castle become quite respectable. I have no wish to harrow the feelings of the club unnecessarily, but I have the authority of eminent spider-students for accusing the female spider of devouring the male spider alive, thus attaining, as it were, to the ultimate goal of iniquity. And if it be incumbent upon me as your president to offer some explanation or theory, or hypothesis, to account for this most erratic proceeding, to say the least of it, I can throw out what they call a suggestion—what our Gallican neighbours would regard as an extenuating circumstance—that the female spider devours the male spider alive because she is so fond of him.

Waking from this most unpleasant of all Nature's evil dreams, we followed our Retiring President into the solitudes of the Forest. As our guide, out of his stores of knowledge and official experience taught us how to preserve the forests which have survived the woodman's axe, our minds involuntarily wandered back to the days when no small part of Britain was covered with forest, and the Druid priest with golden knife severed the sacred mistletoe; to the time when the Red King fell by Tyrrel's avenging arrow in the glades of the New Forest, or to the days of Robin Hood and Maid Marion, or of Orlando and Rosalind amid the forest trees of Arden. But returning to the practical aspect of things, a scheme of afforestation is under the consideration of Government, which, if it does not bring back the days of poetry and romance, may teach us to think more of the works of Nature, and make us thankful that we do not live in days when the savage forest laws of our Norman Kings seemed to confer upon the outlaw the aureole of martyrdom.

Taking a retrospect of the pleasant expeditions of the past year, I was not present, to my great loss, at the first field meeting held on May 29th. Those who were able to accompany the party had the opportunity of visiting Rowlstone Church, the architecture and antiquities of which were so ably interpreted by our lamented member, Mr. Blashill, at the meeting of the Congress of the British Association as far back as 1876. A copy of Mr. Blashill's paper on that occasion was contributed to our Transactions for the year 1891, the year when the club, wandering in search of mushrooms, found itself close to Rowlstone Church. The accomplished architect in his address pointed out among other interesting features the iron brackets fixed to the walls of the chancel made to fold back against the wall, the only examples, Mr. Blashill said, in England. The sculpture in the tympanum of the door was also explained, representing Christ in an aureole supported by four angels, and technically known on the Continent and in England as a "Majesty."

For the second field meeting at Birtsmorton I myself was responsible as president for the year. In spite of the rain, which poured down all day, and was very trying on the long journey to and from Malvern, we had an interesting gathering. It was not the first day the club had visited the spot, but to many of the newer members Birtsmorton would be fresh ground. A full description of the ancient manor-house, and a summary of the day's proceedings, will be found in the Transactions for the year when published together with a few notes I put together at the time. Birtsmorton was interesting to me from its connection with the Oldcastle family who formerly held the manor of Almeley, and from the fact that tradition hides Sir John Oldcastle in the paneled chamber, where he narrowly escaped his remorseless foes. Perhaps one of the most interesting mementoes of our visit were the horseshoes found in the moat some years ago, which had been so changed by Vulcan's art as to leave upon the turf of the forest the footprint of a child, or of a cow.

Then we went on through pitiless rain to Tewkesbury Abbey. The old Abbey with its crypt, in which persecuted Lollards worshipped figures in the interesting pages of "Malvern Chase." Its history has been traced and its architecture described in a useful book locally produced, and many members of our club will remember Canon Robeson's interesting and able paper read at our meeting in 1881. One could not forget as we walked amid the sculptured monuments of the dead, the fearful battle which raged around, and even within, its walls; the figure of the aged abbot rises up before our minds as he stretches forth his hands pleading for mercy to the vanquished who vainly sought safety beneath its sacred roof. Nor can one forget that fearful scaffold on which the conqueror sated his revenge, like another Achilles, in the blood of men who had taken sanctuary in the Abbey, and whose lives he had promised to spare. These he consigned to the headsman on that fatal Monday after he had joined in the worship of God in the Abbey, the day before. If there is any consolation to set off against the blood shed in the Wars of the Roses it is to be found in the fact that they largely diminished the number of mail-clad ruffians who turned this beautiful England of ours into a scene of fratricidal murder and desolation. Yet the solemn and beautiful architecture of the old Abbey, the silent memorials of the recumbent dead, with their faults and their misfortunes, pleading to us as it were with marble hands beneath their sculptured canopies, drove away sterner feelings from the mind, and bade us remember that we are at best poor interpreters of the ages that are past.

Very different was the weather which greeted the ladies who honoured the company with their presence at the third field meeting

in July, when Llangorse Lake and the Allt were visited. Some of the fair trusted themselves to the frail craft of the lake, and "cleft with pliant arm the glassy wave," watching the wild fowl as they skimmed with light wing its ancient waters; descendants, it might be, of the birds which, according to the story of Giraldus Cambrensis, flapped their wings and sang their song as the rightful heir, a Welshman of course, Griffith ap-something, drew near to its margin. Some of us under the courteous guidance of the Vicar of Llangasty ascended the Allt, attaining an elevation of 1,237 feet. The climb was steep, but the view was glorious. Far below was the beautiful valley in which the Usk of Arthurian memory follows its winding course to the sea; and the ridge along which we ascended marked the watershed where the Wye and the Usk part company for ever to fulfil their respective destinies. Some of us walked over a piece of the ancient Roman road known as the Strada Julia, reminding us of the supremacy of the Cæsars over the Silures. Nor did some ancient monastic buildings escape our attention, now used for agricultural purposes, but showing from their very construction that they belonged to an age long since passed away. Then, having accomplished our several explorations we were most courteously received and hospitably entertained at their charming house of Trebarried by Mrs. Raikes and her daughters, bearers of an honoured name. Those who were fortunately present will not soon forget the day. The weather was ideal. The calm summer peace which reigned in that sheltered garden, the shining lake at our feet embosomed among those æonian hills, the sheep with tinkling bell peacefully grazing upon the mountain side, the company seated around partaking of libations unknown to the ancient dwellers by the lake, made up a scene which called for the pencil of the artist, rather than the notes of the casual observer. The sun-dial in the garden, with its happy memories of domestic felicity, seemed to heighten the tranquillity of the scene with its appropriate legend, "The Lord's name be praised from the rising up of the sun unto the going down of the same." As the shadow passed slowly over its face amid a scene where once the shouts of contending races re-echoed among the hills, we might, had we been pagans, have imagined the shades of Ostorius Scapula and Caractacus, of Llewellyn and Owen Glendower looking down appeased upon a land over which the evil passions of the past had lost their ancient power, and upon a company for whom the beliefs of the old pagan world of Celt, and Roman, and Saxon had lost all their witchery.

Our last expedition for the year brought us to the walls of Wigmore Castle, the stronghold of the Mortimers. As we sat on a grassy knoll beneath those frowning towers, we listened from one of

our company to a brief recital of the story of Wigmore, and the part it played in stormy ages which have happily passed away. The Abbey of Wigmore like other monastic institutions, may have played a useful part in a superstitious age, and have done something to soften the manners of men, but the Castle with all its memories has no glamour for us, and we may look without regret upon the ivy which mantles its crumbling walls. Then some of us wandered to the Chapel Farm,* where once the Lollards mingled their hymns with the songs of the birds of the forest.

Were I competent, I would gladly review the progress made during the past year in the subjects which engage the attention of this Club, but even if I had the ability I am too far removed from sources of light and information to attempt such a task. I hope, however, I may make one or two suggestions without abusing the privileges of the chair. I do not know whether it has been done or not, but I cannot help thinking that a map devoted to the elucidation of the ancient pack-roads of Herefordshire, without confusing them with modern roads, would be a useful addition to our historical and antiquarian lore. Another suggestion would be to pierce beneath our palimpsest map of diverse races, and to recover, if possible, the Celtic equivalents for English place-names, and to identify the Romano-Celtic vicus with the Saxon tun and Norman manor. That this has been done in a few cases is probable, and in Mr. Flavell Edmonds' well-known book there is much valuable information, but I am not aware of any systematic treatment of Herefordshire names beyond the identification of Doomsday with the modern spelling of places by the late Judge Cooke. A little piece of work for our genealogical friends. Families once familiar to Herefordshire have apparently disappeared from the county altogether, leaving only their names to linger amid the manors in which they once played so important a part. But have these families really vanished ? or could the expert genealogist set them before us in living representatives deriving through the female line ?

In connection with the objects and studies of our club, I should like to refer to the accumulation of civic records of old times in this city. A year or two ago I went early one winter morning to the muniment chamber near the market-place with the object of making some research into a subject in which I was interested. My guide led me by the light of a flickering tallow candle into a sort of chamber which would have delighted the heart of Guy Fawkes. Stored up in this chamber was a vast collection of documents, some of which were calendared and described in a printed

* See paper in *Transactions* for 1881 on Deerfold Forest, by Dr. Bull.

catalogue some years ago, but the rest have been removed to the new building in sacks, where they remain in the slumber and dust of ages. Of these the greater part would probably not be of historical importance, but even municipal official or commercial documents with names and dates may be of considerable interest to the antiquary.

And now I may be forgiven for referring, as my trifling contribution to to-day's proceedings, to a family once well-known in the county, and formerly lord of the manor and patrons of the living of Almeley. Three or four years ago the club visited the ruins of Tretower Castle, and what is left of Tretower Court. The castle, formerly known as Stradewy, was anciently the home of the Picards, whose name still survives in the parish of Ocle Pychard. Being in another part of England at the time the club visited Tretower, I can only now refer to the interesting information communicated to the company at the time, and recorded in the Transactions for 1903. The inscribed stones known as the Valens and Peregrine stones, the Turpilian stone, the Ogham inscription, in the neighbourhood, were described and those interested in the subject of the latter were referred to the work of Sir Samuel Ferguson entitled "Ogham Inscriptions in Ireland, Wales, and Scotland." At a recent visit to the Castle and Court on my own account, the present occupant of the latter courteously afforded me every facility for inspecting the buildings of what was once an important residence. But as nothing was said at the 1903 meeting of the ancient lords of the Castle, a few notes respecting them may not be altogether out of place on this occasion. The visitor to Worcester Cathedral may observe in the west window of the south aisle four stained glass lights placed to the memory of James Pychard by descendants in the female line. The designs in the tracery include coats of arms of the Picards and allied families, together with pictorial illustrations of their ancient history. The first of the family of whom anything is known was a Miles or Milo Pichard, a comrade-in-arms of Bernard de Newmarch, who defeated Bleddyn, the last Prince of Brecon, in battle. Bernard amply rewarded the knights whose swords enabled him to acquire the territories of the conquered prince. Accordingly the designer of the window represents him surrounded by his twelve knights giving the deeds of Stradewy or Tretower, as it was afterwards called, and Scethrog to the first of the Picards. Of these knights Devereux of local, if not national fame, Baskerville, later of Eardisley, and Turberville appear with their shields, having held land under Bernard at the time. Jones, in his history of Breconshire, mentions in addition to these four knights, Sir Humphrey Burghill, Sir Humphrey Sollers, and Sir John Scull, all well-known names in the West, besides others less

familiar to us. Not many years after, the wreath of the conqueror was exchanged for the garb of the penitent, and Bernard sought to make atonement for the blood he had shed, by building and endowing St. John's Priory, now the Priory Church of Brecon. So we have in the Worcester window the representation of the Dedication of Brecon Priory Church. Miles Picard, following the example of his chief, endowed the new Priory with three carucates of land, and tithes of his provisions and cattle in Wales. He accordingly appears standing, on the right of Bernard, bearing his shield as a donor. The castle of Brecon has long crumbled to ruins, but the Priory Church, thus endowed, has survived the storms of ages to remind men of a nobler power than that of the sword. The Picards of Tretower filled a prominent place in the local history of the western shire. In the year 1215 we find several members of the Picard family imprisoned in Hereford Castle as hostages to King John, for the good behaviour of Walter de Lacy, of the well-known family of that name. From the Patent Rolls of Henry III, for the year 1223, we find that Roger Picard was a prisoner in the castle of Llewellyn Prince of Wales. Another Roger Picard conveyed the manor of Le More near Leominster to the Abbot and Convent of Reading, a house which afterwards fell into dire disgrace. From the Cantilupe Register, recently edited by Canon Capes, we learn that a Sir Roger Picard of Stradewy presented in 1280 a rector to the Church of Almeley, he being the true and lawful patron of the same. From the same record we fear Sir Roger Picard must have been a very naughty person, as he was accused with others of breaking into the Bishop's park at Sugwas, hunting game therein, and taking away timber, but the party appears to have got back with their booty into the Welsh Marshes, where the King's writ did not run. Scattered up and down in the Picard Memoirs are several items of considerable interest. For instance, in 1294, Sir Roger Picard of Stradewy confirmed a deed executed in 1277, the effect of which was to entail his manors of Stradewy, and Almeley, upon the heirs of his son John and his wife Katherine, daughter of Lord Reginald Fitzpeter, the saving clause being added "except it be for the cause of Judaism, prison, or poverty." It is not quite clear what the reference to Judaism means in this deed, but as the Jews were expelled from England a few years after the original deed was executed, it probably reflects the dread with which the financial transactions of the seed of Abraham have for centuries been regarded. By a Fine executed in 1308, Peter the son of Roger Pichard, acknowledged the right of Ralph Bluet and Amicia his wife to the manor and advowson of Almeley, for which they were to render to Peter one rose yearly in lieu of all service. By the marriage of Elizabeth, a descendant of Ralph and Amicia Bluet, to a Sir James Berkeley, the

Stradewy property passed to the Berkeley family, and through subsequent marriages to the Beaufort family, to which it now belongs. The other property of the Picards appears to have passed through the marriage of Joanna Picard to Edmund Brugge of Brugge or Bridge Sollars, to Sir James Baskerville, who married a daughter of Sir Walter Devereux, from whom it descended to the Mylbournes and their modern successors. Time will not allow me to speak of the cattle-raidings and law-suits, the many "fines," and other comical legal proceedings in which the Picards of old times were concerned, an account of one of which reached me this morning from the British Museum. I must content myself with two cameos, as it were, of family history. We read of a Milo Picard, one of the Stradewy Picards, going with many others at night to the house of Walter de la Hide with the intention of killing him, for what reason does not appear, but as they failed to find him they carried off his married daughter and her husband, half dressed, to convey them into Wales, together with goods and chattels to the value of a hundred marks. Lord Walter de Clifford, who was that night at Hereford, hearing the hue and cry, followed the assailants, and with difficulty rescued the prisoners and the booty. For some reason or other the famous William, Earl Marshal, took Milo Picard under his protection in defiance of the Sheriff of Hereford who wrote to the Chancellor of England for instructions in the matter. The result was that all the parties concerned in this disorderly proceeding came to an amicable arrangement. My next picture is from the window in Worcester Cathedral already referred to. It refers to the year 1311, and represents King Edward II., accompanied by Sir Milo Picard and Henry de Pembridge, bearing their shields and confronting Robert Bruce, King of Scotland, accompanied by Douglas.

Let me add one picture from the chronicler Stowe. It is a scene of municipal splendour.* The chronicler records that a Henry Picard, a vintner, who was Mayor of London in 1356-7, did in one day in the year 1363 sumptuously feast Edward III., King of England, John King of France, David King of Scotland, the King of Cyprus, then all in England, Edward Prince of Wales, with many other noblemen, and after kept his hall for all comers that were willing to play at dice and hazard. And now all these figures have faded into the irrevocable past. The belted knight who helped to conquer Brecon, the benefactor of the Priory, the stalwart soldier contending against the defenders of their fatherland, the wealthy citizen entertaining royalty, the Sheriff of Here-

* A painting of this banquet was shown in the recent Anglo-French Exhibition, and I am told that a similar picture appears on the walls of the Royal Exchange.

fordshire, the itinerant judge, are now but memories which yet may not be without instruction for us in these days, and may at least serve to illustrate the continuity of history, and the unswerving laws underlying human affairs.

In concluding this address I should be failing in my duty were I to omit all reference to the removal last year of a valued member of our Club—Mr. James Lloyd, of Kington. His contributions to our *Transactions* on curious antiquarian and scientific matters were highly valued. Having frequent opportunities of seeing Mr. Lloyd, I always found him ready to help me with valuable suggestions in any matter I had on hand, and to place at my disposal any books which might assist me in his valuable library. As I stood at his grave, surrounded by his Masonic brethen, I could but feel regret that I had not known more of so amiable and estimable a man.

And now I gladly make way for one whose contributions to our knowledge of science, whose services to his constituents and country, and whose eminent public and private character ensure him a hearty welcome to the chair he formerly so ably filled. May he once more delight us " with the fairy tales of science and the long results of time."

Woolhope Naturalists' Field Club.

FIRST FIELD MEETING, MAY 28TH, 1907.

NEWNHAM.

The members of the Woolhope Club held their first meeting of the season on Tuesday, when the venue selected was Newnham, for the Forest Bed, and for the Rhaetic Beds at Garden Cliff, Westbury-on-Severn. The weather was somewhat dull and cold, which considerably detracted from what otherwise would have been a most enjoyable excursion, the locality being an exceedingly picturesque one. Altogether some thirty-eight members and visitors took advantage of the opportunity, it being a source of regret that Mr. H. C. Moore (one of the joint secretaries) and Mr. James B. Pilley (assistant secretary) were unfortunately unable to be present owing to ill-health. Mr. Moore is the life and soul of the party on these expeditions, and the cheerful sound of his horn, whereby he summons members together to view some interesting spot was greatly missed. The party consisted of the president (Sir James Rankin), Mr. T. Hutchinson (joint hon. sec.), Dr. Bargrave Wyborn, Mr. E. F. Bulmer, Mr. C. P. Bird, Mr. G. Child, Rev. C. B. Caldicott, Mr. J. U. Caldicott, Mr. R. Clarke, Mr. W. E. H. Clarke, Mr. P. Leighton Earle, Rev. H. E. Grindley, Mr. C. O. Hanson, Mr. F. S. Hovil, Mr. J. J. Jackson, Rev. A. G. Jones, Captain Kilbee-Stuart, Mr. J. Lambe, Rev. Preb. Lambert, Rev. C. Lighton, Rev. A. H. McLaughlin, Mr. T. W. Morris, Rev. M. S R. Onslow (Stoke Edith), Dr. Scudamore Powell, Mr. E. Stooke, Rev. J. E. Grasett, Mr. A. H. Lamont, Mr. A. P. Small (Ross), Mr. G. H. Phillott, Dr. C. S. Morrison (members); Dr. E. W. Prevost, Ph. D., F.R.S.E., Mr. L. Richardson, F.G.S. (hon. sec. of the Cotteswold Naturalists' Field Club), Mr. E. T. Paris (hon. assistant sec. of the Cotteswold Club), Dr. H. E. Durham, F.R.C.S., Mr. Kenneth Lupton, Mr. T. W. Morris, Mr. F. Morris, and the Rev. Scarlett Smith.

Hereford was left by the 9.55 a.m. train, Newnham being reached just before half-past eleven, when the party was met by Dr. E. W. Prevost, Mr. L. Richardson, and Mr. E. T. Paris, and conducted through the quaint old streets of the town, which, in the 13th century, is said to have returned one member of Parliament, but the inhabitants praying to be exempted from this privilege, on

account of the expense, the representation was discontinued. Another interesting fact connected with the town is that King John presented to the Corporation of Newnham, then governed by a bailiff, a sword of office. This sword has a blade 4ft. 4in. in length; on the upper part and immediately under the hilt it has the following inscription:—"John Mor Being Maier This Sord Did Repaire 1594." The clock tower, 60 feet in height, with a short spire and vane, was erected at the junction of High street and Station-road by public subscription in 1873. The members proceeded through the prettily kept churchyard of St. Peter, from which a splendid view of the Severn was obtainable, and Dr. Prevost gave some interesting particulars of the Severn Bore. Time did not allow for an inspection of the church, very little of the old part of which remains. It was originally in the Norman, Early English, and later styles, and after being enlarged and restored in 1875 at a cost of £4,600, was destroyed by fire in 1881, and again rebuilt in facsimile, at the cost of about £4,430.

After Dr. Prevost had drawn attention to a section of the old Roman road within a short distance of the church, the members walked along the Severn bank to Garden Cliff, under the directorship of Mr. L. Richardson. The first object to which attention was directed was the sunk Forest Bed near the mouth of Garden Pill. This deposit is based upon the Red Keuper Marls. Above come in ascending order: (4) blue clay, (3) peat, (2) clay, and (1) tidal alluvium. The clay-beds have yielded crowds of foraminifera and numerous shells, a few bones, some insect-remains; and several seeds have been obtained from these and the other beds.

Dr. Prevost remarked that he could not claim to be the discoverer of the bed, because he had been told of it; but as Mr. Richardson later observed, the knowledge that it was there was of little value if details of it were not recorded for the benefit of the scientific world. Dr. Prevost, however, had not only had the fact of the occurrence of the bed recorded, but, with the assistance of Mr. S. S. Buckman, F.G.S., had secured the services of several leading geologists; of Mr. T. Mellard Reade, C.E., F.G.S., for describing the exposure; and of Messrs. A. S. Kennard, B. B. Woodward, F.L.S., A. C. Hinton, C. O. Waterhouse, and Clement Reid, F.R.S., for dealing with the palaeontology.

Above the variegated Keuper Marls is blue clay, with rootlets striking into it; then peat with remains of trees, mostly birch, scattered about; while above, in ascending order, is clay and tidal alluvium. From the clay-bed between the forest bed and Keuper Marls, Mr. Joseph Wright, F.G.S., of Belfast, recorded a few broken specimens of Foraminifera, one Ostracod, and two Diatoms. From

the clay above, Mr. Wright recorded numerous Ostracoda and frequent Foraminifera, one species *Psammosphæra fusca*, being very common; while from the tidal alluvium he obtained Foraminifera most abundantly, Ostracoda frequently, and Diatoms rarely. Indeed, the yield of this last bed amounted to 86 species and three varieties.

Mr. Richardson observed that the succession of beds here reminded them forcibly that even in the Lower Severn Valley, in quite recent times—geologically speaking—oscillations of the land had taken place. First, the land was considerably higher in relation to sea level than it is at present. Second, it subsided, and upon the eroded Keuper marl was laid down the blue estuarine clay that underlies the forest bed. Third, the land re-emerged, and forest trees flourished where once flowed the waters of the estuary. Judging by the intermittent occurrence of forest-beds all round the British Isles, this re-elevation probably amounted to some hundred of feet. And, fourth, there was subsidence again, and tidal alluvium, rich in Foraminifera, was deposited upon the relics of the forest.

A good section of the Forest Bed was seen, the numerous rootlets in the underlying clay-bed and Keuper marls attracting particular attention.

The company partook of an *al fresco* meal at the north-western end of the Garden Cliff, in the course of which Mr. Richardson gave an address leading up to a detailed exposition of the Lower Lias, Rhætic, and Keuper rocks exposed in the classic section close at hand.

Many years ago, he said, Dr. Buckland had remarked that a line drawn through England from the mouth of the Tees to the coast of Dorset, and corresponding with the base line of the Jurassic System, would divide the country into two very dissimilar parts—dissimilar physically and economically. On the north-west side of that line Palæozoic rocks predominated; on the south-east Neozoic. The Palæozoic rocks gave rise to hilly tracts, and since they contained much mineral wealth, were dotted (where the minerals were most abundant) with a mining and manufacturing population. On the other hand, on the south-east side of the line there was little subterranean wealth, and the country was eminently suitable for agricultural pursuits. On the one hand, said Mr. Richardson, the members saw the hill region of the Forest of Dean, noted from Roman times for its subterranean mineral wealth; on the other the flat vales of Gloucester and Berkeley celebrated for their dairy produce. So on the one hand they had Palæozoic and Archæan

rocks, on the other Neozoic. The lowest series of the Neozoic Group is the Bunter. To the Bunter succeeded the Keuper, and it was to that series that belonged the red and variegated marls they saw so well exposed before them in the north-western end of Garden Cliff. The Keuper Beds were deposited under a variety of conditions; at times inland-sea, at others lacustrine, and at yet others desertic. At least, that was as far as could be seen at present. But the Lower-Lias rocks at the other end of Garden Cliff contained truly marine forms. Therefore, the change from Keuper to Liassic conditions was chronicled in the intervening deposits, which went by the name of the Rhætic Series.

At the south-eastern end of the section Mr. Richardson continued his interesting story. The "Tea-green Marls," he holds, are Keuper. Above them, and, between them and the Rhætic Black Shales, in the Lavernock and Watchet districts, come what he has called the "Sully Beds." They also are principally marls, but they contain a Rhætic fauna. Therefore they should be classed with the Rhætic Series, and not with the Keuper. These Sully Beds are absent from Garden Cliff. There is thus a "non-sequence," or a break in the succession, between the Keuper and the Rhætic. The Black-Shale portion of the Rhætic Series comprises thinly laminated shales, occasional sandstone bands, and here very inconspicuous impure limestone bands.

Mr. Richardson then pointed out the Bone Bed: a bed that extends all across England, and is usually present as a thin layer about an inch thick, highly charged with iron pyrites and fish and saurian remains; but occasionally as a sandstone-band, anything up to 2 feet 6 inches in thickness and devoid of vertebrate remains. Above the Black Shales come greenish-yellow marls and argillaceous limestones. Their fauna shows a reversion to brackish water conditions, and they are capped with the *Pseudomonotis*-Bed, which is on the same stratigraphical horizon as the well-known Cotham Marble of the Bristol district. The *Pseudomonotis*-Bed is succeeded by certain "Paper Shales," which constitute the basement deposit of the Lias.

Mr. Richardson here remarked that some of the members might have heard of the White Lias. It was well developed in Somerset and Dorset, and its stratigraphical position was between the Cotham Marble and the Paper Shales. There was, they would see, no true White Lias here.

Here, then, at Garden Cliff, the Rhætic Series admitted of division into two parts: at Lavernock and on the opposite side of the estuary into four, (1) Sully Beds, (2) Black Shales, (3) "Upper Rhætic," and (4) White Lias and Watchet Beds.

After a short time had been devoted to fossil collecting, the members walked along the foot of the cliff farther to the north-west, where Mr. E. Talbot Paris, hon. assistant secretary of the Cotteswold Naturalists' Field Club, gave a very clear outline of Dr. G. T. Moody's ideas in connection with the cause of the variegation of the Keuper marls.

The colour of the Keuper marls, like that of many rocks, is due to the presence of compounds of iron. The colour of the green marl is due to iron in the ferrous condition, and that of the red marl to iron in the ferric condition. It is well-known that ferrous compounds are usually green or blue, and ferric compounds red and brown, and generally the former are fairly easily changed into the latter by exposure to atmospheric influences. Therefore, assuming that the marls were originally all one colour, it might be supposed that the red marls had been formed from the green by the action of air, and a consequent change in the condition of the iron from ferrous to ferric, accompanied by a change in colour. This is the view which was held at one time by many geologists. That it is not correct, however, is shown by the fact that the red marl contains just as much iron in the ferrous condition as the green does; also, the green marl on weathering does not turn red or brown, but greyish-green or white. The ferric compound (ferric oxide), which causes the red colour, is over and above any ferrous compound, and masks the green colour.

It has been suggested by Dr. G. T. Moody that this ferric compound was introduced through the agency of chalybeate waters. In all probability the whole mass of the Keuper marl was originally green. Chalybeate waters circulated upwards through them, and effected a change which resulted in the greater part of the marl being turned red owing to the introduction of ferric oxide. Certain bands and patches remained green because they were in a harder and more crystalline condition, and so were able to resist the action of the waters.

Returning, Mr. Richardson pointed out a slab of *Pullastra* Sandstone, conspicuously ripple-marked, and from the top of the cliff the geography and geology of the hilly district west of the continuation of the great Malvern fault.

The entire day was devoted to geology, and those members delighting in the subject derived a considerable amount of pleasure and instruction. Garden Cliff exhibits a magnificent section of the Rhætic Series, with the Keuper below and the Lias above. It is the finest exposure of these beds in the Lower Severn Valley, and fossils abound at certain horizons.

Returning to Newnham, luncheon was partaken of at the Victoria Hotel.

On behalf of the Club the PRESIDENT thanked Dr. Prevost, Mr. Richardson, and Mr. Paris for their valuable services that day.—Mr. RICHARDSON, in reply, referred to the pleasure he derived when he was with the club on a former occasion. He expressed the hope that when they next met he should see Sir James Rankin and Mr. Moore.

The PRESIDENT subsequently said no society had done more useful work for the county, and for the precincts of the county than the Woolhope Club. He had spent many happy days with the club, and if it had not been for politics he would have been with them a great deal more. His first presidency of the club was in 1869. He regretted very much that Mr. H. C. Moore, who devoted so much of his time and talent to the club, was unable to be present with them that day.

Among the papers read were the following :—

THE GARDEN CLIFF OF WESTBURY-ON-SEVERN.

[BY JAMES G. WOOD, M.A., F.S.A., &c.].

The first point for consideration is the meaning of the name "Garden Cliff." The very appearance and surroundings of the place exclude the obvious suggestion that it is derived from the occurrence there of horticultural pursuits—"Garden" in the sense in which the word is familiar to us is derived from, or at least (for it may have come to us more directly from the French "jardin"), connected with, the A.S. "guard," a yard or enclosure. In none of the senses in which those words have been, or are, used, can any application of them to this place be found.

The "Garden Cliff" is, in fact, the "Warden" Cliff.

The words "Warden" and "Guardian" are of the same origin and meaning. Strictly, the English form would be "Warder"; the "-den" ending having come through the older French form Wardein; which, in later French, became "Gardein." In low Latin we have the form "Guardianus"; and so on the brass of William Porter (1524) in Hereford Cathedral he is said to have been

"Quondam Collegii beate Marie Virginis Winton in Oxon. Gardianus," *i.e.*, Warden of the College now called New College, Oxford (1).

Again, as Professor Skeat tells us, Cotgrave in his Dictionary (1660) has "poire de garde, a warden or winter pear, a pear which may be kept very long"; and "gardien, keeping, warding, guarding," and the same pear is called a warden pear in Shakespeare's "Winter Tale," iv, 3, 48.

Warden is another form of Ward (A. S. Weard), *i.e.*, a guard or watch. But this is not quite the original meaning. The expression "to keep watch and ward" is not pleonastic. The watcher on the height had a double duty to perform. He had not only to watch for the signal or for danger, but he had to pass on the signal or the warning. The ultimate root is to be found in the old Norse vara, beacon. "In Iceland this word enters frequently into the composition of local names in the sense of landmarks for the guidance of travellers, but in Orkney and Shetland Wart or Ward is a common term for a beacon consisting of a mound erected on some high point of land with wood ready piled for firing in case of emergency. They are sometimes called Wardhills, and correspond to some extent with the Varberg of Scandinavia" (2).

At the back of the Wyndcliff, near Chepstow, is a place which on old maps and particulars I have seen called "The Gardens." It is from its elevation and situation even less suitable for an ordinary garden than the Garden Cliff. But it is separated by a shallow valley from a "Tout" immediately on the Roman road from Trellech to the Roman bridge near Chepstow; and there are remains of a hollow way between the two. This "tout" commands a view of the Brecon and Hereford Hills and the Mendips, besides several passes in the nearer distance. Again, in the parish of Totteridge (*i.e*, the ridge of the Tot or Tout), on the southern border of Hertfordshire, the hill on which the church stands was, until 1854, called "the Garden Hill."

I think, therefore, that we shall not be wrong in adding the Garden Cliff to the list of place names in which Warden occurs.

---

(1) In the description of this brass in the "Antiquities of the Cathedral Church of Hereford" (1717), there are at least three mistakes. The deceased is called Johannes instead of Willelmus: he is said to have been a Prebend, instead of Precentor of the Cathedral, and the date of his death is given as 1424, instead of 1524 (see Le Neve, Fasti, i., 486). This William Porter is described as "Custos Collegii" in the College decree, for the observance of an obit for Bishop Mayo who had been a Fellow of the same College, now in the Hereford Cathedral Library and described by the Dean in Woolhope *Transactions*, 1901, p. 116-117. The decree is dated August 9th, 1509, and Porter became Precentor, October 21st, 1515, and the Bishop died the following April.

(2) Streatfeild, Lincolnshire and the Danes (1884), p. 180, in reference to Warden Hill at Tetford, and citing Jamieson.

A consideration of a few of these and of their situation will perhaps add to our conviction.

At the N.W. corner of the Isle of Wight, and forming one horn of Totland Bay, is the " Warden Point," guarding the entrance to the Solent from the west. On the N.E. of the Isle of Sheppey is another " Warden Point," guarding the entrance from the east to the Thames and the Medway.

In Bedfordshire, on the ridge between the valleys of the Ouse and the Ivel, is the Old Warden, and on the same hill in one direction at an elevation of 215 feeet, is the Deadman's Oak ; in the other direction at an elevation of 269 feet the Deadman's Cross on the road leading from the Icknield Way and Roman road at Laldock to Bedford, corresponding to the portion of the Deadman's Cross on the Roman road at Yorkley Top in the Dean Forest.

Opposite the Old Warden, on the other side of the Ouse, is another Warden Hill, in the parish of Tetworth, or the Watchers' village.

In Lincolnshire is the Warden Hill near Horncastle, with Tetford on the way to it, while on the farther side of Tetford is Gaumer Hill, which Mr. Streatfeild derives from the old Norse gaumr, observation (3).

If then we are on a " warden's " or " watchman's " cliff, it will not be out of place to review shortly some of the events which in past centuries might have been seen from it.

To the eastward the view is limited by the escarpment of the Cotswolds, but that line is furrowed by earthworks and camps of many ages. From Nottingham Hill to the left beyond Cheltenham we may see in succession, one after the other towards the right, Cleeve, Leckhampton, Crickley, Kimsbury, Haresfield, Uley, Nibley, Horton, Sudbury, Dyrham, and Cold Ashton, each with one camp or more, some British, some Roman, some converted from British to Roman, and sometimes, as at Haresfield, the two stand side by side. This may very probably be the line of camps, made or adapted by Ostorius Scapula (circa A.D. 50) to carry out his plan by means of a line of frontier camps, as far as the Wiltshire Avon and

(3) In several of the foregoing instances it will be noticed that Tot-, Tet-, and Tout- occur. They are all forms of the same word, the meaning of which I explained in Woolhope *Transactions*, 1904, p. 233-4. In fact, the Tout, the Warden, and the Deadman, or Dodman, are all the same, or involve the same idea.

I should, perhaps add a word of caution that the termination " wardine " common in Hereford and Salop, is quite different in origin and meaning. It is the same as the " worth " of Gloucester and other counties to the eastward, and " worthy " in Devon.

Severn to secure peace for the south-east of England, and leave, for a time at least, the county west of Severn alone (4), a plan defeated by the refusal of Caractacus to remain simply on the defensive, a refusal that hastened the ultimate subjugation of Mid-Wales. Or they may be attributed to the period of Aulus Didius, who a few years after determined on practically the same plan as his predecessor, rather to secure what territory had been gained than to extend it (5).

For a time then the Garden Cliff watched the limits of the Roman advance, but for a time only. The Roman power acquired the control of the whole Severn Valley. With Gloucester, Cirencester and Bath established on the east, and Caerwent, Caerleon, and Ariconium in the west, new lines of communication had to be opened up, and the treasures of Dean Forest had to be unearthed. For this purpose a road had to be driven from Cirencester to the Forest ; and it passed in sight of the Garden Cliff, almost in the axis of the great horseshoe bend of Severn that lies in front of the Cliff, past Fretherne and Arlingham to the present Newnham Ferry, and so straight over the hill to Little Dean, where it met the road from the nameless town near Lydney and struck across to Ariconium.

This road is not, as between Cirencester and Newnham Ferry, one of the recognised Roman roads. I have previously mentioned it in a paper in the *Transactions*, 1903, pp. 167 and 190. Besides the Hyde tumulus and earthworks on its line between Cirencester and Stroud, the fact that from Fretherne to the Ferry it is in a direct line with the Roman Camp behind Newnham Church is almost conclusive ; and further, the road (which is certainly Roman) from Little Dean to the Ferry could have had no objective if there was not a continuation of this road on the Arlingham side, east of Severn.

It should also be noted that a branch road from the site of a Roman Station on the Foss- Road, near Tetbury, comes into that road near Eastington, and so connected Newnham Ferry with Bath and the west by means of the Foss.

This road must, in fact, in Roman days, have been a busy one, and by it many of the Roman legionaries must have passed on their final recall to Rome.

The next event after that recall was the coming of the Saxons. For over 100 years the Severn Valley remained unconquered. In 577 the Battle of Dyrham gave to the Saxons Bath, Cirencester and

(4) Tacitus Annales, xii. § 31, Cuncta castris Avonam usque et Sabrinam fluvios cohibere parat.

(5) Tacit Agric. § 14, Mox Didius Gallus parta a prioribus paucis admodum castellis in ulteriora promotis per quæ fama aucti officii quæreretur.

Gloucester, as they had been given to the Roman Conqueror five centuries before, and the Newnham crossing must have been crowded with the British fugitives.

Seven years later, however, the British returned over the Severn and gave battle to Ceawlin of Wessex at Fretherne on the peninsula in front of the Garden Cliff. Of this more will be said later on. The result was to bring the Wessex border to the Shores of Severn. To this period may probably be assigned the camp called Welshbury, on the hill between Newnham and Flaxley, and overlooking the crossing.

Another hundred years passed and Mercia conquered Wessex, and crossed Severn, and all the Forest district fell under its power. At that moment probably Westbury-on-Severn first had its existence as the " byrig " on the west of Severn.

The Garden Cliff commanded a view not only of the Roman roads and the Newnham crossing, but of another crossing at Framilode, or the Ferry near the Frome River. This use of " lode " as a " ferry " is somewhat late Saxon, and is rather confined to Severn crossings. It occurs in a lease (9th Hy. vii.) of the Manor of Apley, near Bewdley, with " the fery other whyles called the loode of Apley with the were to the same fery or lode be longyng " (6).

One more event which I associate with this place demands an entire chapter to itself.

ST. AUGUSTINE'S OAK.

St. Augustine arrived in Britain in A.D. 597. At that time the Welsh, and Christianity with them, had retreated (so far as regards the district we are concerned with) west of Severn. East of it lay the Saxon power, divided politically, it is true, into several petty kingdoms at variance with each other, but united under a common bondage of heathendom. What that meant may be read in Kemble's " Saxons of England," Vol. I., 327, 523.

Within a few years, probably in 603, Augustine was moved with a desire to induce the Welsh Christians to join with him in a common attempt for the conversion of the heathen races that lay between them and the scene of his early labours in Kent ; and he proposed a conference for this purpose. I do not intend to deal with any of the ecclesiastical questions involved ; but, to make a fresh attempt to determine where the conference was held. We have two records to consider, and two only.

(6) P.R.O. Ancient Deeds No. 11057.

The first account is that written before 731, by the Venerable Bede (7), who says that Augustine, with the assistance of King Ethelbert, invited to a conference the bishops and doctors of " the nearest province of the Britons " (which would certainly be the S.E. part of what we now call Wales) " at a place which to this day is called in the language of the Angles Augustinaes ac, that is Augustine's Oak on the borders of the Huiccii and West Saxons. He then gives an account of the proceedings at the first session of the conference, at the close of which it was agreed to adjourn in order that a fuller attendance might be obtained. There is nothing to indicate that the second session was at any different place or after any considerable lapse of time. The adjournment may even have been merely to allow others to arrive who were already on the road. To this second session came seven British Bishops and a large number of learned persons ; the latter drawn chiefly from the monastery of Bancornaburg, *i.e.*, Bangor Discoed on the Dee. On their way to the conference they visited " a certain holy and wise man who passed among them the life of an anchorite " ; of him and of the Abbot of Bangor I have a few words to say presently. On the advice of this anchorite, the negotiations with Augustine were broken off, Augustine parting from them with the almost prophetic words of warning that " if they would not have peace with those who were their brothers in the faith they must have war with their enemies in the field ; for if they refused to preach to the Angles the way of life they must expect to receive at their hands the punishment of death." In a few years this was fulfilled by the destruction of Bangor Discoed.

The first point to determine is what Bede meant by " the border of the Huiccii and West Saxons." (8) Mr. J. R. Green would render it " on the border between the Hwiccas and West Saxons." With all deference I think this is wrong. It is due to what I think is his mistaken view of the locality and result of the battle of " Fethanleag " (A.D. 584), which he locates at Faddeley, in Cheshire ; instead of at Fretherne, opposite the Garden Cliff (9) ; and to his treating it as a rout of Ceawlin, the West Saxon King, and defeat of the West Saxon power, instead of, as it practically was, a drawn battle involving a great loss on both sides, including the death of Cutha, Ceawlin's brother (10), after which Ceawlin with further forces broke

(7) Hist. Eccles., Vol. I., p. 99, Eng. Hist. Soc. Edition.

(8) " Making of England," p. 224.

(9) I have not time at the moment to write more as to this battle, which most writers agree in locating at Fretherne ; see A. S. Chr. 584 ; and Matt. Westm. who writes it Frithenleia. For myself the " Barrow " Hill in the line between the Garden Cliff and Fretherne Church, and " Oldbury " Farm at its base suggest the actual side of the battle.

(10) Possibly buried on the Barrow Hill. See preceding note.

across the Severn, " took many towns and innumerable spoil, and wrathful returned to his own (11). From that time till at least the latter part of the 7th century this district between Severn and the Wye lay devastated and a " no man's land " ; and to this invasion is no doubt to be attributed the destruction of Ariconium (at Weston-under-Penyard) and the nameless town in Lydney Park as some of the many towns looted by Ceawlin.

At the time of Augustine's visit, Severn was thus the boundary of the West Saxon kingdom ; and of this kingdom the Hwiccas formed a province, extending from the Bristol Avon to the Worcestershire Avon ; and not " politically distinct " from that kingdom, as Mr. Green necessarily suggests consistently with the views from which I have dissented above. Nor at this time had the Hwiccas any settlement west of Severn. When, indeed, later on, Mercia overran the West Saxon territory and under Offa extended not only across Severn but also to the Wye, we find the Hwiccas on the west of Severn ; but they were still a province, only now of Mercia, instead of Wessex; as is shown by Charters of Offa as to lands near the mouth of the Bristol Avon.

Bede, therefore, in my opinion, meant a place on the borders of that part of Wessex which was included in the Province of the Huiccii. Such a place would be that which we now know as Newnham. We will see if we can get a little closer.

The other account is an extract from the Book of Llanganna in the Iolo MSS., p. 143, as follows :—" Llyma r Esgobion a fuant yn dadlu ag Awstin Esgob y Saeson ar lan Hafren yn y Denau ; nid amgen Esgob Caerffawydd, a'elwir Henffordd ; 2, Esgob Teilaw ; 3, Esgob Padarn ; 4, Esgob Bangor ; 5, Esgob Elwy ; 6, Esgob y Wig ; 7, Esgob Morganwg " ; that is, " these are the Bishops who contended with Augustin Bishop of the Saxons on the bank of Severn in ' the Denes,' namely, the Bishop of Caerffawydd, otherwise Henffordd ; 2, the Bishop of Teilo ; 3, the Bishop of Padarn ; 4, the Bishop of Bangor ; 5, the Bishop of Elwy ; 6, the Bishop of Wig ; and 7, the Bishop of Morganwg."

I agree with Mr. Willis Bund (12) that this list is " obviously the guess of some Welsh antiquary of a much later date," in an endeavour to find the seven Bishops mentioned by Bede. To what he has said as to the impossibility of there being at the time Bishops of some of the places named, I may add that I believe the identification of Caerffawydd with Henffordd (or Hereford) is totally wrong,

(11) See Thorpe's Note on " Florence of Worcester," i., 7, Eng. Hist. Soc. Edit.

(12) " Celtic Church in Wales," p. 246.

and that it was identical in site as a meaning with Backbury, near Mordiford (the fort among the Beech trees), and that the writer, whoever he was, having erroneously supposed it to be Hereford, endeavoured to give colour to his account by using a Welsh name. There was no Bishop of Hereford till Mercian times.

But that is no reason for rejecting the MS. altogether. Its value consists in this : that it does not purport to give an account of the conference, but treats it and its location as if a matter of common knowledge, known by tradition to all. I think we cannot refuse to accept it as evidence of a Welsh tradition that the conference took place on the bank of Severn in the part afterwards, but not, of course, at the time of the conference, known as " y Denau," or, as we should say, Dean Forest.

Mr. Stevenson, in a note in his edition of Bede, wrote : " I am inclined to believe that the Synod was held not in a town but under the shade of an oak tree, a custom of which early ecclesiastical history furnishes numerous examples." I think this note first suggested to me what I am now about to propose.

The Roman road from Newnham Ferry to Westbury-on-Severn lies immediately on the bank of Severn and passes through the hamlet of " Broad Oak," before reaching another part called " Elton," *i.e.*, " eald-tun," significant of the previous existence there of a Roman Station (13). In fact Newnham took its name (the new " ham ") in contrast to that of the old " tun " which is superseded.

That such a name as " Broad Oak " was taken from some noted and wide spreading tree cannot be doubted. There is none there now to account for the name ; but there may well have been one in past times such as sheltered Augustine.

To recapitulate the points in favour of this suggestion. Broad-oak is actually on the bank of Severn, and lay beneath the Roman Camp of which a fragment remains by Newnham Church, which in the Flaxley Charters was called Castellum de Dene. It is therefore within the limits required by the Welsh tradition. Immediately over Severn was the province of Huiccii and the West Saxon kingdom, and thus it satisfies Bede's description and it has preserved in its name the memory of a famous oak.

Probabilities, too, point to the same conclusion. The spot was readily accessible for both parties. Augustine would have

(13) Woolhope *Transactions*, 1901, p. 207, n. Other forms from the same derivation in Gloucestershire are Aylburton, Elberton, Elbury ; as also Albury in other counties.

reached Cirencester either by Silchester and Speen and the Ermine Street thence. From Cirencester to Newnham Ferry the Roman road I have traced was direct. The failure to recognise the road, and false suggestions by other writers of a road from Cirencester to Aust led (14) Bishop Stubbs wrong in his acceptance of Aust Cliff as the locality. There was handy to Broadoak an ancient village to afford a resting place at Elton.

From the Welsh side the direct Roman road from Caerleon through Caerwent (15), over the Wye just above Chepstow and by Lydney and Blakeney Hill led straight to Newnham Ferry and Broadoak. This would bring in all the Ecclesiastics from South Wales. The monks from Bangor Discoed would travel through Ludlow, Hereford, and Monmouth, by the western branch of Watling Street, and thence by the Roman road past Tintern Cross to the Wye Bridge just mentioned, and so to Broadoak.

That the Welsh Bishops would have crossed the Severn right into East Gloucestershire or into Wiltshire, as some writers have imagined, seems most unlikely ; while on the neutral ground afforded by the then political conditions on this " no man's land " on Severn they would be safer from Saxon indignities on the one hand, and not be conceding too much to Augustine on the other.

Several other places have been suggested. I will deal with two.

Aust I have already mentioned. As I have said elsewhere (16), there was no principal road to it at that time. If there was a ferry at all at that part of Severn before Norman times, it most probably was from Redwick to Beachley, to connect the lands of Bath Abbey at both points, and not from Aust ; and even that did not exist till some time after the time in question. Writers have been attracted by the name of Aust, but it has nothing to do with " Augustine." It is part of the fuller name " Austreclive " (or East-cliff) which appears in Domesday and several charters. Stubbs thought it was derived from Trajectus Augusti, but that idea has been fully exploded, though the name still, unfortunately, is repeated in maps. Moreover, the spot was called Austin in a charter of 691, or 40 years before Bede wrote ; and so it was not called Augustine Oak in his day as he says the site of the conference was.

The other place suggested is the Apostle's Oak at Abberley, in Worcestershire (17), But this is not on the bank of Severn ; it is

(14) " Councils and Eccles. Docts., iii., 41.

(15) Where St. Tathan had founded his college some 50 years before.

(16) Woolhope *Transactions*, 1903, p. 171 and 195.

(17) See Abberley Manor, by Rev. J. L. Moilliet, 1905.

40 miles from it at the nearest point, and separated from it by, and on the west side of, the Abberley Hills. It was right outside the Hwiccan and West Saxon district at the time in question ; it had no connection with the " Dean," and when the access to it is considered, it seems the most unlikely place for such a meeting. " Apostle's Oak " is probably a boundary oak like the many Gospel Oaks up and down the country.

If we accept Broadoak as the site of the conference, we may found upon it another interesting speculation.

At that moment the Bishop of Llandaff (who we may assume to have attended, without relying on the Iolo MS.) was Docheu, or Oudoceus (18). His brother was Dunawd, or Dinot (called Dinoot by Bede), the founder and first Abbot of Bangor Discoed. (19). There are reasons for the opinion that Gwent (Monmouthshire) was then still ruled by Meurig, son of Teudrig, and that his father, who had handed over the government to Meurig and retired to live a hermit's life amid the rocks of Tintern (as told in the Liber Landavensis), was still living. If so, what more probable than that the " holy and wise anchorite " consulted by Oudoceus and Dunawd on their way to Newnham was the kingly hermit of Tintern, afterwards known as St. Theudric, and commemorated at Mathern ? (20)

I admit that this hypothesis involves recasting some received notions of Welsh Chronology, but I am quite unable to reconcile a battle between the Saxons and Welsh at Tintern in the lifetime of both Theudric and Meurig (which Liber Landavensis records) with the assumed date of 575 for the death of Meurig. At that date, as we have seen, the Saxons were still beyond Severn.

On the earlier Ordnance Maps a farm at Arlingham, opposite Broadoak, is named " St. Austin's Farm." To prevent misconception, I should add that this has no relation to the event we have been considering. Its name is due to the fact that the farm belonged to the Abbey of St. Augustine, Bristol, as appears by proceedings relating to it in 1236, recorded in Berkeley Charters, No. 240.

(18) Commemorated at Llandogo on the Wye.

(19) For the answer said to have been made by him to St. Augustine at the conference, see Haddon and Stubbs, i., 122. It is obviously apocryphal.

(20) For other references to St. Theudric, and a photograph of his monument in Mathern Church, see Woolhope *Transactions*, 1903, facing page 192.

DUXMERE.

By James G. Wood, M.A., F.S.A., &c.

The question has been proposed to me, what is the meaning of the place names "Duxmere" and "Baker's Oak" which occur in the southern part of the parish of Ross?

In a letter to the *Hereford Times* (August 5th, 1905) on Place-names, I wrote:—"The first thing to do when we desire to arrive at the meaning of a place-name is to discover its true original form. This sounds elementary enough; but the amateur guesser wholly ignores it. . . . . In such a search it is necessary to go back through mediæval and early charters and similar documents, noting every variation of the word."

It would be a departure from the rules I thus laid down if, on the present occasion, I attempted to do more than give a provisional opinion as to the above name, and indicate what should be done in the way of further search. For unfortunately I have no materials more than 100 years old.

In that period I find three forms of the name. Fosbrooke, in his "Ariconensia" (p. 159) gives *Duxmore*. The original One-Inch Ordnance Survey published 1831 gives *Dukesmeer*, and the Six-Inch Ordance Survey (of about 1870) gives *Duxmere*.*

These are obviously insufficient to lead to any certainty as to the form; but I should conjecture that Fosbrooke's termination "more" is erroneous, basing this somewhat on what I believe to be the explanation of the earlier part of the name.

I do not think that *mere* (or *meer*) here is the word meaning "lake or pond." I see no evidence of one near the place. In some places "mere" is no doubt applied also to low marshy ground; but in that sense it is certainly inapplicable here. Nor has that word any connection philologically with "moor."

"*Mere*," from the A.S. ge-maere, in many forms as mer, mere, mare, meer, etc., means a boundary or landmark. It is extremely common in composition in Saxon and later charters and documents. I will first give instances from the Dean Forest Survey of 1282, as being a document relating to the neighbouring district.

*Since writing the above, I have seen in the Record Office, a Charter of feoffment, dated 2nd December, 7 Eliz. (1564), by which Thomas Gruffith, of Ross, settled upon himself and Eleanor his wife and their heirs in tail, two burgage tenements in High street and Edcroft street, "et unam acram terrae in Duxmere intra parochiam de Rosse"; (and one acre of land in Duxmere within the parish of Ross). This confirms the opinion above expressed as to the original orthography of the name. The reference to the document is "Ancient Deeds A. 12507."

In the Perambulations of the boundaries of the several bailiwicks in that Survey we find at Blakeney and at Ruardean, etc., the mersty, i.e., *maer-stig* or boundary path; the *merbrok* or boundary brook; in the Blaize Bayley the *meriuerudinge* or "the Ridding by the boundary yew"; in Staunton the *merok* or boundary oak; and in Abbenhall the *mersiche* or boundary gutter.

For the use of maerdic or boundary dike we may, among numerous instances, take the grant by Eanberht of the Hwiccas (757) of lands at Tredington, near Tewkesbury, where the line is drawn "on da maerdic," to the boundary dike (Codex Dipl. cii); and the grant by Edwy to Bath Abbey (circa 956) of lands at Olveston, Gloucestershire, where the line is drawn "on da ealdan maerdic," to the old boundary dike (ibid 461).

Some years ago I recovered the lost line of Offa's Dike from Marcle Hill to the Bridge at Ross over the Rudhall Brook. I then prosecuted my search on the south of Ross and came to the conclusion that the ditch from the Hill Court road, past "The Firs" (where it was rapidly being filled in), and across the railway to the Vine Tree Inn on the Walford road, was, in fact, the line of that Dike; and that in the other direction it was represented by the lane to Cleeve Farm, where the ditch had been widened and deepened.

It is often supposed that a dike is necessarily a bank; but that is not so. It means anything, whether bank or ditch, produced by digging; though in the former sense "dic" in A.S. is masculine, in the latter feminine.

I, therefore, have no doubt (assuming that further investigation does not suggest another form altogether) that in Dukesmeer or Duxmeer we have a variant of dic-mer; or "the boundary formed by the Dike"; and that the name has been transferred from the boundary to the land itself.

In many places the word "dike" has suffered similar corruptions. We are here nearly at the S.W. extremity of Mercia, the land of the Mark or boundary, maere. Its northern boundary against Northumbia was the River Tame, a tributary of the Mersey. Here in the early part of last century were visible the earthworks which were raised by the Mercians for their defence, and have left their name in Dukinfield, the field of the Dikes.

In prosecuting my searches for Offa's Dike between Highbury (south of Redbrook Station) where the Ordnance Surveyors left it, and Staunton, I succeeded in tracing it across the Newland Valley and round the breast of *Bunker's Hill* between Lower and Upper Redbrook. This name I found on the Tithe Map. "Bun-

ker," like dike, means both a bank and a hollow, as golfers will appreciate. North of Upper Redbrook I identified the western bank of Duffield's Lane across Duffield's Farm as the continuation of the Dike. Here " Dike-field " had become " Duffield."

These names of Duffield and Bunker's Hill we find again in juxtaposition north of Derby, where once more we are on a Mercian boundary line.

Bunker's Hill occurs again on the Seager Hill in the Woolhope district, above Pentaloe Spring. (Query, is not Pentaloe " Pendahlæw," or Penda's Hill ? The same name occurs in Essex on the other extremity of Mercia.) The name " Bunker's Hill," however is marked on the map some little distance from what I have considered to be the line of the Dike between Park Farm and the Clouds (Clawdd) ; but it may be connected with it. " Bunker's Bank " is also the name of the hill S.E. of Haresfield Station on which two camps, one Roman, stand in juxtaposition.

Further still, in Bedfordshire, Bunker's Hill is a part of the hill on which stands the Stretford Camp near Sandy. There can therefore be no question as to the connection of the name with ancient Earthworks.

Yet another form is to be found in Dixton, i.e., dic-tun. This occurs at Dixton Hadnock (i.e., Dic-tun-Weithenauc) on the Wye above Monmouth, which parish includes Duffield's Farm above mentioned, and across a further part of which the Dike must have passed, though the traces of it are mostly obliterated by forest operations. Dixton occurs again three miles N.W. of Winchcomb, derived from some ancient entrenchments near the village.

It should here be observed that Dixton Newton, on the opposite bank of the Wye to Dixton Hadnock, appears in the Lincoln Taxation of 1291 as " Dukeston "; and that no duke had anything to do with it until the Monmouth lordship and estates passed to Henry Earl of Lancaster, created Duke in 1351. It is therefore obvious that Dixton Newton derived its name from its neighbour, and took its suffix to distinguish it therefrom ; and I should be unable to accept the suggestion (if made) that Dixton or Dukeston has any relation to the name of the Saint to whom the Church of Dixton Newton (originally Henllan Titiuc or Lann Tidiuc, as in the Liber Landavensis, and Ecclesia Sancti Tedeoci, as in the Monmouth Charters of the 12th century) was dedicated ; for there is nothing to connect that church in early times with the east side of the Wye. In fact it was one of the churches which Urban claimed as belonging to Llandaff, while he did not claim anything beyond the Wye as within his diocese.

I may add that the name Newton indicates a manor created after Domesday ; of which there were several in this district, as Welsh Newton (adjoining Dixton Newton), Shirenewton (the new " tun " of Durand, the Sheriff of Gloucester, temp. William I.), and Wolvesnewton (formerly spelt Wolphsnewton), the new " tun " of Lupus or Lovell, a family which came out of Glamorgan and were there known as Bleddyn.

One more form of Dic-tun is Ditton, which occurs in Cambridgeshire, as Fen Ditton at the west end of the Fleam Dike, and as Wood Ditton and Ditton Green at the east end of the Devil's Dike near Newmarket. There are many other places where it occurs, of which, however, I have no personal local knowledge.

BAKER'S OAK.

I understand that the intersection of the ditch at Duxmere, which I have identified as Offa's Dike, and the Hill Court-road, is called Baker's Oak. I have no personal knowledge as to this ; but it seems to be confirmatory of what I have written. Though typically the evidence of Offa's Dike, in the greater part of its length, is the occurrence of ancient yews and hollies, yet other trees occur on it, and are named as if boundary marks ; notably Slieve's Oak and Hooper's Oak on the line of the Dike on Marcle Hill. I have no doubt that such names are merely personal ; and that it is useless to conjecture any other derivation than that they were the names of some official who planted them as boundary marks.

Fosbrooke, pp. 153-5, gives an account of part of the perambulation of the parish of Ross on May 31st, 1709 (Rogation Tuesday), beginning at the Gospel Oak in Penyard Park ; and connects the name with the reading at that point of a portion of the Gospel. The name similarly occurs in other manor boundaries, and has been misunderstood.

The oak in the Dean Forest now called " Jack of the Yat " is almost certainly the oak mentioned as a boundary mark in the Survey of 1282 as Ketherick's Oak ; a name that seems to carry us back to the time when the Conqueror first hunted there. These instances show the use of oaks as indicative of boundaries.

It is stated in Fosbrooke that the original of the Perambulation of 1709 was extant among the parish papers at Ross. It would be very well to have this examined ; as also the Chancery proceedings in 1614 as to the Manor of Ross Foreign (also men-

tioned by Fosbrooke), and any extant Surveys or Perambulations of the Manors of Ross and Ross Foreign. These would be very likely to throw light on the above matters.

JAMES G. WOOD, M.A., F.S.A., &c.,
Lincoln's Inn, April 22, 1907.

NEWNHAM-ON-SEVERN.

In continuation of the account given of the proceedings of the day, and of some of the papers prepared for the meeting, the Editor remarks that the papers of Mr. James G. Wood have aroused interest and produced criticism already. The writer carefully avoided saying more in his paper as to the Welsh Bishops and their sees, in order not to overload it unnecessarily.

With reference to the paper on "St. Augustine's Oak," and the translation therein from "The Book of Llanganna," Mr. Wood writes to the Editor:—"Escob Teilaw" cannot be translated "Bishop Teilo" for three reasons—(1) because all the other names, as I will show, are of places—not persons; (2) because it is a rule of the Welsh language (neglect of which leads to absurd mistakes) that where two nouns come together that which qualifies, or is descriptive of, the other comes *last*. So "Bishop Teilo" would be "Teilo Esgob," not "Esgob Teilo"—the person being named and described as a Bishop by the word "esgob," the latter word would come *last*. But where a Bishop is described as by reference to his see the name of the see describes him, and so comes last. So Esgob Teilo is Bishop of Teilo—i.e., of Llandaff, which was constantly spoken of as the Church of Teilo—thus long after his death a gift to Teilo meant a gift to the Church, and the Bishop of Teilo meant the Bishop of the See of which he was regarded as the first founder; (3) St. Teilo had been dead at least 30 years before St. Augustine landed.

What I have said above as to the proper collocation of Welsh words is well illustrated in the passage before us by "Awstin Escob y Saeson." The name comes first, then the first qualification that he was a Bishop, next the final qualification that he was a Bishop of the Saxons—exactly in the reverse order of English, where we should say "the Saxon Bishop Augustine." And it illustrates the further rule that where more than two nouns come together (as here) the definite (or rather defining) article "y" precedes only the last, as the most defining of the descriptive words. Thus,

Pont: a bridge; Pont-faen; a bridge of stone; Pont-faen-y-Saeson: the stone bridge which the Saxons built.

For the same reasons Escob Padarn is not Bishop Padarn (or St. Padarn who died many years even before Teilo); but the reference is to the Bishop (or head) of the British Monastery of Llanbadarn fawr in Cardiganshire, which in Norman times became attached as a priory to the Abbey of Gloucester—see my paper in "The Antiquary," vol. 38, p. 309.

Elwy is of course St. Asaph (which is situate on a ridge between the rivers Elwy and Clwyd), or rather the monastery "ar lan Elwy" which was superseded by St. Asaph.

Bangor, as I wrote before, is "Bangor is y coed "or Discoed.

y Wig I agree it is impossible to identify. Henllan (Hentland) on the Wye has been suggested with nothing to support it.

Morganwg was roughly the district between the Rhymney and the Neath rivers. Possibly the writer meant the Abbot of Margam, but if so it is as bad an anachronism as Henffordd, for it was not founded till centuries afterwards.

Mr. Morgan's (of Llanigon) suggestion of "yn y Deheu" is ingenious, but I cannot accept it. I do not think we are at liberty to alter the reading of a manuscript simply in order to found a possible explanation which suggests itself to us.

But further:— y Deheu (as meaning Deheubarth) did not, except in very early times, include the cantrefs of Gwent and Morganwg; much less include anything east of the Wye—and Gwent and Morganwg even would not have been described as "ar lan Hafren," but as on "Mor Hafren," i.e., the Severn Sea, which was the invariable name for the "broad water" west of the Wye mouth.

Nor do I see any puzzle in the expression "yn y Denau." By the time the Book of Llanganna was written the Dean Forest was well known. The Castle of Dean (at Newnham), the Great Dean (Mitcheldean), and Little Dean were all familiar terms, and a Welshman would well describe the district as the Deans and give the word a Welsh plural termination.

I fail to see how any place which a Welshman would describe as "in the south" could be on the borders of the Hwicci, and I decline to believe that the Welsh Bishops ever crossed Severn.

THE TIDAL WAVE IN THE WYE AND SEVERN.

In the Transactions of the Woolhope Club a paper on the above subject appeared in Vol. 1892, pages 316 to 330. This paper was read afterwards before the Manchester Geographical Society on April 18th, 1894, and appears on page 227 of the Journal of that society, with additions by Mr. W. Nelson Greenwood.

In Transactions 1892, page 326, we read :—Tide of January, 1846, 48.39 feet above datum line ; tide of 17th October, 1883, 48.55 feet ; tide of 1799, 49.13 feet above datum line. " It thus remains 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 line (three feet above deepest point of river bed, and nine feet below the edge of the ' starling ' of the pier on the Monmouthshire—or south—side of the centre arch of the Road Bridge, under the centre line of the bridge) or more than 7 feet 1½ inches above the piers, he will please note."

Since those lines were written the writer of them has unearthed in a most unlikely quarry, what is probably the earliest record of a measurement of the Wye tide. The Commissioners appointed in Febuary 1548, to enquire into the revenues of the Chantries held their inquest at Chepstow, and after finding that the only Chantry there was that of " Saynt Kataren," with the magnificent nett income of 58s. 10d. a year, proceeded to report as follows ; " The saide towne of Chepstowe ys bothe a portt towne and a markett towne and well wallid being somewatt in dekey. The same towne standyth within ij myles of the ryver of Seyverne and yovyng [giving] upon the ryver of Wye ; wher of late the inhabitantes of the saide towne dyd beyld a goodly bridge of tymbre over the ryver of Wye, where it dothe floye and ebbe under the said bridge frome the lowe water marke upright ix fadome ; by reason whereof the yerely reparacious of the said bridge ys very chargeable to the said inhabitantes." (P.R.O. Augmentation Office Chantry Certificate No. 74).

Unfortunately we are left in doubt as to the length of the fathom. Formerly there were the long fathom of 6 feet, used in men of war ; the middle, of 5½ feet used in merchant ships ; and the short of 5 feet, used in fishing vessels ; (Dr. Murray's Dict. : sub. voce.). Most probably the middle was here used ; which would give 49ft. 6in. as the rise of the tide, or a fraction over the measurement of 1799 ; which (unless we admit this of 1548 as an exact one) stills " holds the record " ; the only approximation to it since

1883 having been on Feb. 12, 1899, which was one inch lower than that of 1883. (Transactions 1902, p. 79).

The probable reason for the Commissioners apparently going out of their province to report about the bridge, is that some application was made to have the Chantry revenue applied to keeping up the bridge. Such a diversion of funds had in fact been already made on the other side of Severn by the inhabitants of Henbury Saltmarsh ; as we read in the similar Certificate as to the Chantries there ; which says that four years before 220 men and women had been drowned with all their goods and that " the same parishe is verie greate and poore, nott able to defend the grete rager of the water beatynge against the towne." The latter Certificate is printed in Bristol and Glouc. Arch. Trans. vol. viii. p. 253.

The destruction of the bridge at Chepstow is only incidentally mentioned by Leland (circa 1537) who says that the Castle " standeth fayr and strong not far from the ruin of the Bridge." The building of the new " goodly bridge of timber " was assisted by the bequest of £40 by the will of John Fawkner, Merchant of Gloucester, on condition that the Bridge was finished within a year of his death in Sept., 1545 ; see Gloucester Corporation Records by W. H. Stevenson, 1893. Its life however was short, for in the Statute of 18 Elez: (A.D. 1576) Cap. 17, it is recited that " the great bridge of wood called Chepstowe's Bridge having nothing to mayneteyne the same ys of late fallen to greate ruyne and decay and ys likelye daylye to fall." By that Act the Bridge was brought under the Act of 22 Hy. VIII. as to county bridges : which previously did not apply, as at the passing of that earlier Act and until 27th Hy. VIII. the County of Monmouth had not been formed, nor was the parish of Tidenham, at the other end of the bridge, part of Gloucestershire. But " threatened men live long " ; and it took another Act (3 James I. cap. 23) to compel the Justices to set about the rebuilding of the Bridge which again was destroyed in the Civil War.

A CORRECTION.

We take this opportunity of making a correction as to the meaning of the word "Sanager" in the first paragraph of page 328 of Transactions 1892.

Mr. Wood writes to Mr. Moore :—

"A Correction.—In some notes on the Bores in Severn and the Wye, in Woolhope Club Transactions 1892, p. 328, I made a suggestion as to the origin of the name of the "Sanager" sand in Severn. I hope we have all learned a good deal in the interval; and I have to confess that I have learned that that suggestion is erroneous. It is a typical instance of the danger, to which I have since then often alluded, of attempting to explain a place name without early documentary evidence of its true form.

"On the east bank of Severn at the place in question are two farms, one called "Sanager," the other "Oakhanger." The former place appears in three charters of the 13th century (temp Henry III.) as Swanhangre, Swanhungre, and Swanhunger; and in one of 1377 as Swonhongre; while the latter appears as Ochungre in another of the 13th century (Berkeley Castle Docts., Nos. 320, 415, 427, 552, and 352).

"These show that the ending is the A.S. hangra; the exact meaning of which seems to vary in different parts of the country. Generally it is taken to mean a meadow by a roadside; but it also meant a hanging wood; as "hanger" is still used in Sussex. So Swanhanger was the "Swineherd's Wood," probably of beech timber; while the Oakhanger was the Oak-wood.

"The same termination appears in Clehonger, near Hereford, and Clinger, near Berkeley, both being "Clæig-hangra," or the clay bank. In the latter instance "n" was very oddly intercalated in Domesday, where it is called Claenhangare."

JAMES G. WOOD.

June 2nd., 1907.

THE TIDAL WAVE OR "BORE" IN THE SEVERN.

BY E. W. PREVOST, PH.D., F.R.S.E.

It is not my intention to enter upon the subject of the height to which the tidal waters rise in the Severn, for this has already been discussed by Mr. Moore in the Journal of the Manchester Geographical Society 1894, Vol. I, and treated in the Transactions of the Woolhope Naturalists' Field Club, 1892, pp. 316 to 330. There the author traces in a general manner the passage of the tidal wave up the Severn and the Wye, but his attentions are especially directed to the *volume* of water flowing up the latter river. I now wish to bring together the accounts of investigations which have been made to contradict the exaggerated ideas existing concerning the speed and height of the Bore, or "head" as it is locally called, which for all practical purposes does not commence till the leading wave reaches Frampton Channel, there meeting the conditions which determine the height of the heads. These conditions vary considerably from year to year depending, as Mr. J. Miller of Broadoak writes to me, "on the position of the channel through the Noose Sands opposite Awre. If the channel is such that the bore has a clear course the head is not so big as when it has a more circuitous course." Mr. Miller also reported more *in extenso* to Frank Buckland (Log Book of a Fisherman, p. 300) as follows :— "When it happens that the low water lies round the Frampton side and the Noose Sands are high, so that the tide has a long roundabout course to go, then there is always a very big 'bore' at Newnham in spring-tides. I think it is mainly caused by the great body of water being for a time kept back by the Noose Sands, till, rising higher, it suddenly bounds over and joins the current on the Frampton side at a place called Hock Cut, both currents, after meeting in wild confusion, sweeping up the river with renewed vengeance.*

* This description by Mr Miller of the "two currents meeting in wild confusion and then sweeping up the river with renewed vengeance" explains, and really reproduces, the account of the same phenomenon by "Nennius" (p. 56, Eng. Hist. Soc. Edin.) He wrote: "Another, wonder [of Britain] is the 'Duo Rig Habreu,' that is, the two Kings of Severn. Whenever the sea flows in to the mouth of Severn, two heaps of foam are collected separately; and they fight with each other like rams: and each advances at the other, and they attack each other in turn; and again the one retreats from the other; and again they go forward along each bank. This they do from the beginning of the world to the present day"; and so they do still, 1,000 years after "Nennius" was written!

J. G. W.

Should there be a low-water channel through the Noose Sands close to the Awre side, then there is rarely a ' bore ' of any size at Newnham, the tide having a straight course upwards. It is always in a freshet season that the channel cuts down the Frampton side ; and in a dry summer the up flood tide cuts a low way in the Awre shore through the Noose. No ' bore ' takes place in the Severn below Sharpness Point (except on very rare occasions), and it is not of much size till it gets up in the Frampton Channel. . . . That same tide, after passing Newnham, may flow nearly to Worcester, a distance little short of forty miles."

I am quite at a loss to understand why that excellent observer, the late Frank Buckland, should have stated that the pace of the " bore " was equal to that of an express train. This statement can be so easily confuted by any one watching the tide coming in, that one feels disposed to say that Buckland could never have seen the phenomenon which he describes.

Whilst living for some years close to the river and about 1½ mile from Newnham, I frequently watched the incoming " springs," especially those of the equinoxes, which latter however are not invariably the finest. So general is the interest shown that those living near the banks at Broadoak, the Denny, the Flatt, and elsewhere, turn out to watch those tides likely to come up with a good head. Parenthetically I may remark that as the moon wanes, so does the height of the head until a minimum is reached, when the change from the upward to the downward flow of the stream is barely perceptible.

Punctuality is one of the characteristics of the Bore which is never late unless there is a high wind blowing from the north-easterly quarter ; conversely a high S.W. wind may somewhat accelerate the time of arrival and will certainly increase the " head." The time of arrival at Newnham Nab coincides with that at which it is high tide at Bristol (see Whitaker's Almanack), and the water continues to flow for about one hour and twenty minutes after that. The best head of the series comes up as the third after the full or change, and there is practically no difference between the tides of the full and new moon. As a rule the best heads of the year occur at the equinoxes, but not invariably so, indeed the finest that I have seen, came up in the morning of February 12th, 1899.

In Whitaker's Almanack will be found, in the " Time of High Water " Tables, an indication warning Londoners of tides in the Thames which will probably be unusually high ; this warning holds good also for the Severn, and with a 21ft. 6in. tide, fresh water in the river and a high S.W. wind blowing, it is very necessary

to erect a barrier of clay outside the doors of some of the houses at Broadoak to keep the water out. During the last few years the waters have not risen so high, for the winds have at the critical time been blowing from the E. and N.E., thus keeping the flood back from rising to its full extent. Flood water besides keeping the bore low also exercises more influence on the channels and formation of sandbanks than does the tide at this part of the river ; this probably accounts for the sands coming across 23 years ago to the right bank between Broadoak and Newnham, when riders were able to exercise horses where now is water ; five years previously the sand banks extended up as far as Westbury-on-Severn, and Mr. King of Broadoak, remembers drilling on them when he was a member of the Artillery Volunteers. Mr. Miller reports that at the date referred to " there had been a very heavy spate lasting for some weeks." Since then there has been no transference, but there still is a not infrequent change at Garden Cliff, when the stream will be running one day immediately below the right bank, but on the next morning it will be running alongside the opposite bank, whilst there will be only a large pool below the cliff.

I have already stated that the popular idea of the height of the head is an exaggerated one, and after many inquiries I offer a plausible and possible explanation. Having been often told that the heads sometimes attained a height of 6 ft. and more, I began to cross-examine and found that my informants had in mind the height on the bank to which the water reached ; this was therefore not the perpendicular height of the leading wave, but the extent to which the water was driven up the sides by the passing wave ; it would vary with the slope of the bank, the lesser the angle of the slope the further up would the water run. My suspicions were finally made a certainty when one morning, at Cobbler's Hole, standing on the bank barely 8 ft. perpendicular above the water level, and watching the Bore coming up, a labourer said to me that he thought the " head " was quite 10 feet high. It certainly was only a moderate head with no wave at midstream, but I daresay that it did run up the bank which was here not very steep, to the amount of 10 ft.

A short description of the river near Minsterworth where others have observed is necessary, for the conditions under which the river runs at Newnham are very different. Dr. Vaughan Cornish observed at Stonebench ; myself in 1902 at Cobbler's Hole at a distance of about 13 furlongs from the King's Head Inn at the Flat ; Messrs. Whitmill and Thomas stationed themselves at either end of a stretch of 1,583 yards lying between the King's Head and the Denny. Unluckily corresponding tides were not chosen ; mine was the

third, and Mr. Whitmill's was the second from the equinoctial full moon. Starting from Stonebench the river has a pretty straight run for a mile, when it turns sharply at right angles and pursues a westerly course of something like another mile with but little bending, and reaches Cobbler's Hole ; after this there is another straight stretch of about two furlongs ; then follows a gradual bend of a quarter circle southward to the King's Head Inn, a distance of 13 furlongs. The width of the river along this course is about 250 ft., the depth at Stonebench in mid-stream is about 10 ft., and the bank on the left shore is overgrown with osiers. Thus we have a stream well confined between its banks. Now at Newnham the stretch from Bullo Pill to the White Hart at Broad-oak (1 mile 7 furlongs) is practically a straight line unbroken except by Newnham Nab ; the bed immediately below the right bank is of rock, whilst a wide expanse of level sands form the left bank at low water. At the Minsterworth section of the river there is a bench of rock, submerged at all times, on each side. My main observations refer to the part of the stream starting from a point below Cliff House and ending at the garden of the White Hart Inn, I have not found any account of observations made by others concerning this section of the river except one by Dr. Cornish to which I shall refer later on.

In 1900 Dr. Vaughan Cornish kinematographed the Bore at Stonebench, his results being published in the Journal of the Royal Geographical Society for 1902 ; one of the views of the series was reproduced in " Nature " January 23rd, 1902. The leading wave estimated at 3ft. 6in. in midstream, and at the left bank, when the stream was flowing at the rate of 13½ miles an hour. Mr. Whitmill published in " Nature," February 13th, 1902, the results of his observations made on March 31st, 1891, between the Flat and the Denny, not far from where I was shown the 10ft. wave. Mr. Whitmill in conjunction with Mr. Thomas found the speed to be 17.7 miles an hour and the height " as measured by a post close to the river bank near the King's Head was 4ft. 10in. ; as seen in midstream the height of the crest of the bore seemed only about 3ft. above that of the water in front of it." Dr. Cornish estimated the average speed as 8 miles an hour along the stretch between Newnham Ferry and the Denny, a distance of 9 river miles. Mr. Whitmill remarks " that the velocity thus evidently increases as the stream narrows. . . . and was more than twice that estimated over the longer distance." It must not be forgetten that at the Denny where Mr. Whitmill observed, the river is only 250ft. across and closely confined between its banks, whilst at Broadoak the rising waters can overflow the low sandy margin on the left bank and spread themselves over an expanse of sand ; the river being

at least 500 yards across, and at Severn Mill 600 yards. It is a remarkable fact shown by Dr. Cornish that the level of " high water at Stonebench is several feet higher than high water of a 40-foot tide at Portishead."*

Now as regards my own observations made on various dates, I will describe the method employed at Broadoak for determining, if possible, the height of the leading wave. Parallel and close to the right bank of the river stands a row of telegraph poles ; the pole (1) nearest to Cliff House was found to be 330 yards from my point of observation on the bank near to the garden of the White Hart Inn ; the second was 240 ; the third 180 ; the fourth 120 ; and the fifth 60 yards. My assistant, standing at post 1, whistled as soon as the " head " came level with that post ; he then ran to No. 2, whistled again when the wave came up, and so on to the last post. As soon as I heard the whistle I noted the angular height of the wave and in some cases caused a photographic plate to be simultaneously exposed. The instrument employed for measurement was a telescope having a set of graticules in the eyepiece so arranged that the space between each horizontal thread represented five minutes of arc. By following the base of the leading wave with the zero thread I was able to read off the height in minutes, and thus got the requisite acute angle and a base (distance of assistant), for the solution of the triangle whose perpendicular was the wave.

I claim only an approximation to accuracy in the figures obtained and tabulated below, for I found it most difficult to determine the foot of the wave, that is, the line where level water ceased and the wall of water began.

	Heights in Feet.		
	Sept. 29th.	Oct. 29th..	Mar. 26th.
	Feet.	Feet.	Feet.
At 330 yards -	1.7	2.9	1.5
At 240 ,, -	1.0	3.6	1.5
At 180 ,, -	3.6	1.6	1.7
At 120 ,, -	1.99		0.8
At 60 ,, -	1.2		0.6

(One wave, on March 26th, at an estimated distance of 700 yards 2.1 feet).

Two photographs taken on different days show the wave at the 180 yards post. On February 24th, 1902, I was able to measure

* For a note on a similar variation of level or high water on the Monmouthshire sides, see Transactions, 1902, p. 327; when a rise of at least 6½ feet in 16 miles is demonstrated.

only one wave and that close to shore; the height was 2¼ feet., whilst in mid-channel there was but little visible. The finest head which has been seen for some years came up on February 12th, 1899; this I luckily photographed, but could only estimate its height, by means of the trow moored to the shore, at 4.2 feet. Two photographs taken at Minsterworth show the leading wave the one, as seen from the left bank, the other from the right; this latter shows the rush of water up the bank, whilst there is only a ripple in midstream. The weather and the light were much against photography on this occasion, for the rain was falling heavily; those plates exposed at Newnham received only an 8 o'clock light, which, in the months of October and February spells under-exposure, when a short exposure must of necessity be given.

I have already referred to speed as measured by Dr. Cornish, Messrs. Whitmill and Thomas; my results obtained by timing the passage over a distance of 520 yards at Cobbler's Hole, gave a speed of a fraction under 15 miles an hour, whilst the average speed from Newnham to Minsterworth, a distance of about 10 river miles, was 10 miles. The evidence of measurements as well as public opinion shows that the tide does not always run at the same speed, for wind and flood-water exert their respective influences; at Broadoak it is considered that 8 to 9 miles is the average rate, but I feel sure that this is in excess of the truth; simple guesses are frequently misleading. Therefore to avoid as far as possible errors arising from different conditions, I measured first the speed at Broadoak finding it to be 6.1 miles an hour, and then drove to Minsterworth a distance of about 6½ miles, arriving in time to observe the same tide coming up as already stated, at a rate of 15 miles an hour. When the heights as tabulated were measured on September 29th, the tide was flowing at the rate of 5.2 miles as measured over a distance of 330 yards.

Though there is no great danger to a boat caught by the incoming tide if proper precautions are taken, yet fatal accidents have occurred owing to carelessness. Dr. Cornish's photographs show a boat in mid-stream easily riding over the crest, and once I secured a photograph showing ducks just as they were quietly floating over the top.

The leading wave of the Bore is followed by a series of turbulent waves which in their character recall the appearance of the incoming tide on the sea-shore (photograph); these at Newnham are confined to the channel stream, but following them and passing over the sands on the opposite shore are the "racers," well worth observation. The "racers" are formed by the rush over the sands and occur

THE BORE IN THE SEVERN AT MINSTERWORTH.
Taken about 9 a.m. in pouring rain in October by E. W. Prevost.

Plate 24. To face page 364.

in rhythmical order as the channel fills up, lasting only for a short time at any one spot, ceasing as soon as the water reaches a certain depth. They are violent in their action, altering the configuration of the sandbank over which they have surged and boiled whilst the water in mid-channel rapidly but smoothly rises in level. No visitor to Newnham or the Flat should come with the fixed idea that he will see a good " head "; no predictions can be made with any certainty; at any rate this is my experience of 14 years. In support of this statement it is only necessary to look once more at the two photographs of equinoctial tides and compare them with that of the tide coming in at the February full moon. Still whatever the head may be, it is well worth while to walk in the evening as far as the low cliff quarter of a mile above Broadoak when a high tide is expected and the full moon is shining brightly, and there await the Bore, which makes its coming first known by a roaring sound, then, as it turns the corner below Bullo, a thin white line may perhaps be seen, growing distinctly brighter as it nears the Nab; then in about six or seven minutes time there is a mighty rush of foaming glinting waters which, passing on eastwards, leaves behind it a rapidly rising and swiftly flowing stream; then begin the " racers " on the sand bank opposite to make themselves heard, and finally these subside and all is silent save for the swish of the rapid current below the cliff.

Woolhope Naturalists' Field Club.

SECOND FIELD MEETING, THURSDAY, JUNE 27TH., 1907.

KINGTON TO STANNER ROCKS, OLD RADNOR, AND DOLYHIR.

With their minds bent on geology, the members of the Woolhope Naturalists' Field Club had a pleasant and interesting excursion on Thursday, June 27th, to Kington, Stanner, Old Radnor, and Dolyhir, for their second field meeting of the year. The geological marvels of that district, especially in the parish of Old Radnor have been so recently described in the *Hereford Times*—in the illustrated supplement of the Old Radnor Trading Co.'s works and in the quotations from Davies's History of Radnorshire—that references to them now need only be brief. The district is also a favourite with the Woolhope Club, their last visit being in 1888. Sir Roderick Murchison has much to say about the rocks in his great work " The Silurian System," so has Symonds in his " Records of the Rocks," and many other eminent geologists, prominent for his patient researches being the late Mr. R. W. Banks, of Kington. His son, Mr. W. H. Banks, has inherited his talent in this branch of knowledge and the Club were extremely fortunate in obtaining his services as director on Thursday. He kindly met them on their arrival at Kington station, the company including Sir James Rankin (the president for the year), Dr. Ainslie, Mr. Ernest Ballard (Colwall), Rev. Rhys Bishop and Mr. L. C. Bishop (Letton), Mr. F. J. Boulton (Hereford), Mr. Robert Clarke, Mr. C. A. Cuthbert, Mr. Truman J. Cook, Rev. Gilbert Davies, Mr. W. R. Diamond, Col. Dowse (Ross), Mr. Harold Easton, Mr. R. H. George, Mr. E. Howarth Greenly, Mr. F. S. Hovil, Mr. A. G. Hudson, Mr. Thomas Hutchinson, His Honour Judge Ingham, Mr. J. J. Jackson, Capt. Kilbee-Stuart, Rev. Claud Lighton, Mr. A. H. Lamont (Clifton), Rev. A. H. McLaughlin, Mr. James B. Pilley, Mr. F. S. Prosser, Mr. H. M. Purchas (London), Mr. J. W. Stephens (Womaston), Rev. F. S. Stooke-Vaughan, Mr. R. A. Swayne, Mr. H. C. Moore, and others.

Mr. Banks was an excellent guide, taking his party along footpaths through picturesque and instructive places the whole of the day, and he had with him porters carrying cases of the best fossils which had been found in different parts of the district, and best of all showed his companions how to find similar trophies, be-

sides pointing out the pictureque scenery and historical associations. In this task, he was ably seconded by the President, who drew attention to many interesting things which might otherwise have been missed.

A delightful walk along the old tramway by the side of—

" Rapid Arrow's sedgy bank "—

brought the party to Broken Bank, where Mr. Banks indicated the course of an ancient glacier where boulders of stone had been rolled by it for miles from Stanner Rocks. A detour was then made up the slope of Bradnor Hill to Ivy Chimney quarry, where in the Downton sandstone which is now being worked, such fossils as heads of cyathaspis, eruypterus, and pterygotus, with scales and body rings could be found. In Mr. Banks's case were the two celebrated fossils found by his father and named by geologists " Cyathaspis Banksii " and " Pterygotus Banksii." In the lane at Newton the party were taken amongst stones of the Upper Ludlow formation, thickly marked with worm tracks, fish spines, and things like lobsters, and there was also said to be a bone bed here. At Quarry House, Aymestrey limestone containing *Dayia navicula* was examined, and fossils were noticed in other places.

Passing Dunfield, a long track of Offa's Dyke was viewed near the tops of two hills. On the summit of Stanner Hill, the pedestrians were glad of their luncheon, al fresco, and the President took the opportunity of moving a hearty vote of thanks to Mr. Banks for acting as guide and giving the party the benefit of his expert knowledge of geology.

Sir James also read the following paper which had been kindly sent by Mr. J. G. Wood, who was unable to be present :—

RADNOR AS A PLACE NAME.

The modern spelling and pronunciation of Radnor, which divide it as " Rad-nor," have obscured its meaning.

In Domesday (fol. 181) there are accounted for as in the Hezetree Hundred of Herefordshire, two pieces of waste called" Berchelincope " and " Raddrenove." The former is now Burling-jobb at the south end of Stanner Hill ; and we thus get a clue to the origin of the singular termination " jobb," as far as I know, in this district alone.

The hundred of Hezetree included, at this time of Domesday, that part of Herefordshire which abutted on Radnorshire. It

extended as far north as Wigmore, and comprised, among other places less easy to indentify, Downton, Lynhales, Staunton-on-Arrow, Pilleth, Titley, Knill (Chonille), Herrock (Hercope), and Cascob, in addition to Buling-jobb and Radnor. It must have disappeared early as it is not mentioned in the Statutes of Henry VIII, which rearranged the border counties and their boundaries.

" Raddrenove " is, by a not uncommon misplacement of the letter " R," a mistake for Raddenovre. That this is so may be seen by turning to the Cheshire Domesday, where the hamlet of Radnor, near Congleton, appears as " Radenoure."

Later on we find the name as " Radenor " in the Lincoln taxation of 1291. In the Red Book of the Exchequer the " Honor de Radenoure " appears under the head of " Herefordia in Wallia," circa. 1210, and a little later as " Honor de Radenore."

It need hardly be mentioned that in documents of that period there is no distinction between " u " and " v."

The name is, in fact, " Readan-ofre," meaning " the red bank." The name (in this case of a place in Worcestershire) occurs in this very form in a Saxon Charter (Kemble 599), " on readan ofra."

The Saxon word, " ofer," or " ofor," appears as a place name by itself at Over, near Gloucester, and in Cambridgeshire. It means " an edge, border, or margin," more commonly of the sea or of a river, but it is also used as of a hillside.

That it ultimately took the form "Or" we can see by the typical instance of " Bican-ofre " (as it appears in early documents) becoming Bicknor. The change is easily traced; the " f " passed into " v," the " v " passed into " u," and then became silent. The same thing has happened to the preposition " ofer," or " over," which, provincially, and notably in Gloucestershire, is pronounced " oer," or " ore."

For the use of " ofer," as meaning a hillside, we have good instances in Herefordshire. Eastnor is eastan-ofre, i.e., the eastern bank bounding the valley of the Leadon and its tributaries; the corresponding limit to the west is the Marcle Ridge; at the southern end of which is Westnor's End, i.e., the end of the " Westan-ofre," or western limit or bank.

Again Bircher (N.W. of Leominster) appeared in the " Red Book " as Burchoure, i.e., beore-ofer, or the bank of the birch trees; a name that recurs as Birchover in Derbyshire, which will be found as Barcoure in Domesday.

OLD RADNOR CHURCH, ANCIENT CARVED SCREEN.

Photo by A. Watkins.

Plate 26. To face page 369.

OLD RADNOR CHURCH. ANCIENT CARVED SCREEN AND ORGAN.

Photo by A. Watkins.

Close to Old Radnor itself is Bradnor, *i.e.*, Bradan-ofre, or the broad bank or hill which well defines its contours.

On the Medway is Upnor Castle, *i.e.*, the castle " Uppan-ofre," on the bank.

The appropriateness of the name to the place must be considered with reference rather to Old Radnor than to New Radnor, to which the name has been transferred. It appears to be due to the exposure of the altered " Llandovery " at the place itself, and the survival of the Old Red a little to the south ; in contrast to the " Grauwacke " around.

JAMES G. WOOD, M.A., F.S.A.

Mr. Greenly, alluding to the term " ofre," remarked that it was very much the same as " ufer," the German word for bank of a river.

The descent was past Bilmore Gore quarry (where the Old Radnor Co. are turning out hard road metal), and on to Old Radnor Church, where the antiquities embrace ancient carved screen and curious organ case, recessed seat in west-end wall, old tiles, and a huge font cut out of a single block of porphyritic stone. The interior of the basin is 2ft. 7in. diameter, and 10 inches deep.

In the Volume of the *Transactions* for 1886–9 is an interesting account of the church by the Rev. W. Bamford.

Botany was not neglected, Mr. Truman J. Cook and Mr. Ernest Ballard obtaining various herbs and blossoms.

Reaching Dolyhir, the company partook of tea under spreading trees, after which Mr. W. Chambers, the genial and enterprising manager of the Old Radnor Trading Co., took the party over the quarries of volcanic and other rocks and showed them the manufactory of beautiful granitic stone, paving slabs, vases, etc.

In the pretty station garden, the Rev. J. M. Campbell (Eardisley), Mr. H. E. Durham (Hereford), and Rev. H. J. Marshall (Winforton), were elected members.

Mr. L. Richardson, hon secretary of the Cotteswold Club, and Dr. A. E. Boycott were elected honorary members.

Woolhope Naturalists' Field Club.

THIRD FIELD MEETING, (LADIES' DAY), THURSDAY, JULY 18TH, 1907.

BRECON.

The third meeting of the Woolhope Club was on Thursday, when the venue selected was Brecon, and thanks to the brilliant sunshine the picturesque old Welsh town was seen at its best. On this occasion lady guests were invited, a privilege many of the fair sex availed themselves of. The gathering was, therefore, a large one, and included once more Mr. H. C. Moore, one of the hon. secretaries, whose illness has been so much regretted by every member of the club. The full list of those present was as follows :—Members : The President (Sir James Rankin), Mr. H. N. Apperley, Mr. H. C. Beddoe, Mr. S. H. Bickham, Mr. C. P. Bird, Count Lubienski, Mr. J. A. Bradney, Mr. G. M. Brierley, Rev. Walter Butt, Rev. C. B. Caldicott, Mr. J. U. Caldicott, Mr. R. Clarke, Rev. R. H. Craft, Rev. R. H. Davis, Mr. Luther Davis, Mr. Stephen Deakin, Mr. Illtyd Gardner, Mr. R. M. George, Mr. F. Griffiths, Mr. W. M. Haywood, Mr. A. G. Hudson, Mr. J. J. Jackson, Rev. John Jones, Dr. H. E. Jones, Captain Kilbee-Stuart, Rev. Preb. W. H. Lambert, Judge Harris Lea, Mr. Le Brocq, Mr. C. J. Lilwall, Rev. H. B. D. Marshall, Rev. H. J. Marshall, Rev. C. A. Money-Kyrle, Rev. R. T. A. Money-Kyrle. Rev. W. E. T. Morgan, Rev. M. A. S. Onslow, Rev. A. Pope, Dr. Scudamore Powell, Rev. C. H. Stoker, Rev. F. S. Stooke-Vaughan, Rev. C. A. Treherne, Rev. R. Hyett Warner, Rev. S. E. Watkins, Rev. Preb. H. T. Williamson, Mr. Hutchinson and Mr. H. Cecil Moore (hon. secretaries), Mr. James B. Pilley (assistant secretary). Visitors : Mrs. Adams, Miss Barbour, Mrs. Bickham, Misses Bird (2), Miss Maude E. Bull, Miss Bond, Miss M. Butt, Miss Bartleet (Kent), Mrs. Chave, Mrs. and Miss Clarke, Miss Davis, Mrs. Deakin, Mrs. and Miss Durrant, Miss Gardner, Miss Grain, Mrs. Griffiths, Mrs. Haywood, Mrs. Hudson, Mrs. Hutchinson, Rev. D. Jones (Brecon), Miss Johns, Mrs. Kilbee Stuart, Miss Lea, Mrs. H. C. Marshall, Miss Derham Marshall, Misses Turmand Moore (2), Mr. H. A. Petre (London), Mrs. Scudamore Powell, Miss Rankin, Mrs. and Miss Stooke Vaughan, Rev. C. J. Tuck, Mrs. Hyett Warner, Miss Woodhouse.

The Rev. W. E. T. Morgan, of Llanigon Vicarage, Hay, who arranged the progamme for the day, was the director of the route, and under his guidance the members went to the Church House

and thence to Newton, where they were met by Colonel R. D. Garnons Williams, who explained the features of this old country house, built in 1582. Leaving Newton, the company proceeded to Christ College, where the Headmaster (the Rev. R. H. Chambers) explained the beautiful chapel, dining hall, and library (date 13th century), and their restorations and extensions.

Luncheon was partaken of at the Church House.

In the afternoon, Miss Gwenllian Morgan, authoress of the Illustrated booklet, "The Priory Church, Brecon," conducted the members over the grand old fane she knows so well. From the Priory Church, the members passed, by the kind permission of Mrs. Mayberry, through the grounds of Priory House. A brief visit was paid to Archdeacon Bevan, Ely Tower; and subsequently St. Mary's Church was inspected. Leaving the church, the members wended their way to the Captain's Walk for the purpose of viewing the old town walls. The return journey to Hereford was commenced at 5.30 p.m.

NEWTON.

[NOTES BY R. D. GARNONS WILLIAMS.]

The Newton estate seems to have belonged to the powerful Norman family of Havard, whose ancestor, Sir Walter Havard, (probably so called from the town of Havre), came to Breconshire with Bernard de Newmarch at the time of the Norman Conquest. The house which preceded this one was called Trenewydd, the new home, or settlement, the Welsh equivalent for Newton, and Leland who was in Brecon in the reign of Henry VIII, so calls it.

It is commonly thought that Sir David Gam the hero of Agincourt lived here, but this is quite incorrect, as he lived at Peytin on the Honddu not far from here, a property which the Llewellyns had purchased many years before his time from the Peyton family. David Llewellyn, nicknamed Gam on account of his squint, was the original of Shakespeare's Fluellen in Henry Vth, and was the great grandfather of John Games the first of the family to take the name of Games, who married Margaret the last of the line of Havards and came to live at Newton. It was his grandson Sir John Games who built the present house, as may be seen from the inscription on the Chimney piece in the Great Hall. He is supposed to have been a great traveller, and his portrait, as well as many of the curios brought home by him from abroad, may still be seen at Penpont.

The house was originally much larger—one large wing has entirely disappeared, and there were terraced gardens down to the river,—but it is still an excellent example of the best style of Welsh Manor House of the Tudor period, and was built in the reign of Queen Elizabeth in the year 1582, and possibly by the same architect who built Buckingham House about the same time for Dr. Aubrey. There are many points of resemblance between the two houses, but of course Newton has not been " restored " as Buckingham House has been.

One of the principal features of Newton is the Great Hall with its fireplace, the original dais, and the minstrels gallery still *in situ*. It was in this Hall that the Great Sessions were held in the Spring of 1638. The inlaid mantelpiece of coloured woods in the parlour is of later date—the tulips would suggest the reign of William and Mary. The beautiful plaster work in the upper rooms should be seen, though now, unfortunately, it is in a very dilapidated condition. The roses and lilies are emblems of loyalty. The Games were devoted loyalists—indeed the last of the male descendants, Hoo Games, suffered much on this score as he was called to account by the Parliamentarians for drinking the King's health. Hugh Thomas the Herald, writing in 1698 says, " The chiefest family of note, both of late and for several ages past, dwelling within the borough, is the right worshipful family of the Games, and not only here but through the whole County. . . . They do yet enjoy several large possessions within and without the borough ; their principal seat is Newton, and certainly it is one of the fairest in the County ; it stands upon the fall of the river Tarrell into Usk, and surrounded like a Castle with inward and outward Courts, both enclosed with strong embattled walls, and for rich furniture within is not inferior to any in Wales. Unfortunately very little is left of its ancient glory ! It was John Games (who married Margaret Havard) who procured the Charter for Brecon Borough from Philip and Mary through his influence with the Earl of Pembroke. His Son Edward was the first Recorder of the Town, and lies buried under the High Altar at the Priory Church. He died in 1564. The burial place of the Games was however in the church of the Blackfriars, the Chancel of which is now the College Chapel of Christ College, owing no doubt to the fact that Sir David Gam's father, Llewelyn, had been a great benefactor to the Dominican Friars, and both he and many members of the family are buried there. From 1558, when Edward Games, the father of Sir John Games, was Sheriff, until 1657 when the last male descendant Hoo Games was Sheriff, members of the family filled this high office on sixteen occasions. Hoo Games had three daughters ; Elizabeth, who married Thomas Walker, Blanch who married Daniel Williams

of Penpont, and Florence who married Richard Lucy. The Lucy Altar tomb at Christ College Chapel, shows the augmentation of arms granted to Sir David Gam's descendants by Henry V. for his bravery on the field of Agincourt ; a Lion on the upper part of the Shield *sa. a chro. arg.* between three spears heads embrued. All the children of these marriages died young, with the exception of Mrs. Walker's only child, a daughter who married Richard Jenkins of Hensol in Glamorganshire, and, as they had no children, the property passed on her death to her husband's sister's heir, Lord Talbot of Hensol, who sold it in 1783 to the Rev. Thomas Williams, vicar of Brecon, whose representative and ultimate heir, the Rev. Preb. Garnons Williams of Abercamlais, is the present owner. It is interesting to note that his ancestors the Bullens had on several occasions intermarried with the Havards, the original owners of Newton.

I am greatly indebted to both Miss G. Philip Morgan and Mrs Dawson for assistance in preparing these notes.

Woolhope Naturalists' Field Club.

NOTES ON A SEVERE HAILSTORM ON JULY 22ND, 1907, IN THE HONDDU VALLEY

By J. T. Hereford.

A severe storm of hail passed over this valley on Monday July the 22nd, accompanied by thunder and lightning. The hail began to fall about 3 p.m., and ceased about 5 p.m. The maximum intensity of the storm as it passed over the valley was spread over a width of from ¾ mile to 1 mile. It came over the valley from a north easterly direction, and the hail fell quite straight, there being no wind at the time. I visited the valley on the morning of the 23rd, with a view to a day's fly fishing for trout in the Honddu.

On arriving at Llanvihangel by the 10 a.m. train from Hereford, I was met by the trap from the "Queen's Head" inn, and was told by the driver of the extraordinary storm of the day before. Proceeding to the inn, which is about a mile and a half from Llanvihangel station, we picked up Mr. Hughes the landlord, and proceeded together to the scene of the disaster.

Half a mile up the valley, beyond the inn, I noticed the air blowing colder, as if from a glacier, and looking down into the fields below the road, I could see dirty masses of ice and débris.

At Tredunnow, a small farm close to the road on the right hand side, the hedge and bank had been swept away in several places, and on coming round a bend in the road I saw a huge ice drift, composed of hail stones, some 25 yards in length, about 18 inches deep in the centre of the road, and level with the hedges at the sides. The ice-balls, 20 hours after they had fallen, were rather smaller than the ordinary black Hamburgh grape one sees in hothouses, and I was told that when they fell on the previous day they were the size of pigeons' eggs.

There were other smaller drifts higher up the valley, one by the side of the road hedge I judged as being 3ft. 6in. deep. Quantities of stone had been washed down an incline in the road leading from Hentland Farm so as almost to obstruct passing vehicles. The banks and hedges were washed away in several places and deep ravines could be observed as having been cut out of the hills on either side of the valley.

On the Hatterel hill just above Hentland farm, a huge ravine had been cut from the top of the hill, down to the Honddu, its depth seeming to be about 15ft. where it joined the stream. Below this the brook was running rather strong and very highly coloured. On the day before at the height of the storm, judging by the marks on the banks, it must have risen 7 or 8 feet in a very short time.

I was told that a number of trout had been washed out on to the banks, some being picked up dead quite close to Llanvihangel station. Some of the fish weighed as much as half a pound, a good size for Honddu trout, which do not average more than 3 to the lb. Any one who knows the activity and strength of these mountain trout will understand the violence of the storm which could wash them out on to the banks and leave them stranded. Above the wash-out the brook was quite fishable and the trout took the fly well.

It is needless to say that all crops within the area of the storm were reduced to pulp, even the thickest rhubarb stalks being beaten down. Forty chickens were killed at Tredunnow by the violence of the storm, and, a week after, the small coppices adjoining the stream were entirely denuded of leaves, owing to the severe hail and subsequent winds. A remarkable instance of the severity of this summer may be noted in the fact that, 8 days after the storm, hailstones were picked up in the valley and brought in to the "Queen's Head," although no hail had fallen in the meantime.

I have made many enquiries in the valley, and no one can ever remember hearing of any storm in the district approaching this one in violence. I hope these few notes, some from my own observation, and some from questions asked of the inhabitants of the valley, may interest members of the Woolhope Club. Doubtless this is one of the severest, if not the most severe storm, which has ever visited the Charming Vale of Ewias, and as such I think some record of it should be entered in the transactions of the Club

Woolhope Naturalists' Field Club.

FOURTH FIELD MEETING, THURSDAY, AUGUST 29TH, 1907.

RISBURY CAMP AND HAMPTON COURT.

FIELD DAY IN THE DINMORE DISTRICT.

The fourth field meeting of the Woolhope Naturalists' Field Club was held on Thursday in glorious weather, when Hampton Court, the ancestral home of the Arkwright family, was visited. This was President's day, and Sir James Rankin, Bart., accompanied the party, which was composed of the following, viz. :Revs. C. B. Caldicott, S. M. Campbell, Father R. A. Davies, Preb. W. H. Lambert, H. B. D. Marshall, A. Pope, F. S. Stooke-Vaughan, R. Hyett Warner, S. Cornish Watkins, and Preb. H. T. Williamson, Colonels E. C. Dowse and T. H. Purser ; Captains T. H. Morgan and R. Kilbee Stuart; Drs. Scudamore Powell and G. H. H. Symonds; Messrs. H. C. Beddoe, L. C. Bishop, J. U. Caldicott, E. L. Cave, H. H. Child, R. Clarke, W. E. H. Clarke, Luther Davis, A. B. Farn, R. H. George, J. T. Hereford, A. G. Hudson, A. H. Lamont, C. J. Lilwall, W. G. Lloyd, George Marshall, T. Neild, Walter Pilley, H. Southall, J. E. H. Stooke, H. A. Wadworth, P. J. Walker, T. Hutchinson and H. Cecil Moore (hon. secretaries), and Mr. James B. Pilley (assistant secretary). The visitors were Captain Pope, Messrs. Marshall, Denny, and Denham.

By a concession of the L. and N.W. and G.W. Railway Companies, the 9.20 a.m. train was stopped at Ford Bridge Station, and the party allowed to alight there. They then walked eastwards over the fields, and when 2½ miles had been traversed, they arrived at Risbury Camp, Mr. John Nash, head keeper of the Hampton Court estate, acting as guide.

Those who had followed the recommendations given in the Programme for the day were grateful for the instructions which were as follows :—"Members should read 'Risbury Camp,' by the late Flavell Edmunds, in *Transactions*, Vol. 1868, page 19. See also *Transactions*, Vol. 1885, pp. 333 to 339, with a Plan and Section of the Camp; and, on page 340, a paper by Mr. T. Davies Burlton, on 'Some traces of Roman and Saxon occupation of the district of Risbury.'"

Risbury Court is situated below the south eastern corner of the Camp. The ascent was covered here along the outworks and deep ditch on the eastern side and the camp was entered by the original eastern entrance, which is situated in the middle of the eastern and other rampart.

At the request of the President Mr. Moore made some remarks on the formidable character of the earthworks, especially upon the western side at the base of which flowed the Humber brook, and the Holly brook upon the northern base, flowing into the former at this north-western angle of the Camp.

Attention was called to the facts that the Camp stood upon lowland only about 400 feet above sea level and its command was limited only to this neighbourhood.

From Risbury Camp, the walk was extended southwards for another 2½ miles along Hill Hole Dingle and Humber Brook, and through the Deer Park to Hampton Court. Some fine trees in the Deer Park attracted attention. An ash tree was measured and found to have a girth of 19 feet 2 inches. A Wych Elm measured 22 feet 4 inches, both measurements being taken at 5 feet above the ground. Upon arrival at Hampton Court the members were received and hospitably entertained to luncheon by Mr. J. S. Arkwright, M.P., under whose able guidance the fine mansion and lovely grounds were inspected. A short paper was read on the history of the Court by Mr. R. H. George, of Croftmead, Kingsland.

SHORT NOTES ON THE HISTORY OF HAMPTON COURT.

BY R. H. GEORGE.

In the time of Edward the Confessor the Lordship of Leominster included the Great Manor of Leominster with its sixteen members, two other Manors, and Lands at Hampton amongst some twenty other places mentioned, and in Domesday Book Roger de Lacy is charged a rent of 13s. 4d., payable to Leominster, for Hampton Mappenor.

Townsend says Hampton was part of the domains of the Mortimers, and after the attainder of Roger Mortimer, the first Earl of March, in 1330, it passed to Richard Fitzalan, Earl of Arundel, one of the heroes of Crecy, who was unjustly impeached for treason in 1397, and executed, when Hampton reverted to the Crown.

The son of Richard, Earl of Arundel, was restored to his parental estates on the deposition of Richard II., but he died without

issue, and his sister Margaret married Sir Rowland Lenthall, who became Master of the Wardrobe to Henry IV. The Lady Margaret dying, Sir Rowland married Lucy Gray, daughter of Lord Gray of Codnor. Elizabeth, his daughter, married Sir Thomas Cornewall, Lord of Burford, by which marriage Hampton passed to the Cornewall family, who sold it to Humphrey Coningsby, a judge in the time of Henry VI.

Another account says that this estate consisted of two manors, viz., Hampton Richard and Hampton Mappenor, and that it belonged to the De Hamptons in the time of Edward II. This does not quite agree with Townsend's account but the difference is not very material, as in all probability the owner of the property would be styled De Hampton in virtue of its ownership, in addition to, or instead of, any other surname he may have had.

According to this version, John De Hampton held Hampton in the reign of Edward II., and resided in his capital house of Hampton. He gave the profits of certain lands to the church of St. Leonard, at Pyon, to be received at Michaelmas yearly at his said house at Hampton. I cannot trace the church of St. Leonard at Pyon. King's Pyon church is dedicated to St. Mary, and Canon Pyon Church to St. Lawrence, but there may have been a chantry chapel in one of these churches dedicated to St. Leonard.*

Leland says, "Sir Rowland Lenthall being a gallant fellow, either a daughter or a very near kinsman of the King fell in love with him and afterwards married him, whereupon he had lands given to him and his heirs amounting to £1,000 per annum, amongst which lands he had Ludlow for one part. Sir Rowland Lenthall distinguished himself at the battle of Agincourt, and took many prisoners there, by which prey he beganne the new buildings of Hampton Court, and brought from a hill a springe of water, and made a little pool in the top of his house." It seems probable, however, that the building of Hampton Court was commenced by Henry IV. when he was Earl of Hereford, and finished by Sir Rowland Lenthall. Camden says: "Now the Lugg hastens to Wye first by Hampton where Rowland Lenthall, Master of the Wardrobe to Henry IV., who married one of the heirs of Thomas, Earl of Arundel, built a fine house, which the Coningsbies, a family of great note in these parts, have a good while inhabited."

Hampton Court was held by the Coningsby family until the last Earl, leaving two daughters, the Lady Margaret and the Lady

* Since writing the above I have ascertained that this must refer to a priory of Augustinians or "Black" canons, of the order of St. Victor—an expansion of a hermitage at King's Pyon, dedicated to St. Leonard de Pyona (see page 778 under "Wormesley" in Jakeman and Carver's Directory of Herefordshire, 1902).

Plate 27. To face page 379.

HAMPTON COURT. FROM A PRINT OF 1801.

Frances. The Lady Margaret dying childless, it came to her sister, the Lady Frances, who married Sir Charles Hanbury Williams, and her daughter brought the estate to Lord Maldon, afterwards Earl of Essex, whose son sold it to the ancestors of the present owner.

Stukely describes Hampton Court as "a fine seat built by our countryman, Harry of Bolingbroke, afterwards Henry IV. It is castle-like situated in a valley on a rapid river under coverture of Dynmawr. The gardens, very pleasant (the finest greens I ever saw,) terminated by vast woods covering all the side of the hill, whose wavy tops, when agitated by the wind, entertained the eye with a vast agreeable spectacle and verdant theatric concavity, as high and as far as you could well see. Here is a great command of water on all sides of the house for fountains, basons, canals. Within are excellent pictures of the Earl's ancestors and others by the best hands, Holbein, Dobson, Vandyke, Sir Peter Lely, etc. There is an original of the founder, Henry IV., of Queen Elizabeth, and the Duchess of Portsmouth. The windows of the chapel are well painted; some images of the Coningsbys."

The park is described as "eight miles in circumference, and containing 1,200 head of deer. There are lawns, groves, canals, hills, and plains. There is a pool three-quarters of a mile long, very broad, included between two great woods. There is a new river cut quite through the park, the channel of which for a long way together is hewn out of a rock. This stream enriches, with derivative channels, vast tracks of land before barren. There are new gardens and canals laid out, and new plantations, and timber in proper places to complete its pleasures. Warrens, decoys, sheep-paths, pastures for cattle and the like, entirely supply the house with all necessary conveniences without recourse to a market."

The mansion, grounds, and park are still amongst the finest in England, and certainly one of the finest properties in the West of England. King William III. paid a visit to Hampton Court, and a room is still kept in the same state as when he occupied it. George I. created Thomas Coningsby a Baron, and afterwards Earl Coningsby, and his daughter Margaret a Baroness and Viscountess Coningsby, of Hampton Court. Sir Thomas Coningsby founded the hospital at Hereford which bears his name, and several of the family represented Leominster in Parliament. The Coningsby Hospital is the only Military Order in England, and was endowed for the support of worn-out soldiers and superannuated servants. The owner of Hampton Court is Commander of the Hospital, and is so addressed by the pensioners, who receive the sum of a guinea

each per month. The pensioners, or servitors are ten in number, presided over by a Corporal, who receives £20 per annum, and there is also a Chaplain.

The Lord Coningsby of the first quarter of the eighteenth century must have been a very combative individual, and his lawsuits included one with the Crown, which lasted for twenty years, as to his right of presentation to the living of Leominster, and also all the other Churches and Chapels which were attached to the ancient Manor.

He collected a great mass of records, etc., for the futherance of his cause, and preserved them in a room, which he called the Evidence Room, at Hampton Court. Stukely says the transcripts of these records cost his lordship £500 in writing and fees.

The present owners of the property have always identified themselves with every movement for the welfare of their neighbours. The late Mr. J. H. Arkwright was a keen sportsman, a good landlord, and an accomplished musician, and was Lord Lieutenant of the county. His son, the present owner, is M.P. for the city of Hereford, and has made a name for himself in the sphere of literature. I can be allowed, perhaps, to express regret that, with his great literary skill, he did not undertake to prepare a fuller and more descriptive paper for our meeting to-day than, with the meagre materials at my disposal, I have been able to compile.

Sir James Rankin thanked Mr. George for his paper and Mr. Arkwright for his hospitality. In reply Mr. Arkwright acknowledged his delight in welcoming the Woolhope Club, and the party divided into two sections, were alternately conducted over the interior by Mr. Arkwright, whilst the other section were enjoying an ideal summer afternoon in the delightful garden.

The refreshed party, leaving Hampton Court, crossed the river Lugg by the Lawn Bridge ; a private bridge in the grounds, and after ascending the well wooded Dinmore Hill, rested on the summit to hear the following paper read, in the absence of the author, by Sir James Rankin.

USEFUL AND INJURIOUS INSECTS.

By Walter E. Collinge, M.Sc., F.Z.S.,
University of Birmingham.

At the present day there is a wide and ever-increasing interest in agriculture and horticulture, in its scientific, commercial, and what I might term its pleasurable side. And just as it is important to know something of the methods of cultivation and of those processes which favour the growth of the plant, so it is equally important that all who are engaged, either as professionals or amateurs, in the subject, should know something about the diseases of plants.

Ever since man cultivated certain plants for purposes of food, clothing, decoration, etc., we know that they were attacked by diseases, very many of which were caused by insects. At the present day this subject is recognised and carefully studied by all thoughtful and far seeing people who are interested in plant life, but it is only comparatively of recent years that the subject of Economic Entomology has received the attention that so important a study demands and merits. Indeed, we in this country are far behind many others, and not until we more fully realise that our field and garden crops suffer to the extent of from 25 to 75 per cent, of their value by the attacks of insects, that our live stock are seriously impaired, that stored grain, timber, and other products of great commercial importance are seriously injured, and that we ourselves are suffering from diseases disseminated by insects, will the subject receive the thorough attention it deserves.

It will thus be seen that the subject is one of great scope and importance, as well as of great interest, and in the present days of farming, gardening, and commercial competition, the part played by insects is now recognised to be one of prime importance. No student of agriculture, and no one who gardens for profit, can afford to neglect this study, for the successful agriculturist and horticulturist must not only be able to grow crops, but he must be able to obtain the largest possible yield by protecting his crops from the damage and destruction caused by insects and other pests.

In order to combat successfully these pests, it is necessary that we should know something about them, their habits, methods of attack, where they live, their migrations, when they appear, and why they become destructive. Without this knowledge it

is almost useless to expect any good results from the steps we take to destroy or hold them in check. With a full knowledge it is often possible to devise simple means for checking them or stamping them out almost entirely, or even possible to prevent their coming.

In practically every civilised country except our own the subject is being entered into with energy and enthusiasm, with what results all who are interested in agriculture and horticulture know only too well.

It is only by long and patient study that we can arrive at proper conclusions respecting the value of those insects which are termed useful, and the seriousness of the harm done by those termed injurious.

It has been estimated by Dr. Howard that of the three hundred families into which we can divide the different orders of insects, 113 are beneficial, 116 injurious, and 71 both or undetermined.

Insects are useful as destroyers of injurious insects and noxious plants, in the pollination of plants, in destroying dead and decomposing matter; they are also used as food by man and other mammals, birds, amphibians, and fishes; they are employed in clothing; and, finally, are used in various ways in arts and commerce.

It is as destroyers of injurious insects that I wish to bring before you their useful side. In this respect they are perhaps greater benefactors than in any other. The subject of insect enemies of insects is now of the greatest importance. In the United States of America it has received a large amount of attention, insectaries have been established and many insects—particularly Scale insects—held in check or almost exterminated.

The results that have been achieved in America are little short of marvellous, and read more like a fairy tale than the sober facts of science. One by one the original home of different injurious insects has been run down, and its natural insect enemy or enemies discovered. These latter have then been shipped to Washington, bred, and distributed, with the results that some of the worst pests have been held in check, whilst in certain districts they have been almost exterminated. In the Californian fruit-growing district the well-known Cottony Cushion Scale (*Icerya purchasi*) has been held in check by a small Australian Ladybird (*Vedalia cardinalis*). Before the introduction of this small beetle the citrus industry of California was threatened. In a like manner various aphids, the Black Scale Mealy Bugs, Red "Spider," the Tent Caterpillar, the Cabbage Butterfly, and many other insect pests have been

attacked. So successful has this method proved, that a member of the Californian State Commission of Horticulture recently stated: "This method has been found so effective that we have now very few really troublesome orchard pests, the worst at the present time being the Codling Moth, and for this we hope to find a natural Check."

In California the method employed has been as follows: An endeavour is made to trace back the course travelled over by the pest, and to trace them to their native country; there the check is to be found. This check, whether it be a parasitic or a predaceous insect, or both, as sometimes found, is secured, introduced into the insectary, and bred with care. It soon becomes acclimatised in its new home, and as the species progagates itself it is sent out into those sections of the country where the pest it attacks is most prevalent. So effective has the work of introducing beneficial insects and encouraging native parasites been, that in California they have practically reduced all the worst of the Scale insects and very many other injurious species, so that they are no longer a source of serious danger.

Turning next to a consideration of those species which are injurious, we may group them under four headings, viz.: (1) Those that are concerned in the destruction of plant life, (2) Those that are concerned in the destruction of stored goods, (3) Those that are concerned in injury to live stock, and (4) Those that are concerned in injury to man.

The loss that injurious insects inflict upon our crops and forests is enormous. Many years ago Dr. Riley estimated the average damage to crops in the United States af nearly £60,000,000 per annum. In this country it is no unusual thing to find injury to the extent of 25 to 50 per cent. of the crop, whilst in other cases it is much beyond that. Curtis records that in 1786 the turnip crop in Devonshire suffered to the extent of £100,000 owing to the injury caused by insects, and about the same time the Turnip Saw fly destroyed thousands of acres of turnips in Norfolk, and again in 1835. In 1881 the Turnip Flea Beetle did damage to the extent of half a million sterling in this country, and in 1882 the Hop Aphis caused a loss of over a million and a half sterling. These cases might be multiplied to almost any extent, although most of us are aware of the seriousness of the situation. With the advance that has been made in our knowledge of the life history of the different species and the improvement in our methods of attack, there is every reason to expect that the farmer and fruit grower will suffer less if he takes advantage of the known preventive and remedial measures.

Conspicuous among remedial methods is the practice of spraying. It is no longer an experiment, the practice of thousands of growers in this and other countries has clearly and conclusively demonstrated its value, so that it is becoming a regular part of the farm operations of the successful farmer and fruit grower. In this connection it is most important to remember that syringing or squirting a liquid upon a tree is not spraying. The fluid must be broken up into a fine mist, further it must be "a limpid liquid so prepared and maintained that it is free from all solid or semi-solid particles that can obstruct the easy passage of the liquid through the small orifices of the spraying machine. A spray fluid ceases to be a spray fluid the moment it becomes contaminated."

Thanks to recent experiment and research it is now possible to destroy by spraying the eggs of most insects, and what is now termed winter spraying will undoubtedly become as common a farm practice as ploughing or manuring.

The injuries effected through the agency of insects upon live stock are of an extensive nature. The aggregate loss occasioned by the Ox Warble flies (*Hypoderma lineata* and *H. bovis*) in England has been variously estimated at from £2,000,000 to £7,000,000 per annum. The Sheep Maggot Fly is another insect which causes considerable loss but I am not able to give any exact figures. The Gad flies (*Tabanidae*) and Bot flies (*Oestridae*) are further examples of insects causing considerable losses to stock breeders and feeders, whilst there are a large number of what may be termed minor pests, such as fleas, the Flesh fly, Stable fly, Sheep "Ked," etc.

The injury occasioned to man by insects has during the past few years received special attention in view of their great importance as carriers of disease. Recent research has shown that such diseases as typhoid fever, anthrax, plague, cholera, enteric fever, etc., are disseminated by certain insects, whilst gnats or mosquitos convey from man to man the parasites which give rise to such diseases as malaria, yellow fever, sleeping sickness, filariasis, etc.

One of the chief agencies in carrying disease-causing organisms from infected to uninfected animals is the common House-fly, and it does not seem unlikely that ere long our Departments of Public Health in all our large towns and cities will take this matter in hand with a view to preventing the wholesale breeding of these pests.

During the past few years we have begun to realise the seriousness of the situation and how important it is that we should possess a thorough knowledge of all those insects which are carriers of disease. To a nation which possesses great Colonies in almost

every part of the world, it is doubly important that we should have this information and know how to treat such diseases and their cause. In not a few cases it has been shown that by removing the breeding grounds of certain insects it has been possible to control and greatly reduce certain diseases. Apart from the awful loss of human lives, many of the diseases to which domestic animals are liable in tropical countries are due to parasites carried by insects. "The old idea," writes Mr. Shipley, "that there is something unhealthy in the climate of the tropics is giving way to the idea that the unhealthiness is due to definite organisms conveyed into man by definite biting insects."

Time does not permit of my entering into greater detail, but sufficient has been said I think, to at least show that the subject is one that we cannot afford to neglect. From one of occasional and local importance it has grown to be one of constant and national concern, which must receive proper and adequate attention.

"It is our belief and hope," wrote Professors Miall and Denny, in 1886, "that naturalists will some day recoil from their extravagant love of words and names, and turn to structure, development, life-history, and other aspects of the animal world which have points of contact with the life of man." The change has been long in coming, delayed in no small measure by the one-sided nature of the teaching of Biology in our Universities and University Colleges, but now twenty years after the above words were penned there are signs that there is a greater and wider interest in what I may term "living natural history," and no department, to my mind, offers a more entrancing field of study than that of Economic Entomology.

As yet in this country we have scarcely realised the importance of the subject, but there are signs that things are changing and that a new order of entomologists is rising who are not content with, indeed, take very little interest in, the collecting and naming of specimens, but desire to know something of the wonderful story of the life history and habits of insects and the part they play in life. The study of living insects—and of all other animals—is far more fascinating and profitable than that of their dead or preserved remains. As Professor Miall has very pertinently remarked, "Morphology is very well; it may be exact; it may prevent or expose serious errors. But morphology is not an end in itself. . . . . Surely our chief reason for studying animals ought to be that we would know more of life." Here, to my mind, is the key note of all natural history studies, to know more of life, the mode of growth of individuals, the different stages they pass through and why, their adaptations to their surroundings, the methods

of defence and protection, the care of their progeny, and a thousand and one other facts which can only be learnt from the patient study of the living organism. No group of animals offers such wonderful field for such study as Insects, and if I can induce but one member of this club to turn his attention to such, I shall feel more than repaid for any little effort made on my part.

At 5 o'clock our party sat down to further refreshments at the Railway Inn, Dinmore Station, where the Report of our Delegate Rev. J. O. Bevan to the Meeting of the British Association at Leicester was read :—followed by " Notes on the use of the Microscope in the study of Mollusca " by Rev. E. W. Bowell, M. A. of Penshurst, Tonbridge, Kent.

The members and visitors returned by the train leaving Dinmore at 7.3 and reached Hereford before 7.30.

The Rev. J. O. Bevan, the club's delegate to the Leicester meeting of the British Association for the Advancement of Science, presented his report on the meeting, as follows :—

I have the honour to furnish my report of the late meeting at Leicester of the British Association for the Advancement of Science. The members were warmly received, and all the arrangements for the meeting were admirably carried out by the local authorities. I have already dispatched to you the Journals, Presidential addresses, and other printed matter relating to the gathering. The General Presidential Address, by Sir David Gill, dealt with his own particular subject (astronomy), and was necessarily technical in character. Although no startling discovery in any branch of science was announced, the papers in the various sections were of exceptional interest and merit. In Section A Lord Kelvin and other eminent physicists discussed the Atom; and, in the same section, Sir William Ramsay gave an account of certain phenomena connected with the decomposition of radium. Newspaper reports have been sent to you of the sectional proceedings. The Conference of Delegates was held on Thursday, August 1st and Tuesday, the 6th. At the first session the Chairman, Mr. Mackinder, opened the proceedings by an address, of which an abstract is furnished herewith. He advocated Regional Surveys and the study of plant associations. A paper was then read by Mr. Bullen on " The Advisability of Appointing a Committee for the Photographic Survey of Ancient Remains in the British Islands." Both these subjects were discussed. They would have a special interest for our members.

At the second session, in the absence of the Chairman, your delegate, as Vice-Chairman, was called upon to preside. Mr. Carleton Rea opened a discussion in support of " A plea that local societies should give greater attention to the investigation of the fungi occurring in their districts, with suggestions for the encouragement of the study of this group." This subject would naturally recall the attention of members of our club to the Fungus Forays carried on aforetime in the neighbourhood of Hereford, and would serve, perhaps, to stimulate an interest in their continuance. At this gathering, various suggestions were made by representatives from the various sections, but most of these are covered by the notes of my opening address, which I, therefore, venture to append to this report. The Corresponding Societies' Committee would desire that I should earnestly call upon the club to take what share it could in the prosecution (especially) of the work suggested by Mr. Mackinder and Mr. Bullen. I may add that information as to the presentation of photographs of ancient remains can be obtained from The Recorder of Section H (Photographic Committee), British Association, Burlington House, Piccadilly, London, W.

Mr. Bevan's address was in the following terms :—No one denies that more might be done to stimulate local societies into greater active interest and concerted action. Certainly, these bodies possess the requisite facilities for carrying on work of a scientific nature. They have the men, the means, the money, the local knowledge, and the opportunity for work, for counsel, and debate. If these local societies fail the British Association, on what support can that body fall back ? A wide field stretches out before them, a part of which is dealt with, more or less systematically —a further portion being still unexplored. In our democracy of science, that which is designed by one individual society should be made known unto all, so that what is done might be done on similar lines. Co-ordination, co-operation, communication should be our battle cries ! An ideal clearing house is furnished by the British Association for the Advancement of Science; rather this would be the case if corresponding societies and their respective delegates realised their duties and carried out their obligations. These conferences have now been held for twenty years or so. Societies, representing some 70,000 constituents, have joined the union. A new departure has recently been made by the admission of " Associated " Societies on less onerous conditions than those imposed in the case of " Affiliated " Societies. Are the results of our deliberations commensurate with expectations naturally based upon these figures ? Unfortunately, the answer is in the negative. There has been a slackness, a lack of cohesion and application. One

cannot say that the Standing Committee is blameable. The members of that body would gladly be placed in a position to do more. The primary evil lies in the fact that the corresponding societies do not take sufficient interest in *original* work and investigation—they do not put a definite end before them, such as may be warranted by local conditions. They suffer the mixed multitude which constitutes a considerable proportion of their clientèle to leaven the lump. Some societies go to sleep in the summer—others, in the winter! The committees do not provide for continuity of office in respect of their delegate, and do not promptly decapitate him if he fail to attend the meetings of the Conference, and (on his return) present a succinct account of the proceedings both at the sectional gatherings and at the Conference itself. On the other hand, it may be that the delegate, full of zeal and energy himself, is unable to set on fire his secretary and committee. It is not as if abundance of work did not lie ready to our hand. There is much that is Observational—in respect of geological sections and borings, meteorological, tidal, phenological, anthropometric and folk-lore records. Catalogical—in its essence, archæological, botanical, biological, regional. Industrial—in regard to re-afforestation, return of nitrogenous substance to the soil, life-history of food-fishes, quantitative movements of tidal, river and underground waters, conservation of the line of coast against erosion. Inventional—dealing with such subjects as precipitation of nitrogen from the atmosphere, to ensure a fitting supply of food for the generations still to come; precipitation of oxygen etc., from the two atmospheres of air and water to furnish supplies of heat when our woods are cleared and our coalfields, etc., exhausted. Educational—putting all teaching on a scientific basis, introducing set scientific subjects, in a suitable manner, into the curriculum of secondary and elementary schools, stimulating original research in Universities and University Colleges. The application of the latter subject is of such immediate interest that a special point may be made of it. Speaking generally, what is desiderated is not so much the cramming of the young or immature mind with formal science, or with series upon series of isolated facts, under the impression that one is teaching chemistry, physics, agriculture, domestic economy, and the like; but the free experimental, connected, open-air treatment of natural objects and phenomena, so as to develop an interest in nature—a love of nature—and a power of close, persistent, patient, and (consequently) correct observation; eventuating in clear, precise, inclusive, expression; of practical aptitude in measurement, in weight, and in the recording of results—whereby a scientific spirit and temper may be induced. During the last 35 years Acts of Parliament have been passed which have transformed the whole field of education. Under these Acts, Local Education Authorities

have been instituted, armed with enormous power and furnished with ample means. It is important to bear in mind that one-third of the population of this country consists of children under 15 years of age, also, that over 7,500,000 pupils attend the elementary schools alone, at a cost to the rate and taxpayers of £21,000,000 annually. In one community alone, that of London—there are about 760,000 names on the full roll attending the primary schools. Furthermore, secondary schools are now involved more closely than before—for good or evil—in the State system; they receive a proportion of their scholars (sometimes up to 25 per cent.) from the primary schools; and, under certain circumstances, are aided by imperial and local grants. May a suggestion be permitted that the members of local societies should take a special interest in the schools in their neighbourhood, of every grade; and should even go so far as to provide for the co-optation of a representative on the managerial body or on the Local Education Authority, so that the interest of true and simple science should not be thrust aside or neglected? I am conscious that nothing in my work or position justifies me in offering advice to the Delegates, or in distributing praise or blame. I may claim, however, a certain immunity from censure, inasmuch as I am a constant attendant at these gatherings, and have always taken a lively interest in the proceedings; it is evident that none of us is satisfied with the outcome of our Conferences, or with the amount of influence exerted collectively, or individually, upon the societies we represent. It must be allowed that the time allotted is all too short for deliberation, that the Conferences are conducted at a period of the day when one is wearied with the serious work of the sections, and legitimately anxious to listen to the voice of the charmers luring us away to some social function. Our discussions are sometimes discursive and pointless for lack of a definite topic to take up and quarrel about. The information and requisitions vouchsafed to us by those who come officially from the sections at our second session, need to be dealt with more impressively, and persistently followed up, so as to gain the assurance that the recommendations are really communicated by the respective Delegates to their Societies, and efforts made to follow them up where practicable. When our work at the Conference is over, it is really only begun. We should hammer away at our Societies, and make ourselves a nuisance to the Committee until they are incited to take suitable action. The stagnant waters were moved at the Glasgow meeting by a discussion which revealed the necessity for Regional Surveys and the like. Different gentlemen gave in their names as willing to furnish initial information to those wishful to undertake a share in this work—but the result has been infinitesimal. Do not, however, let us despair, but gird up our loins for further exertions. The Council is anxious to bring

about a closer connection between the Conference and the Committees of Sections, and to involve, more directly, their own representatives in the deliberations and work of the Corresponding Societies Committee. This is a good sign, and a guarantee of greater efficiency for the future; but, after all, the point to be arrived at is that we who are Delegates, should realise our individual responsiblity, and seek to maintain touch between ourselves and our Societies on the one hand, and, on the other, between our Societies and the great Association to which we have the honour to belong.

THE PENNINES.

By T. Howse, F.L.S.

Who, but the sportman, visits the Pennines? And yet the hills are nearly as high as those of Lakeland. Crossfell is 2,900 feet high, only 200 feet lower than Scawfell. And the average height of the chain is higher that that of the Lake hills. The Pennines rise to 2,000 feet, for at least twenty miles without a break.

But there are no lakes, no hotels, and no convenient railway stations nearer than Appleby, which is four or five miles from the foot of the hills. And yet the Pennine range is interesting in many ways especially to the geologist, who sees in the great Pennine fault the most remarkable instance of downthrows and denudation in England. More than 20,000 feet has been removed by denudation during the Old Red Sandstone period, and the soft red sandstones and conglomerates of the Permian and New Red Sandstone have been let down between the Palæozoic rocks of the Lake hills to the west, and the Pennines to the east, forming the valley of the Eden.

The general aspect of the Pennine chain reminds one of the Southdowns, but on a larger scale. The range presents the same rounded, grass-covered swelling downs, but is at least twice the height of the Southdowns, and is relieved from monotony by numerous scars of carboniferous rock and volcanic dykes and sills on the western scarp of the range. The most conspicuous of these scars is the Melerby scar, limestone, whose white cliffs are seen running along the hills for many miles.

A striking feature of the range near Appleby is the outlier of the lower palæozoic rocks, Ordovician and volcanic. This outlier is split up into pyramidal hills by cross faults, and forms the picturesque volcano-like summits of Dufton, Murton, and

Knock pikes. Fine views of Lakeland, with Helvellyn, Skiddaw, and other hills, may be obtained by ascending these pikes.

Some of the side valleys of the Pennine range near Appleby, especially High Cup Valley, are very picturesque. This valley is terminated by a cirque of carboniferous rock, through which runs for miles a sill of volcanic rock, called the Whin sill. This volcanic rock produces metamorphism on the rocks with which it is in contact, altering the limestone to a crystalline, marble-like rock.

There are many interesting glacial phenomena in the district. Moraines occur in the side valleys, and the valley of the Eden is bordered with drumlins—cigar shaped ridges of glacial origin—resembling eskers, but not stratified as are eskers. The drumlins are supposed to have been formed in the same way as are roches moutonnées, by the passage of the glacier. But the drumlins are moulded from the lower part of the glacier charged with débris by the more quickly moving upper stratum of the glacier.

Boulders occur frequently; gabbros from the Carrock fells, and granite from Shap. The central mass of Shap granite sends out runners in many directions. There is one on Dufton pike with large flakes of mica, sometimes perfectly hexagonal. The Pennine range is by no means a dry country, but I consider it less rainy than the Lake hills, which intercept many of the showers from the west.

The flora of the western side of the Pennine range is poor and limited; but when the watershed is passed many interesting Alpine plants occur, especially in Teesdale. This is probably owing either to seeds having been wafted accross from Scandinavia, or to plants having travelled across on the old Scandinavian glaciers.

As I have already stated, there are no luxurious hotels in the district. There are fairly comfortable hotels in Appleby, and the naturalist may find clean beds and plain, wholesome fare in the villages at the foot of the fells, especially in Murton, Dufton, and Hilton.

INSECT PESTS IN THE MIDLANDS.

INTERESTING EXPERIMENTS.

In the course of conversation with one of the large fruit-growers in the Vale of Evesham last week, a representative of the "Post"

had his attention called to the remarkable success which had attended the experiments made by Mr. Walter E. Collinge, of the Birmingham University Department of Economic Zoology, in dealing with insect pests in the Midlands. These experiments have been in the direction of the winter spraying of fruit trees, and in view of the interest they have excited, our representative called on Mr. Collinge yesterday, and had an interview with him on the subject.

Hitherto, Mr. Collinge said, fruit-growers had looked with some amount of suspicion upon the practice of spraying, and had questioned whether it was worth the expense. He was not surprised at that, for nearly all the spray-fluids of the past had been mixtures which had never been carefully experimented with, and the results tabulated and checked. The practice of plant spraying as a remedy for diseases dated back to the early part of the sixteenth century, but it was only within comparatively recent years that it had been placed upon a sound and scientific basis. It was in 1898 that Mr. Collinge took the matter up. He had received from people many enquiries which had an economic bearing. The resulting research so interested him that he took the subject seriously in hand, and he soon found that there was an enormous field open to him. Just at the time he received a communication in regard to the black currant mite, and it was on that particular pest that his first experiments were made. Until October of last year be carried on the work during any spare time he had apart from lecturing and his ordinary University duties; but the work grew so, that to carry it on was impossible without a separate department, and such a department was established in connection with the University.

"It is very important to remember," said Mr. Collinge, "that syringing a tree or squirting on a liquid through a hose is wasteful and seldom efficacious. The fluid must be broken up into fine mist, and must be free from all solid particles. Some years ago I was appealed to by several Midland fruit-growers to take this matter up seriously and commence experiments with a view to discovering a winter spray-fluid that would kill the eggs of insects and mites found upon fruit trees at that time. A series of experiments was commenced, and as a result, in November, 1906, I issued a circular giving the formula of the now well-known caustic soda emulsion. This has given splendid results. In orchards where the trees were covered with moss, lichens, and the eggs of numerous insects, it was applied in December, 1906, and to-day the same trees are perfectly clean and bearing more than an average crop of fruit. Here is the testimony of fruit growers from all over the county," said Mr. Collinge, pointing to a pile of letters.

Good as this fluid has proved, Mr. Collinge saw that further experiment would improve upon it. One of the difficulties in connection with it was that it was necessary to have a carefully prepared paraffin emulsion, and this had been and still was a stumbling-block to many would-be users. The next advance was the discovery of a mechanical process whereby a paraffin emulsion could be made that would readily mix with cold water, thereby saving the trouble and cost of boiling and mixing previously in vogue. This was a great advance, for, once having obtained such an emulsion it was possible to combine with it in a concentrated form various chemicals which are certain death to all insect eggs, fungi, lichens, moss, &c.

"The final result was the perfecting of two fluids which I have termed V. 1 and V. 2. The former is a fluid for applying to dormant trees, and the latter for use in the spring and autumn. After a long series of laboratory experiments V. 1 was tried in the open on several large orchards, and fully bore out the excellent results obtained in the laboratory. Of fifty-seven experiments made with the two flnids by different growers in various parts of Great Britain, not one has reported unfavourably. I believe now that the fruit-grower has a fluid which can be applied at a reasonable cost and with the maximum amount of good."

During the coming winter, Mr. Collinge stated that he hoped to see some thousands of acres of fruit trees sprayed with V. 1. He intends, he said, to personally superintend some of these, and, if necessary, would find the means to defray the cost. The matter was no longer an experiment. He was perfectly certain of the results, and that they would establish once and for all the practice of winter spraying as an ordinary farm operation just as ploughing, harrowing, manuring, &c. Naturally, such results had excited a certain amount of jealousy amongst those who for years back had been supposed to know all about insecticides and fungicides, but they had failed to advance the subject in any way that has benefited the farmer or fruit-growers.

Asked how we stand in this country as compared with the United States, Mr. Collinge said:—"We are very much behind the American fruit-grower, who has a magnificent national Department of Agriculture at his back, in addition to the different State Experiment Stations. We are certainly moving rapidly, and fruit-growers are awakening to the fact that not a few of their advisors in the past have been and are men with little or no practical knowledge of their subject. As I pass from farm to farm and orchard to orchard I am constantly hearing of cases where bad advice has been given. Further, they are realising that we are

doing our best to remove some of the difficulties with which they are daily confronted, and that we shall relax no effort and spare no pains until we have fully justified the confidence they have placed in us." He hoped in future to see the establishment of experimental farms with laboratories attached, so that investigation can be made and conclusive evidence tabulated on the spot.

Referring to the fact that he had seen cockroaches from Jamaica in Birmingham, Mr. Collinge said we had quite enough of our own pests without allowing the introduction of others from abroad. "The cockroach is a bug at large," said Josh Billings. Mr. Collinge pointed out that it readily adapts itself to any part of the world to which it may be conveyed in a cargo of bananas. He had also found live slugs in the roots of plants from Japan. This important subject of the importation of "undesirable aliens" was receiving the consideration of the Board of Agriculture. He was of the opinion that there should be places erected in which cargoes could be fumigated before being distributed. This was done in America, and it ought to be done in Great Britain.

NATURE STUDY.

To the Editor of the "Daily Post."

Sir,—As you justly observe, "education is a means, not an end, for those who have to make their way in the world," and after reading the letter on "Nature Study," which reveals so much joy, and sympathy with nature, we have it impressed upon us how much greater is our pleasure when knowledge enables us to discriminate between the varied charms of birds, trees, and flowers. True, the knowledge of nature, "or acquaintance with Cæsar, or Demosthenes, will not of itself enable anyone to earn bread and cheese." Yet few will contend with you in claiming that the training of mind which results from seemingly unnecessary studies has indirectly a great and important influence upon our success and happiness in life. We shall probably hear less of the deplorable conduct of town trippers when a better knowledge of nature prevails, and boys will have more respect for trees and shrubs when they are taught to know them, and learn the many indirect lessons which are to be derived from their study. To this end let our parks be more completely equipped with all that will aid education, for knowledge is not only power, it is often joy and happiness as well.

WILLIAM WHITE.

Birmingham, August 29, 1907.

THE BLACK CURRANT GALL MITE.

To the Editor of the "Daily Post."

Sir,—During 1905-6-7 I have gratuitously distributed upwards of 3,000 reports to different fruit growers in the British Isles giving particulars of the lime and sulphur treatment for the black currant gall mite. Many of these growers have since written me and stated that "the cure recommended has proved most successful," or "we are entirely free from 'big bud' now."

I propose issuing shortly a further report upon this subject in which many of these reports will be incorporated, and I write to invite all growers who have tried this remedy to write me stating upon how many acres of bushes they have tried it, with what result, and if they have any objection to their report being published with the others (not necessarily with their name and address).

WALTER E. COLLINGE.

University of Birmingham, Department of Economic Zoology,

August 29, 1907.

Woolhope Naturalists' Field Club.

ANNUAL MEETING, 17TH DECEMBER, 1907.

The Winter Annual General Meeting was held at the Woolhope Club Room on 17th December, 1907. Present—Sir James Rankin, Bart., (President), Revs. H. M. Evill, Preb. M. Hopton, Preb. W. H. Lambert, H. B. D. Marshall, W. E. T. Morgan, Capts. T. L. Morgan and Kilbee-Stuart, Messrs. H. C. Beddoe, C. P. Bird, J. Carless, R. Clarke, James Corner, P. Leighton Earle, F. S. Hovil, A. H. Lamont, T. A. R. Littledale, A. Watkins, and T. Hutchinson and H. C. Moore (Hon. Secs.), and J. B. Pilley (Assist. Sec.)

On the proposition of Sir JAMES RANKIN, seconded by Rev. PREB. LAMBERT, Mr. H. Cecil Moore was elected President for 1908.

The following four Vice-Presidents were elected :—Sir James Rankin, Bart. (the retiring President), Mr. A. B. Farn, Rev. H. E. Grindley, and Rev. Preb. Lambert.

The Central Committee, Editorial Committee, and other honorary officers were re-elected.

The Rev. J. O. Bevan and Mr. James G. Wood were re-elected delegates to the British Association and the Society of Antiquaries.

Mr. W. F. Dury and Mr. G. H. Jack were elected Members.

The Rev. F. MacCormick was proposed for membership.

The Rev. E. W. Bowell, M.A., was elected an Honorary Member.

Mr. MOORE reported that the volume of Transactions for the fourteen years 1852 to 1865, still remained in the hands of the book-binders, and could not be issued to-day. He presented the unbound volume containing pp. x.—392, with one illustration of the area affected by the earthquake of 6th October, 1863, and called the attention of the members to the resolution of December 15th, 1903 (see Transactions 1903, page 203), that the price of the volume was 5s. to members, to be shortly raised to 7s. 6d.

Amongst miscellaneous business, a letter was read from the Rev. J. W. Joyce, Vicar of Harrow, trusting that the Woolhope Club might make some representation to Messrs. Field & Mackay, as to the danger of obliteration of an ancient landmark on the top of Titterstone Clee, by the extension of blasting of the rocks in that famous Dhu Stone Quarry. This was referred to Mr. H. C. Beddoe.

MAMMALS OF HEREFORDSHIRE.

A letter upon this subject from Miss B. Lindsay, Osney, Oxford, authoress of the Mammals for the Victoria County History, Herefordshire, was in the hands of the Secretary, Mr. H. C. Moore.

INDEX

OF THE

TRANSACTIONS OF THE WOOLHOPE CLUB.

FROM APRIL, 1905, TO AUGUST, 1907.

Field Meetings

AND DATES OF ANNUAL MEETINGS FROM APRIL, 1905, TO AUGUST 29TH, 1907.

1905.

1906.

1907.

List of Meetings.

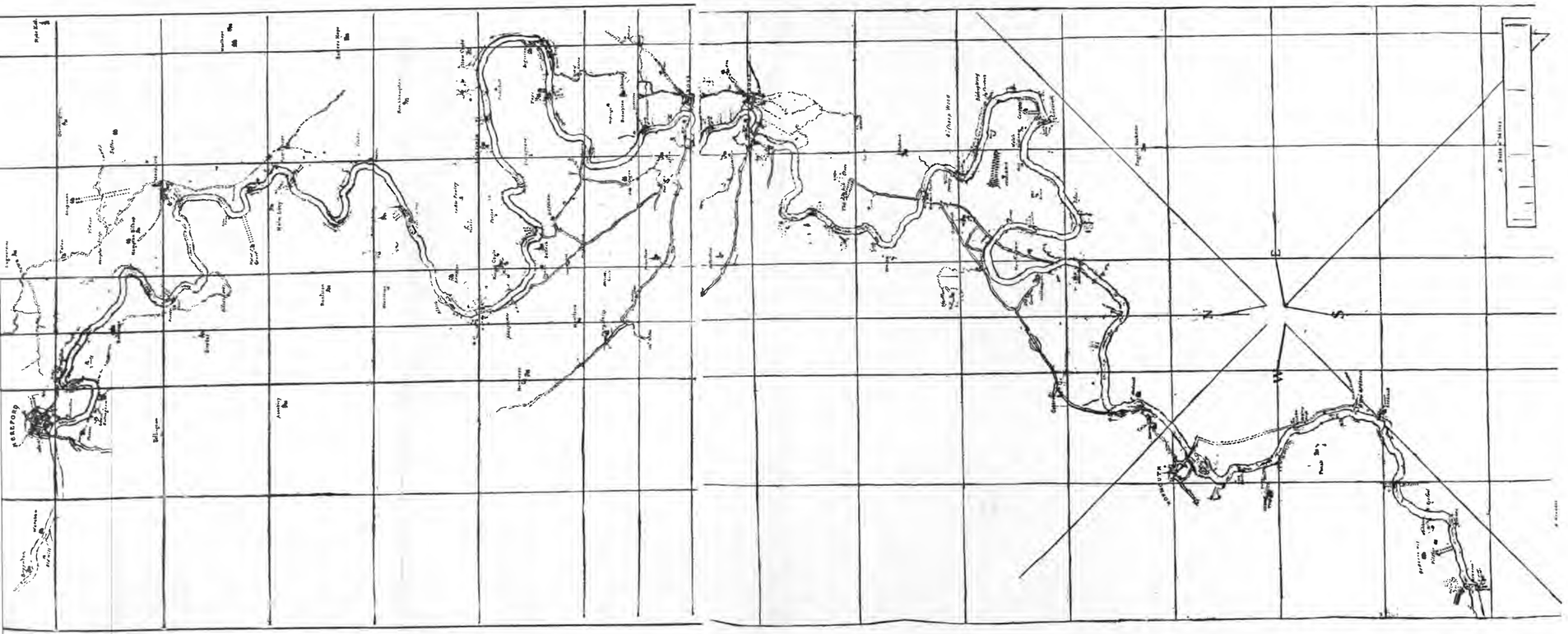
1905, 1906, 1907.

(*Arranged Alphabetically.*)

CONTRIBUTORS OF PAPERS, NOTES & COMMUNICATIONS, APRIL, 1905, TO AUGUST, 1907.

General Index.

From April, 1905, to August 29th, 1907.



A SURVEY OF THE RIVER WYE FROM THE CITY OF HEREFORD TO BIXWEAR.*

Shewing the different Falls, and where Locks should be erected to improve the Navigation.

By Isaac Taylor, 1763.

It ought to be carefully observed, in placing Locks on this River, to leave a sufficient bank above the surface of the water when the Lock is shut, that the common freshes may not affect the Meadows, and every flood cause an inundation. Five or six feet will be sufficient for this purpose, and though at two or three Locks there will not be more than four feet and a half, yet as the length of those Wears will be much greater than the common breadth of the River, it will not leave its channel, except at those times the general Rains fall, which is usually in February and November, when, as the waters will not run off with the rapidity they now do, they will much enrich the Lands. With this view, all the Locks are designed as low as possible (to answer the end intended) and are increased in number; otherwise 20 Locks would have been sufficient from Bixwear to Hereford, exclusive of New Wear, which is higher than any of the new ones will be.

The Salmon Wears should be 25 feet wide at least, and 15 inches lower than the level of the Wear, and I would propose that in the highest Wears a floodgate be placed at that end of the Wear opposite the Lock, to be opened occasionally, by which means I imagine all kind of damage may be prevented as well to the lands as to the Wear itself. And in order to keep the Wears as low as possible, the bottom of some Locks must be 18 or 24 inches below the surface of the present streams where they are placed, and in consequence it will be necessary to deepen the channel from the foot of some Locks into the dead or level water below, and in others to sink one entirely for the space of 20 yards; by these means every barge will pass from one Lock to another in two feet (at least) dead water, with a slight force 30 or 40 tons may be drawn by five or six men, the advantages of which are evident.

And whoever has seen a barge pass the Lock at New Wear when there is only a fresh in the river, will be convinced of the necessity there is of taking off the streams, as the water from the Lock and that from the Salmon Wear meeting forms an eddy below the Lock, into which if a barge falls she is in danger (if deep loaded), and many have been sunk; it is always with difficulty they are drawn out. Add to this, the expense

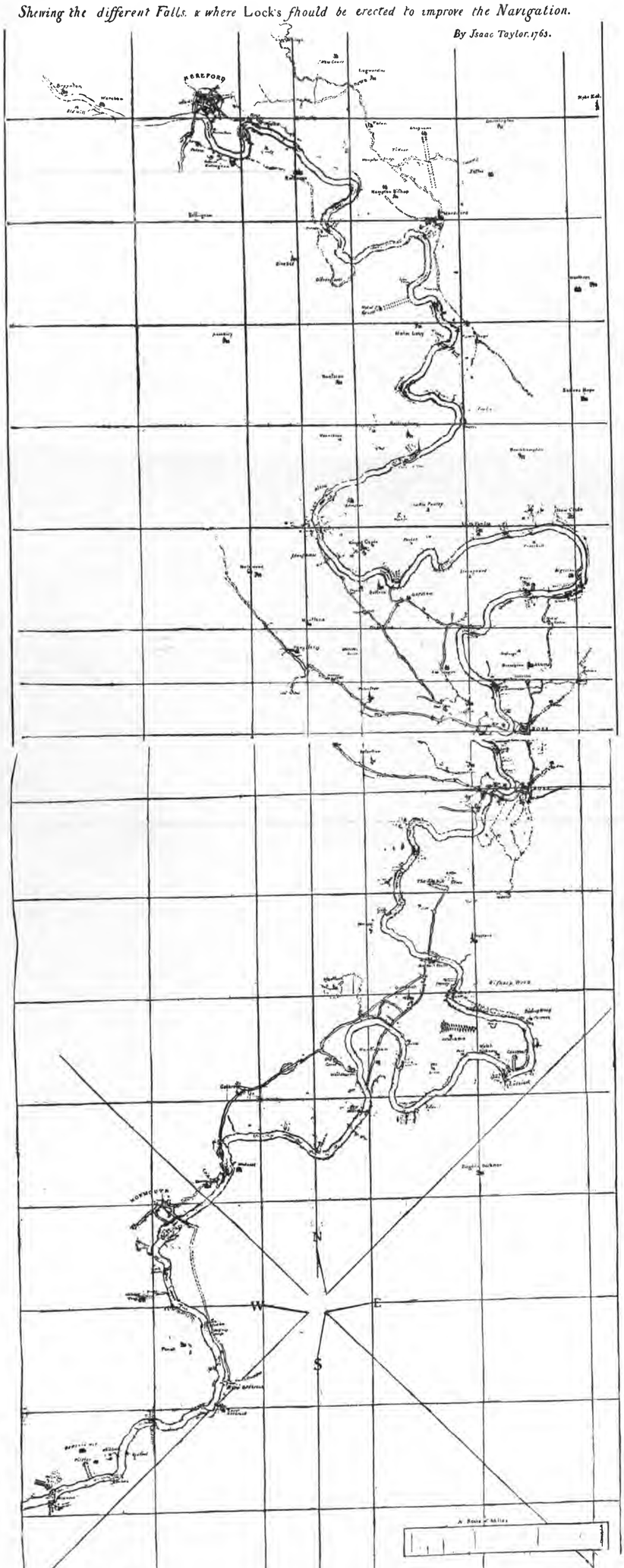
* In the re-publication of this Survey the spelling of the Proper names has been retained; but the language and spelling have, to a certain extent, been modernised.

A SURVEY of the RIVER WYE

From the CITY of HEREFORD to Bixwear.

Shewing the different Falls, & where Lock's should be erected to improve the Navigation.

By Isaac Taylor. 1763.



A SURV

FROM

THE CITY

Shewing the different

It ought to be ca

to leave a sufficient banl

is shut, that the comm

every flood cause an inu

this purpose, and though

than four feet and a hal

greater than the comm

channel, except at those

February and Novembe

rapidity they now do, th

all the Locks are design

and are increased in n

sufficient from Bixwear

higher than any of the r

The Salmon W

inches lower than the l

the highest Wears a fl

opposite the Lock, to b

all kind of damage ma

Wear itself. And in

bottom of some Locks

present streams where t

necessary to deepen the

dead or level water be

space of 20 yards; by t

to another in two feet (

tons may be drawn by

evident.

And whoever ha

there is only a fresh in

is of taking off the stre

the Salmon Wear meet

a barge falls she is in d

it is always with difficu

* In the republication of th
the language and spelling have

of every barge owner keeping a large cable rope which costs from £5 to £8, and also that of an additional number of men to manage the capstern, exclusive of the danger.

In the summer, when there is little water in the river to make head against the tide, it will, at spring tides, frequently flow three or four inches at Redbrook, and as the second spring tide after that which comes to Brockware reaches the foot of Bixwear (which I think is the fourth tide), the next goes over it, and it is five sometimes six tides before it leaves it below. Trows come or may come to Landoga for three or four tides every spring, and as barges may always pass and repass to Landoga where they may unload, but may go down to and come up from Brockware with the advantage of tide (except three or four of the neap tides), it seems unnecessary to place any Lock lower down than Bixwear, which I therefore call the first.

1ST LOCK.

Must be placed at Bixwear, four or five yards below the present Wear on the east side; the height of the Wear should be six feet five inches, but as the bottom of this Lock must be two feet lower, the depth of the Lock when the water is in will be eight feet six inches; the channel must be deepened two feet and a half about 18 yards below the Lock to deaden the stream when the tide is out. This Wear will throw the water over New Wear, within a mile of Lower Redbrook, the materials of New Wear with what may be found below will serve to raise this four feet. I would propose the Salmon Wear on the other channel almost on the other side the river, the expense of this Lock, £400; Salmon Wear, floodgate, and raising the Wear, £430; cutting the channel from the Lock, and laying the stones and gravel above to take off the weight of water, £40; total, £870.

2ND LOCK.

Should be placed near the bottom of a small fall, one mile below Redbrook on the north side the river; five feet and a half the Wear must be in height. This Lock may be built for £350. The Wear, &c., if built with stone, £490; but if with piles and wattle as New Wear, and clearing from the Lock, £460. This Wear will throw the water to the Half-way House, above Upper Redbrook, and as it is not possible to carry it more than 400 yards higher if this Wear were raised, I look upon this place the most proper to fix the 3rd Lock.

3RD LOCK.

This Lock will be most advantageously placed about 150 yards above the Half-way House, on the west side; the Wear should be near six feet six inches, to raise the water over the different falls to that immediately below the mouth of the Munnow, and will cost £430. The Wear, if built with stone, will cost £580; but if the rocks in the river are made use of and it is built in manner of New Wear, £490; removing rocks and deepening the channel, £50; £540.

4TH LOCK.

This should be fixed on the west side the river by a ledge of rocks; the Wear near six feet and a half high, and will raise the water near three feet at Monmouth Bridge. I have been particularly careful to remove this Lock as far from the Bridge as possible; had it been nearer at the bottom of the Islands, it would have raised the water so high up the Bridge as not only to endanger flooding part of the Town every rise of water, but would have affected private property much, and destroyed the wharfs and landing places entirely. Had it been lower, a Lock must have been not far above the Bridge, which would have been attended with many inconveniencies. This Lock will come to £430; if built in the common way the Wear will cost £500; removing rocks and clearing a channel, £60; £990. The same care has been used in respect to Wilton Bridge.

5TH LOCK.

Must be at the bottom of the fall at Hadnock, on the west side near the road; the Wear six feet three inches in height, and with the Lock will amount to £870; the channel from this Lock must be sunk two and a half feet for 15 yards, and from that depth to six inches for 40 yards farther, £100; £970. This and the four subsequent Locks will be near as cheap built with masonry on account of their vicinity to stone and lime quarries. The Salmon Wear on the east side.

6TH LOCK.

Must be placed five yards up the stream above Martin's Pool; six feet three inches the height of the Wear, and will throw the water within 50 yards of New Wear, so as not to flood the wheels of the forge by this Lock; all that danger, difficulty, and expense of going up and down the stream below New Wear will be avoided, especially if the Lock at New Wear be lowered at bottom six inches, which I would propose. This Lock will cost with the Wear and deepening the channel 15 yards £940; enlarging the Lock at New Wear, £250.

7TH LOCK.

Should be fixed 300 yards above Manox, near the bottom of the stream, the Wear six feet seven inches high, to go slanting across the head of the Island, and though a long one, as materials are plenty, may be raised for £500; the Lock and deepening the channel, £450; £950. This Wear will throw the water 100 yards up the stream at Ledbrook. The Salmon Wear near the middle near the Island.

8TH LOCK.

This Lock should be placed at the south end of the Wear at Ledbrook, which Wear will serve, if strengthened in breadth and raised four feet will throw the water 60 yards up the bottom of the fall at the Priory. This Wear will, when raised, be six feet six inches and a half,

and the bottom of the Lock must be two feet and a half lower than the water at the foot of the Wear. This Lock will cost £450; raising the Wear, &c., £400; forming the channel 230 yards, £150; £1,000. The Salmon Wear on the side next Courtfield.

9TH LOCK.

Must be placed two-thirds down the fall at the Priory on the east side the river, the Wear six feet five inches, which will raise a level water six inches over the fall at Goodrich Castle to the foot of a fall between Pencraige and the Callow, and will amount to £550; the Lock to £430; cutting a channel below 35 yards two feet four inches, £70; £1,050. The Salmon Wear on the west side.

10TH LOCK.

This Lock and Wear, six feet four inches high, will throw the water over Glewstone tenders and raise it twelve inches at the foot of Homford, and will cost £580; with removing some rocks and scouring the channel, the Lock, £390; £970. The Salmon Wear near the middle of the river.

11TH LOCK.

Should be placed at the middle of the cliff at Homford and below the rocks; though the river is not broad, the Wear must be 170 feet and slanting, made in the manner of New Wear, which may be done at the expense of £550, five feet five inches high; the Lock, £390; deepening below, £40; £980. This Wear will throw the water over the Ware End to the stream below Wilton.

12TH LOCK.

Must be fixed 350 yards below Wilton Bridge, 370 yards, the Wear four feet six inches, which will raise the water eighteen inches and a half at Wilton Bridge, and throw it 20 yards up the stream at Upper Sheepwash. Will cost, with scouring the channel 15 yards, £470; the Lock, £320; £790.

13TH LOCK.

At Upper Sheepwash, on the west side, five feet eight inches; if built with masonry as the Locks are will cost £520; the Lock £350, forming a channel from the Lock and also at Lower Sheepwash, about nine inches deep for 25 yards, £60; £930. Two quarries near, one of them close to the river.

14TH LOCK.

Must be placed about the middle of the fall at Foy, above the ford on the north side the river, the Wear six feet four inches in height, to throw the water over Ingeston Wear to Underhill Ford. Great part of the materials may be taken from the Wear above. This Lock I estimate at £400; the Wear at £440; deepening the channel 60 yards from the Lock, £70; £910.

15TH LOCK.

If placed at Underhill Ford on the north side the river, and the Wear five feet nine inches high, will raise over Stranguard Ford to the first ledge of rocks at the Goose-neck. This Lock will cost £380; the Wear and channel from the Lock, £510; £890.

16TH LOCK.

Must be at the Goose-neck on the north side the river, at the first and second ledge of rocks, the Wear six feet high. A channel must be cut from the Lock about 15 yards. This Lock will amount to £400, and the Wear with the channel £520; £920. This Wear will throw the water 20 yards up the stream at Horewithy.

17TH LOCK.

Near the bottom of the Lower Common at Horewithy, the Wear five feet nine inches high, and will raise the water almost to the Wear at Cary Mill. Materials for this Wear are in plenty below, and also a quarry near the river side. This Lock will cost £370; the Wear, £510; cutting a channel two feet three inches deep 25 yards, and scouring it for 30 yards farther, £70; £950.

18TH LOCK.

This Lock should be fixed at the north end of Cary Wear, the old Wear will serve when increased in breadth and raised to six feet three inches, which will throw the water over Hancocks Wear to the rocky Wear under the Cliff near Fownhope. A quarry is under Capler, over the river, which will serve for this and the Locks above. This Lock £400; the Wear and deepening the channel, £540; £940.

19TH LOCK.

This Lock should be fixed below the turn of the river to the west of Fownhope, the Wear five feet nine inches high. I would propose may be built on a ledge of rock which lies extremely well for the purpose. The Lock on the north side the river, and may be built for £380; the Wear, £490; channel below the Lock, £60; £930. This Lock will raise the water to near the mouth of the Lugg.

20TH LOCK.

Must be placed near 120 yards below the mouth of the Lugg, to the west side the river. The Wear should be five feet ten inches at least to throw the water to the stream at Dineder Court. The Lock will cost £400, the Wear £520, clearing the channel 15 yards £20; £940. This Lock will be of singular advantage to the navigation of the Lugg, as I apprehend it will make a level water a considerable way up.

21ST LOCK.

Should be fixed near Dineder Court, the Wear five feet seven inches high, and will raise the water to the bottom of the stream at Eyne. The Lock I estimate at £380, the Wear built in the usual way £500, cutting a channel near 40 yards £50; £930.

22ND LOCK.

Must be near the bottom of the fall at Eyne, below the rocks, the Wear six feet high. This Wear will raise the water four or five inches at the bridge at Hereford. The Lock will cost £390, and the Wear £500, deepening the channel below the Castle Green at the Lock and above Rotheras £130; £1,020. Total, £20,900.

The above Estimate has been made with the utmost care, and I may venture to affirm does not exceed the truth. I should have mentioned above, the length of each side Pier to the Locks will be 80 feet, and 66 feet in the clear when the gates are shut; 17 feet is allowed for the breadth of each Lock.

NOTE.—The length of a common Barge from 18 to 20 tons is 50 feet breadth 11 feet.